Additional Submission To

Government Administration Committee ‘B’ Sub Committee Inquiry Into Blueberry Rust

July, 2018

Executive Summary

An executive review of all public evidence presented to the Legislative Committee B Sub Committee Inquiry Into Blueberry Rust July 2018, has been undertaken and the following points are relevant:

Breach of the Plant Quarantine Act 1997 by the Costa Group (namely non-timely notification of the incursion in 2016) has never been pursued.

Lack of transparency in dealing with the List A pest incursion of blueberry rust by DPIPWE and Biosecurity Tasmania in the decision-making process by;

(a) No initial economic analysis undertaken
(b) Biosecurity Tasmania website listing incorrect and misleading information
(c) Macquarie Franklin report, obtained by Freedom of Information process, with no references listed

Total disregard by DPIPWE and Biosecurity Tasmania of any national or international evidence regarding blueberry rust on:

- Spore dispersal
- Spore longevity
- Other plants affected
- Humidity relevance on spore production
- Leaf management

Complete oversight of expertise outside of Tasmanian Institute of Agriculture and the Costa Group to provide an alternative view.

Total disregard by DPIPWE and Biosecurity Tasmania for any evaluation procedure on eradication for the 2016 incursion which was very small in context at the time. In the early stages would have been of minor economic loss to the Costa Group.

Future Solutions

Eradication is still required as a measure to protect Brand Tasmania and restore our national and international credibility.

The review of measures which are aiding dispersal from the Costa Group property at Sulphur Creek require further scientific investigation and if need be tightening of the Plant Quarantine Regulations.

Review of bee pollinators and their effects on agriculture and if the transfer of pests in hives moves across the state.

Education programs regarding visitors in vehicles, clothing and people to assist with prevention of future incursions.

Management by protocol and physical inspection of new plant material as the trend is showing old cultivars in current Tasmanian orchards are being replaced with new genetics. Management of germplasm rather than refusal of new germplasm.

Introduction of property identification in new legislation in the Plant Quarantine Act to provide a registration requirement for all persons producing and selling plants to enable traceability for future Biosecurity incursions.

It is important to review the legislation concerning ***Thekopsora minima*** - blueberry rust in detail.

Blueberry rust is a legislated List A disease. The **Plant Quarantine Act 1997** (Appendix A) determines that a List A disease is declared as follows under Section 11, 12 and 13.

11. Declaration of List A and List B diseases

(1) The Secretary, by public notice, may declare-

(a) a disease to be List A; or

(b) a disease to be a List B disease.

(2) The Secretary may amend or revoke a declaration of a List A disease or List B disease by public notice.

12. Publication of pests and diseases

The Secretary is to publish in the Gazette in each year-

(a) A list of pests declared under section 10 to be a List A or List B pests; and
(b) A list of all diseases declared under section 11 to be List A diseases or List B diseases

13. Notification of List A pests and diseases

A person who knows, suspects or is reasonably expected to know or suspect that a List A pest

or List A disease is present in any plant or plant product must, as soon as possible and in the quickest manner practicable

(a) Notify an inspector; and
(b) Notify the owner of the plant or plant product if it is reasonable in the circumstance

Penalty:

Fine not exceeding 200 penalty units or a term imprisonment not exceeding 2 years, or both

In order for pests and diseases to be declared a process is undertaken by DPIPWE as provided by ISPM 11: Pest risk analysis for quarantine pest (IPPC, 2013) Appendix B to establish

- Economic impact analysis
- Environmental impact analysis
- Social impact analysis

Unlike the model in the United States of America – transparent viewing on a web platform of documentation undertaken whilst analysing pests considered for declaration, and edits to documentation is not present on the DPIPWE website. In recent years certain Erica sp. were added to List A, as a representative of the Nursery Garden Industry Tasmania, a request was made and then documentation was made available. This only occurs **if** the question is asked and not always an answer achieved as in the case of blueberry rust. The Macquarie Franklin report was only made available after a blueberry grower applied through the Freedom of Information (FOI) process.

Documentation regarding any processes towards the decision for containment has never been made public nor has the information regarding eradication been made public. A table has been provided by DPIPWE Submission October 2017, pg 15-17. with no evidence to support any of the decisions listed under each factor, which was supporting eradication or supporting containment.

Information has only occurred in the public arena due to a public hearing instigated by the Legislative House of Assembly.

The investigative processes occur PRIOR to any declaration being made. *Thekopsora minima* – blueberry rust, is a declared List A disease prior to 2005 (Plant Quarantine Manual Tasmania, 2005), Appendix C, pg 65. At the present moment, Plant Quarantine Manual Tasmania, 2018, *Thekopsora minima* – blueberry rust, is still a declared List A disease.

The submission by DPIPWE, 30 October 2017, pg. 27 supports this information.

There was a clear breach of Section 13, Plant Quarantine Act 1997 as DPIPWE outlines the 2016 Rust Incursion, page 18.

Initial reporting of blueberry rust to Biosecurity Tasmania by Costa Group occurred, on the 9th August 2016, 4-6 weeks after the suspected plants samples were sent by Costa Group in Tasmania to a 'sister' property in NSW – instead of the Biosecurity Tasmanian Plant Diagnostics laboratory, as had been the arrangement during the 2014 response with potentially affected plant material. The Costa Group indicated this occurred because management at the property in question in 2016 were not familiar with the 2014 arrangement or reporting procedures for biosecurity threats.

- The Costa Group has a duty of care to educate any management of relevant legislation responsibilities in any period of time.
- Plant material had been imported to the Costa Group property, Sulphur Creek, from Tasmanian suppliers and interstate suppliers over a period of time and Import Requirements clearly outlined in the Plant Quarantine Manual were adhered to by the suppliers and the Costa Group.
- Previous Biosecurity interactions had placed the property under quarantine for separate issues and management were aware of the process for notifying Biosecurity Tasmania of any suspicious material, blueberry rust or other potential diseases.

This comment is made as Brocklands Pty Ltd has been in a position where plants produced by our facility were unable to move to the Costa property in 2008 due to a suspicion of anthracnose. Until this suspicion was investigated plants were unable to move from Brocklands Pty Ltd to the Costa property Appendix D, email DPIPWE to Rory Dow and Karen Brock.

At a time after this, there was a further incident where we were unable to move plants to the Costa property as there was an issue with the property having a "block" on removing or receiving plant material. This was as a result of a Biosecurity Management Order for a pest of which Brocklands Pty Ltd was not privy to.

Mr Tobey's (Costa Group) answer to Mr Finch's question (Public Hearing 13/11/2017) pg24. regarding biosecurity protocols is honest. The Costa Group employs numerous employees with scientific degrees, issues regarding disease transfer has been made aware to the group on previous occasions, yet no protocols regarding basic farm hygiene were provided to transient, or permanent employees.

The concern for Biosecurity Tasmania is the timeframe of 4-6 weeks lost in assessing the situation, the majority of plants were in deciduous state and key personnel, Andrew Bishop and Lloyd Klumpp were not on leave during this period of time. There were employees of the Costa Group with scientific backgrounds with no accountability and were derelict in their duty towards the State of Tasmania.

It was evident at the public meeting in August 2016 (Mt Pleasant, DPIPWE) – that an economic impact analysis had not been undertaken as I personally asked Andrew Bishop that question. The question received "good question" answer. An incursion occurred in 2014 as outlined by the DPIPWE submission, yet no economic survey had occurred during the two-year period between incursions. Admittedly an analysis at the time of declaring a List A disease some ten years prior may or may not have relevance to present day economic impacts as the industry had developed significantly. The 2014 incursion raised awareness of numerous growers not listed in the *Survey of Blueberry Diseases in Tasmania: Y. Ziqing, D. Metcalf, M. Buntain, W. Williams, P. Changyou, Biosecurity & Product Integrity Plant Health Branch: May 2009.*

DPIPWE outlined in their submission (October 2017) pg. 21, that sourcing information from scientific, technical and economic feasibility determined management possibility. The evidence suggests that these reports were obtained from Macquarie Franklin, Dr Bernadine Strik (Costa Group consultant) and Tasmanian Institute of Agriculture (TIA), October 2016. No outside assistance occurred until 2017 after the management program was determined.

Rosalie Daniel was requested for information in 2014, Rosalie presented a Powerpoint to Biosecurity Tasmania but was not consulted until 2017 after growers raised her findings with DPIPWE. Personal email Appendix E.

Dr Katherine Evans, Tasmanian Institute of Agriculture (TIA) stated in her public submission (October 2017)that DPIPWE did not engage with TIA in 2014, but TIA was consulted in 2016. It was evident that Dr Evans had not consulted with counterparts internationally or nationally who had composed papers on *Thekopsora minima* – blueberry rust, as her knowledge of rust spore contamination of fruit was not evident. Dr Evans also answered honestly in that her knowledge was with blackberry rust and that TIA had not performed any industry or government study on blueberry rust. The due diligence to provide a report on a List A disease appears to be lacking.

Information regarding the lack of due diligence of Macquarie Franklin has already been raised in several submissions.

Reporting by Dr Bernadine Strik who is well credentialled in blueberry plant management is irrelevant as her specialty field is in regards to physical management of irrigation, fertigation and pruning. A major issue is the conflict of interest with her arrangement with Costa Group, in researching her published papers, there are no papers evidenced as an author or co-author regarding blueberry pathogens such as blueberry rust.

The information on the situation was identified by Biosecurity Tasmania. In a short timeframe it is evident that Biosecurity Tasmania has excellent capability in multi-processing trace forward, trace back, containing an infected property (IP) instantly with a lock down and collecting immediate information. The information sourced was lacking in due diligence by outsourced information due to insular localisation of the information rather than a global or relevant person (those who have physically completed scientific study) perspective.

Common threads

Researched information by Brocklands agrees that

- *DNA classification of Thekopsora minima as opposed to Naohidemyces vacinii* (ARM McTaggart, ADW Geering, RG Shivas; QDAFF 2013) Appendix F. Work carried out by QDAFF and published in 2013 **NB** publish date is usually years after project completion. There are five strains of *Thekopsora minima* as discovered by the aforementioned researchers
- Two cycles are required for spores to succeed – host plants and fresh blueberry leaf in certain conditions
- Evergreen blueberry plants act as a host to overwinter the spores as does *Tsuja sp.* (Hemlock)
- Blueberry rust reduces plant vigour by premature leaf drop
- Specific temperature range is required for spores' production

Disagreement between scientific and department papers

- Spore dispersal
- Spore longevity
- Other plants affected
- Humidity relevance at time of spore production
- Leaf management

Spore dispersal

Fact Sheets from around Australia state-

Department Primary Industry (DPI) NSW – Primefact 1432. Appendix F1

Department of Primary Industry SA (PIRSA) Appendix F2

Department of Primary Industry WA (DAFWA) Appendix F3

All national fact sheets state that transportation occurs with **wind and rain to nearby plants**. Travel over long distances occurs by people transporting infected plants, fruit, packaging, equipment and clothing.

PIRSA and DAFWA adds that *Thekopsora minima* - blueberry rust can be "*transported by the wind up to several hundred metres*". PIRSA and DAFWA also adds that transportation can occur on people's hands.

DPIPWE Fact Sheet Appendix F4 is quite different in that it proposes *"The disease spreads by airborne spores mainly via wind. In glasshouse environments, spores can be carried by people, on clothing for example, when walking past and contacting plants."*

International fact sheets support the wording used by other Australian departments. This is supported by EPPO Factsheet 2017-09 Appendix F5

Personal communication with Annemeik Schilders (MSU) stated that travel was up to 1km Appendix G.

Mr Klumpp advised the committee in his public hearing that "fomites" maybe responsible for the recent IP as other factors were highly unlikely. One area that has not been mentioned in any discussion is the use of bees as pollinators and the impact that may have on transporting rust spores. Mr Bardon mentioned the use of bees as pollinators, Public Hearing November 13, 2017, pg27, "*We have a combination of varieties for crosspollination so it is very important for us - we use bees as* *pollinators - to have flowering at a certain time to ensure good fruit production and good fruit quality."*

Assessment of the risks of transmission of myrtle rust (Austropuccininia psidii) spores by honey bees (Apis mellifera): Biosecurity New Zealand, July 2018 has proven that 15% myrtle rust spores survived in the hive, Appendix H. This research proved that bees cleaning themselves or hive environment was not sufficient in eliminating spore viability.

Bees as a conductor has been mentioned in public forums by Trish McFarlane on more than one occasion and no emphasis has been placed on these as a possible transportation mechanism. There are many hive placements occurring in orchards to enhance fruit set with no biosecurity plans to reduce transfer of spores to other properties or to the National Park environment.

<u>Spore longevity</u>

Rose Daniel (DPI NSW) presented at Fruit Growers Tasmania Conference 2016, Appendix J, her research evidenced that viable spores lasted to 5 days with spore viability dropping to 0 by 21 days. Peter Cross (DPIPWE) was challenged by growers at the Exeter biosecurity workshop as he repeatedly quoted that the spores were viable for eight weeks. The scientific data regarding timing of visual infection correlate to 10 days. There was limited specific information about spore viability until Rosalie Daniel (2016) studied this factor.

<u>Other plants affected</u>

In the USA hemlock forests are abundant and make eradication of *Thekopsora* minima - blueberry rust impossible to eradicate See Personal Emails from Melodie Putnam Appendix K1, Annameik Schilders Appendix G. These scientists were contacted by myself after researching their papers. Appendix K3 and K4.

Such forests are not abundant in European countries and eradication programs are occurring in

- Belgium (2016) Apendix L1
- Germany(2015) Appendix L2
- Portugal(2017) Appendix L3

Thekopsora minima – blueberry rust, is a notifiable disease to the European Plant Protection Organisation.

Netherlands discovered during a routine survey that *Thekopsora minima* – blueberry rust was present (2017) Appendix L4, in native blueberry bushes near Venlo, tracing to nearby abundant blueberry fields. Eradication was not undertaken, surveillance is continuing after the winter period.

There has not been a paper produced that specifies that other *Ericaeae sp*. is affected by Thekopsora minima. The identification by McTaggart, Geering, Shivas (QDAFF 2013. Appendix M) of a similar but not related rust, *Naohidemyces vacinii*, has been proposed as the likely culprit for similar displays on Ericaceous plants. Rosalie Daniel presented at FGT Conference (May 2016), that her work involved trying to infect *Rhododendron sp.* and *Azalea sp*. with spore inoculum from infected blueberry plants in a laboratory situation and was unable to infect the plants.

The common thread with host material is evergreen plants. Management has been identified by Rosalie Daniel and Fact sheets generated by USA universities, but has never been scientifically proven. Mr Waites (Woodlea Nursery) page 38, Public Hearing 22/1/2018, recited a conversation with Peter Cross, (DPIPWE), "*If you did defoliation on those plants, is it likely it would work and you would kill the spores?*" to which he answered "*Yes*". It would appear that unless something is proven elsewhere then experimentation will not occur despite the fact that a List A disease is present.

Melodie Putnam (OSU), USA also asked the question in personal email, Appendix K1, what is the over wintering factor?

Humidity relevance at time of spore production

The HIA Project BB13002 Appendix N, Rosalie Daniel, studied effect of humidity, particular rain periods on spore populations. Ms Daniel study found that spore counts were not correlating with relative humidity data and the hypotheses that moisture was conducive to spore production required more in-depth study.

Leaf management

Mr Bardon (Public Hearing November 23, 2017, pg27)*"It would concern me to defoliate plants, whether that be by hand or chemically. For me, I would be very concerned. I do not know if it has been proven, but it is not something I would want to jump into. I think it would have big ramifications for our business."*

Cost analysis as prepared, Blueberry Establishment and production costs – PrimeFact 133 4th Edition: Phillip Wilk, Melinda Simpson, Wollongbar Primary Industries Institute (September 2015), Appendix O, gives detailed figures/ hectare regarding various aspects of blueberry production. These figures were not reflected in the Macquarie Franklin Report October 2016.

Leaf and plant pruning has been mentioned in Appendix F1 under title Management "*The removal of alternative or volunteer hosts that may harbour the disease can be beneficial in reducing rust spores.*"

Appendix J, pg 4, Rosalie Daniels presented that "*Retained leaves are* ***main*** (emphasis added) *means of survival in an evergreen system.*"

Rosalie Daniel also presents on the same page under title Pruning, "*Remove diseased material*"

Melodie Putnam, Appendix K1, repeats feedback **from a grower** in the USA*," Fungicides (in advance to prevent in the first place), then if anything [shows up], typically azoxystrobin and quat (KleenGrow). Then sometimes, defoliation if needed.* ***This has actually been quite successful in most cases,***(emphasis added) *if the protocols are followed."*

This information has been presented to Biosecurity Tasmania, Mr Whittington and Minister Rockcliff in 2017.

Property identification

Mr Klumpp referred to a property register (Public Hearing 13/07/2018) and that traceability was important. This system has been investigated thoroughly by the Commonwealth Government, with issues surrounding free trade, civil liberties etc. It has successfully been attained with livestock according to Mr Klumpp with recommendations to support a change in current legislation on this issue is important. Tasmanian legislation demands that eggs sold in the multitude of markets with stamps.

on them before sale to identify which property they were derived from should a human health issue such as *Salmonella sp.* arise. It would be fair to say that a similar system be implemented to trace plant movement in the state and also for access to the producers who are selling or growing the plants/plant products.

One of the issues experienced in both the myrtle rust incursion and the blueberry rust incursion, in my experience as Nursery Garden Industry Tasmania President and Extension Officer, found that plants of *Myrtacea sp*. were being distributed through Facebook, Gumtree markets etc. The issue for blueberry rust was repeated as evidenced by Mr Pike and Mr Klumpp. The work to collate the blueberry growers has been attained with volunteers in the blueberry industry. A system needs to be investigated and developed in order that management of existing Tasmanian producers can be notified and checked and or surveyed during a Pest Incursion.
During the hearings mention of prevention of evergreen species has been made. Mr Klumpp (Public Hearing 13/07/ 2018) correctly stated that *"The principle our biosecurity system, both nationally and internally, is built upon is about least restrictive measures on trade*". The international rules of Biosecurity are derived from the International Plant Protection Convention (IPPC) a committee within the Food and Agriculture Organisation of United nations (FAO). Australia is a signatory to this treaty which is administered by the National Plant Protection Organisation (NPPO)
This is repeated from the original Brocklands Pty Ltd submission (November 2017), as certain constraints are in place and certain actions need to be followed regarding pest identification, notification and emergency procedures are part of the guidelines set out by the IPPC. Appendices B,S & T

Interstate movement

The DPIPWE Plant Quarantine manual has two types of Import Requirements – Fruit and Plants, pg 26. Plant Quarantine Manual Tasmania (2018). Appendix P. Dr Metcalf expressed concern with changes to importing of blueberries as ICA29 became the accepted standard for blueberry plants. This is relevant as Import Requirement 28, in my personal history with importing of plants, remembers that physical inspections of plants would occur on a regular basis before a signed Plant Health Certificate proclaiming blueberry rust freedom would accompany the goods.

Controversially Import Requirement 28, Section 2 is relevant for fruit production and plant import, pg 92. Plant Quarantine Manual Tasmania (2018) is exactly the same as the Import Requirement 28 from a previous version (2005)Appendix C. However, it highlights that there is a discrepancy in the wording that should be investigated.

Section 2

Plants of Vaccinium spp. must:

(a) *Be approved for growing in pre- or post entre quarantine conditions; or*
(b) *Have been grown on a property in a State or Territory or in a part of a State or Territory for which there is a current area freedom certificate for Blueberry Rust*

Section 3

Host plants other than Vaccinium spp., must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown stating that those plants have been inspected within 14 days of dispatch and no blueberry rust detected.

Since the 2016 incursion in Tasmania, Victoria, South Australia and Western Australia have implemented protocols that an inspection of *Vaccinium spp.* occur and be signed by a Plant Heath Officer to be free of blueberry rust. Essentially, they have implemented Section 3 protocols for Section 2.

Page 17 of Plant Quarantine Manual 2018 (PQM 2018), Table 2.8.1 shows that Interstate Certification Assurance (ICA) 31 is applicable to Import Requirement 28. Yet there in no reference to ICA 31 on pg 92 (PQM 2018) with protocols relating to importation of blueberry fruit. ICA 31 Appendix Q has been instigated by Victoria, Western Australia and modified for South Australia in regards to fruit importation from blueberry rust areas. Please note that the documentation associated with ICA 31 indicates the level of scrutiny Tasmanian growers need to apply for exporting fruit interstate. Tasmania has not updated the Plant Quarantine Manual to suit issues arising, yet an incursion occurred in 2014.

To add to the confusion DPI Victoria, have a self-regulation system where nurseries can write a Plant Health Certificate if they have undergone a training regime by DPI Victoria. The only audit on these Plant Health Certificates is on an annual basis to ensure that the paperwork is correctly filled out. This changes the physical appearance of a Biosecurity agent actually inspecting each consignment. Reinstalling the older regime would increase costs as time is charged per 15-minute lots from the office in addition to kilometres to property. Some regions would incur large inspection costs which make Plant Health Certificates not competitive. Biosecurity charges are now viewed as cost recovery by the States rather than identifying Biosecurity as a partnership with business' for future protection of its or other jurisdictions.

It has been identified that there was a breakdown prior to the border in 2014. Tasmania has not upgraded the protocol to ensure that *Vaccinium spp*. plant importation would be able to incur a further incursion of blueberry rust. The process for evaluation after an incursion is outlined in the ISPM2: Guidelines For Pest Risk Analysis (IPPC, 2006). Appendix R.

The Plant Quarantine Manual Tasmania (2018) pg14. and previous versions state the following protocols

2.14 Vessels

2.14.1 A person must not import a vessel into Tasmania except in accordance the following conditions:
I. The vessel must be clean of any soil, plants, plant material or other thing that may harbour a pest or disease agent; and
II. The vessel must be dry.
2.14.2 Upon arrival in the State a person importing a vessel must present it to an Inspector as soon as is practicable.

There has been no mention of this in any of the documents supplied or public appearances about the breakdown of this protocol.

There has been a further breakdown prior to the border in 2016 in that material of some form including equipment such as vehicles, pruners etc entering the state and infecting plants.

Systems relating to List A diseases are proving not adequate with reliance on other jurisdictions to ensure Tasmanian safety. As with business' the application to the same attention to detail with employees or other sources is rarely the same as the business owner or entity with the most to lose.

Future plants should be managed rather than refused as new germplasm from breeders internationally are dictating a trend where traditional blueberry plants are being removed and replaced with new genetics for the first time in 25 years in many cases. These genetics are higher yield results, pruning ease, picking ease including suitability for mechanical harvesting and protected cropping.

Eradication management

Protocols for eradication are outlined by the IPPC Guidelines for pest eradication programmes: ISPM 9, Adopted 1998. Appendix S. The document outlines the steps of eradication programmes and particular note of page 9-9 Section 3.2.3

Treatment and/or control measures

Measures to eradicate pests may include:

- **host destruction**
- **disinfestation of equipment and facilities**
- **chemical or biopesticide treatment**
- soil sterilants
- leaving land fallow
- **host-free periods**
- the use of cultivars that suppress or eliminate pest populations
- **restriction of subsequent cropping**
- trapping, lures or other physical control methods
- inundative release of biological control agents
- use of sterile insect technique
- processing or consumption of infested crop

There has never been documentation that negates the options in bold. These options were discussed at the public forums and Mr Klumpp outlines that these options were over ruled as Mr Klumpp evidenced in the public hearing July 2018, "*The decision-making process is a legal one. The Secretary is the decision maker. The Secretary does so with the advice of the technical experts, scientists, economists and others.*"

The decision-making process is a scientific process with guidelines as per those in PM 9/18 (1) Decision-Support Scheme for prioritizing action during outbreaks (2014)Appendix T, the Secretary has a legislated ability to make a decision based upon the information provided. Information with due diligence and good process is key to managing pest incursions. A decision was made with fingers pointing in many directions and no one person has shown accountability for at the time for decisions or deceions ongoing..

No evidence has been provided regarding the matrix of decision tree for actions taken by Biosecurity The evidence suggests that emphasis on what occurs in Oregon as per the report provided by Dr Bernadine Strik via Melinda Simpson DPI NSW (see Public Hearing 13/11/ 2017, pg 26, Mr Tobey and Mr Bardon), "*I do not recommend eradication of infected plants as a viable method of control*", has more importance than a completion of the processes outlined in the international guidelines.

Mr Tobey evidenced *"If eradication does in fact work, then Costa should not have found rust in 2016 after plants were removed and destroyed from the rust affected grower's farm in 2014, and presumably any other sites where the affected nursery stock may have been found. The re-emergence of rust less than two years later would strongly indicate that eradication, as a form of dealing with the problem, did not work and was unsuccessful."* This assumption is totally incorrect as Tasmania was declared Rust Free in July 2016 after successful survey data was completed. The weight placed on this decision was also put to myself personally by Mr Bardon at the Fruit Growers Conference, May 2016. There is no scientific evidence to support this mode of thought.

It is concerning that the owners of an Infected Property containing a List A disease, sway weight in a scientific process.

Mr Bardon's evidence supports other submissions that only a small part of the property was infected in 2016 at the time of notification. The eradication figures of "200 000" plant indicate the current situation. At the August 2016 public meeting, the room was informed by Colin Spry (DPIPWE) that there were 4 infected sectors out of 11. Of those infected sectors it was the evergreen cultivars that had shown a positive result. The eradication numbers would have been significantly less, anecdotally figures up to 15000 has been mentioned. This supports evidence given by Mr Bardon Public Hearing, 13/11/2017.

<u>Survey Analysis</u>

Since January 2018 properties exporting fruit to mainland states have had regular checks on paperwork and plants to comply with interstate requirements if requested. In our case we have had to request the third inspection in order to ship product to South Australia and Western Australia. However in speaking with the proprietor of Berry Gardens, Sheffield (IP4), regarding plant order, the conversation regarding inspections was surprising. This property is an infected property and claims that no inspections have occurred since November.

There has been no update on survey analysis for blueberry rust. There have been conversations with employees of Biosecurity Tasmania where Fruit Fly surveillance has overridden all other matters apart from those who demand instant action. The implication given by Mr Klumpp Public Hearing 13/7/2018, pg 14-15, stated that funds can be requested if necessary. It is concerning that emphasis on blueberry rust appears to be placed on the "back burner".

Mr Bardon also made comment Public Hearing (13/7/2017) pg 29, in response to Mr Finch's question regarding current situation of number of plants that might be affected by blueberry rust. Mr Bardon replied *"I would say zero. Biosecurity would come in and do a sample and check to verify that, but I would say zero."*

There has not been any evidence put to the community that the Sulphur Creek is rust free. It is also concerning that a property to the west of the Costa Group property has recently been found to have blueberry plants infected with rust.

Sheffield Berry Gardens offered to remove their infected evergreen plants and was advised that would not be necessary by Biosecurity employees.

Understanding confidentiality regarding properties is an issue, however survey analysis is an assistance to the community. As a Nursery Industry person involved in the 2014 incursion, we have never viewed the data on how many infected plants were removed until DPIPWE Submission, October 2017, was presented. The map – Blueberry Rust – 2014 Incursion, was informative in what surveillance has occurred and where plants were removed from infected properties. To reach a rust-free status in June 2016 was an incredible achievement. Communication has been limited to say the least as it takes three years and an inquiry to receive such information.

There has not been any explanation of the web page which displayed that blueberry rust is endemic in Tasmania. Appendix U. It was a supposed mistake that it was placed on the web page. The question is "Why was the text composed in the first place?"

[redacted]

Appendix A

tasmanian legislation
TASMANIA'S CONSOLIDATED LEGISLATION ONLINE

VIEW SUMMARY

The legislation that is being viewed is valid for **9 Jun 2017.**

Plant Quarantine Act 1997 (No. 62 of 1997)

Requested: 9 Jun 2017

Consolidated: 9 Jun 2017

INFORMATION

Notes:	
Links:	
Table of Amending Instruments:	(click to view Table of Amendments)
Responsible Minister and Department:	See the latest Administrative Arrangement Order or view the Information Guides to Legislation

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TASMANIA

Plant Quarantine Act 1997

An Act to provide for the quarantine of plants and the control of pests and diseases

[Royal Assent 22 December 1997]

Be it enacted by His Excellency the Governor of Tasmania, by and with the advice and consent of the Legislative Council and House of Assembly, in Parliament assembled, as follows:

PART 1 - Preliminary

1. Short title

This Act may be cited as the *Plant Quarantine Act 1997*.

2. Commencement

This Act commences on a day to be proclaimed.

3. Interpretation

(1) In this Act –

agricultural equipment means any equipment or vehicle used for the culture, harvesting, packing or processing of any plant or plant product;

approved means approved by the Secretary;

approved quarantine place means a place approved as a quarantine place under section 70;

control includes eradicate;

control agreement means an agreement made under section 47;

control area means an area in respect of which a declaration under section 29 is in force;

disease means –

(a) any disease of plant or plant product declared under section 9 to be a disease; and

(b) a disease agent;

disease agent means –

(a) the whole or part of an organism, being an organism that –

(i) may cause a disease; or

(ii) if in an attenuated, killed or inactivated form, is capable of causing a disease if non-attenuated or viable; and

(b) a part of an organism, being a part that may cause disease; and

(c) a substance that may cause disease;

draft industry control program means the program referred to in section 40;

examination includes any assessment, inspection, analysis or test or a combination of assessments, inspections, analyses and tests;

government control program means the program referred to in section 46;

industry control program means the program approved under section 41;

infected means contaminated or affected by a pest or disease;

infected area means an area in respect of which a declaration under section 23 is in force;

inspector means an inspector appointed under section 49;

List A disease means a disease declared under section 11(a) to be a List A disease;

List B disease means a disease declared under section 11(b) to be a List B disease;

List A pest means a pest declared under section 10(a) to be a List A pest;

List B pest means a pest declared under section 10(b) to be a List B pest;

management committee means the committee responsible for implementing an industry control program;

new disease means a disease that –

(a) is not a List A disease or List B disease; and

(b) is not known to occur in Tasmania at the relevant time;

new pest means a pest that –

(a) is not a List A pest or List B pest; and

(b) is not known to occur in Tasmania at the relevant time;

occupier means a person who –

(a) occupies land; or

(b) has the right to use land under any agreement, lease, licence or permit; or

(c) is in possession of land under a contract for the purchase of the land; or

(d) is acting on behalf of any person referred to in paragraph (a), (b) or (c);

organism includes micro-organism, parasite, invertebrate, infectious material and genetic material;

owner includes –

(a) in relation to land, any mortgagee of land in possession of the land; and

(b) any person acting on behalf of a person referred to in paragraph (a); and

(c) in relation to any prescribed matter, any person apparently responsible or in charge of the matter;

package includes anything –

(a) in, or by, which a plant or plant product may be contained, wrapped or packed; and

(b) on which a plant or plant product may be located;

pest means any organism declared under section 8 to be a pest;

place includes any land, road, premises, river, lake or other body of water;

plant means any organism other than an organism within the animal kingdom;

plant product includes –

(a) the whole or part of any flower, fruit, nut, seed, leaf, bulb, corm, tuber or stem that has been separated from a plant; and

(b) any dried plant material and timber that has been sawn or dressed;

premises includes any building or structure;

prescribed matter means –

(a) any plant; and

(b) any plant product; and

(c) any new or used package; and

(d) a vehicle; and

(e) any new or used agricultural equipment; and

(f) any soil; and

(g) any disease agent;

prohibited plant means a plant or species or kind of plant that is declared to be prohibited plant under section 66;

prohibited plant product means a plant product that is declared to be prohibited plant product under section 66;

protected area means an area in respect of which a declaration under section 35 is in force;

public notice means a notice –

(a) published in any newspaper or magazine; or

(b) published in the *Gazette*; or

(c) broadcast on radio or television; or

(d) affixed to any premises or fence;

quarantine area means a place in respect of which a declaration under section 17 is in force;

record includes a record or information in electronic format;

restricted plant means a plant or species or kind of plant that is declared to be a restricted plant under section 67;

restricted plant product means a plant product declared to be a restricted plant product under section 67;

Secretary means the Secretary of the Department of Primary Industry and Fisheries;

sell includes –

(a) any method of disposition for valuable consideration; and

(b) barter or exchange; and

(c) the disposition to an agent for sale on consignment; and

(d) offering or attempting to sell; and

(e) receiving or having in possession for sale; and

(f) exposing for sale; and

(g) sending, delivering or supplying for sale; and

(h) causing or permitting to be sold or offered or exposed for sale; and

(i) disposal by way of raffle, lottery or other game of chance;

soil includes any substance that may be contaminated by any pest or disease;

unknown disease means a disease whose type or cause –

(a) is not recognisable; or

(b) is uncertain;

unknown pest means a pest whose type –

(a) is not recognisable; or

(b) is uncertain;

used package means any package that contains or contained, or may reasonably be suspected of containing or having contained, any plant or plant product;

vehicle includes aircraft or vessel.

(2) In this Act a reference to a plant includes a reference to any part of the plant.

4. Act binds Crown

(1) This Act binds the Crown in right of Tasmania and, in so far as the legislative power of Parliament permits, in all its other capacities.

(2) The Crown in right of Tasmania is not liable to be prosecuted for an offence against this Act.

5. Act binding on certain persons

This Act is binding on –

(a) a body corporate which is the owner or occupier of any land even though the functions of the body are exercised, or the land is held by the body, on behalf of the Crown; and

(b) the owner and occupier of land even though any estate or interest in the land is vested in the Crown.

6. Reference to land

Land may be referred to, or specified, by reference to –

(a) the entry relating to the land in a valuation roll prepared under the *Valuation of Land Act 2001*; or

(b) maps or aerial photographs; or

(c) any other appropriate unambiguous means.

7. Delegation

(1) The Minister, by instrument in writing, may delegate to the Secretary any of his or her functions or powers under this Act other than this power of delegation.

(2) The Secretary, by instrument in writing, may delegate to a person any of his or her functions or powers under this Act, other than this power of delegation, including a function or power delegated to him or her bythe Minister.

(3) An inspector, by instrument in writing and with the written approval of the Secretary, may delegate to a person any of his or her functions or powers under this Act, other than this power of delegation, a function or power delegated to him or her by the Secretary.

PART 2 - Declaration and notification of pests and diseases

Division 1 - Declaration of pests and diseases

8. Declaration of pest

(1) The Secretary, by public notice, may declare any organism to be a pest for the purpose of this Act.

(2) The Secretary may amend or revoke a declaration of a pest by public notice.

9. Declaration of disease

(1) The Secretary, by public notice, may declare a disease that affects or may affect a plant or plant product to be a disease for the purpose of this Act.

(2) The Secretary may amend or revoke a declaration of a disease by public notice.

10. Declaration of List A and List B pests

(1) The Secretary, by public notice, may declare –

(a) a pest to be a List A pest; or

(b) a pest to be a List B pest.

(2) The Secretary may amend or revoke a declaration of a List A pest or List B pest by public notice.

11. Declaration of List A and List B diseases

(1) The Secretary, by public notice, may declare –

(a) a disease to be a List A disease; or

(b) a disease to be a List B disease.

(2) The Secretary may amend or revoke a declaration of a List A disease or List B disease by public notice.

12. Publication of pests and diseases

The Secretary is to publish in the *Gazette* once in each year –

(a) a list of all pests declared under section 10 to be List A pests or List B pests; and

(b) a list of all diseases declared under section 11 to be List A diseases or List B diseases.

Division 2 - Notification requirements

13. Notification of List A pests and diseases

A person who knows, suspects or is reasonably expected to know or suspect that a List A pest or List A disease is present in any plant or plant product must, as soon as possible and in the quickest manner practicable –

(a) notify an inspector; and

(b) notify the owner of the plant or plant product if it is reasonable in the circumstances to do so.

Penalty:

Fine not exceeding 200 penalty units or a term of imprisonment not exceeding 2 years, or both.

14. Notification of List B pests and diseases

A person who knows, suspects or is reasonably expected to know or suspect that a List B pest or List B disease is present in any plant or plant product must notify an inspector as soon as possible.

Penalty:

Fine not exceeding 100 penalty units.

15. Notification of new or unknown pest or disease

A person who knows, suspects or is reasonably expected to know or suspect that a new pest or new disease or an unknown pest or unknown disease is present in any plant or plant product must notify an inspector as soon as possible.

Penalty:

Fine not exceeding 100 penalty units.

Division 3 - Possession of pests and diseases

16. Possession of pests and diseases

A person must not have possession of a List A pest, List B pest, List A disease or List B disease without the written permission of the Secretary or an inspector.

Penalty:

Fine not exceeding 100 penalty units.

PART 3 - Pest and disease control

Division 1 - Quarantine areas

17. Declaration of quarantine area

(1) The Secretary, by public notice, may declare a place to be a quarantine area if reasonably satisfied that the place is infected with any pest or disease.

(2) A declaration of a quarantine area –

(a) takes effect on the day on which it is made public; and

(b) continues in force until whichever of the following occurs first:

(i) the day specified in the notice;

(ii) if a day is not so specified, the end of 12 months after the day on which it took effect;

(iii) the day on which the notice revoking the declaration is made public.

(3) The Secretary may amend or revoke a declaration of a quarantine area by public notice.

18. Movement and possession of prescribed matter in quarantine area

A person who is not an inspector must not, except as authorised under a permit in force under section 19 –

(a) move or cause or allow any prescribed matter to be moved into or out of a quarantine area; or

(b) be in possession of any prescribed matter that has been moved into or out of a quarantine area.

Penalty:

Fine not exceeding 100 penalty units or a term of imprisonment not exceeding 6 months, or both.

19. Application for permit relating to quarantine area

(1) A person may apply to the Secretary for a permit authorising –

(a) the movement into and out of a quarantine area of any prescribed matter of a specified class or type; or

(b) the possession of any prescribed matter within that area.

(2) An application is to be –

(a) in an approved form; and

(b) accompanied by the prescribed fee.

(3) The Secretary may –

(a) grant the application subject to any conditions the Secretary determines; or

(b) refuse to grant it.

(4) The Secretary may amend or revoke a permit by written notice to the holder of the permit.

20. Directions relating to quarantine area

The Secretary may give the owner or person in charge of a quarantine area directions in relation to –

(a) the management, maintenance, operation and security of the quarantine area; and

(b) the handling, keeping, examination, identification and treatment of anything detained in the quarantine area.

21. Secretary may assume control of quarantine area

(1) The Secretary may assume control of the maintenance, operation and security of a quarantine area ifsatisfied that it is necessary to do so.

(2) On assuming control of a quarantine area, the Secretary may appoint a person as manager of the quarantine area.

(3) The Secretary is to –

(a) notify in writing the owner of the quarantine area on assuming control of the quarantine area; and

(b) post a notice in the quarantine area stating –

(i) that the area is under the control of the Secretary; and

(ii) the name of the person who is the manager of the quarantine area.

(4) The Secretary or the person appointed as manager of the quarantine area may give the owner of the quarantine area or any person on or at the quarantine area directions relating to the management of the quarantine area.

22. Compliance with directions

(1) A person must comply with any directions given under section 20 or 21.

Penalty:

Fine not exceeding 100 penalty units.

(2) If a person contravenes a direction, the person giving the direction may –

(a) take any necessary action to give effect to the direction; or

(b) seize, remove, destroy or dispose of anything to which the direction relates.

Division 2 - Infected areas

23. Declaration of infected area

(1) The Secretary, by public notice, may declare a place to be an infected area if reasonably satisfied that –

(a) a List A pest, List A disease, List B pest or List B disease is present in that area; and

(b) the pest or disease is required to be controlled.

(2) A declaration of an infected area –

(a) takes effect on the day on which it is made public; and

(b) continues in force until whichever of the following occurs first:

(i) the day specified in the notice;

(ii) the day on which a notice revoking the declaration is made public.

(3) The Secretary may amend or revoke a declaration of an infected area by public notice.

24. Restrictions and prohibitions relating to infected area

In the declaration of an infected area under section 23, the Secretary may –

(a) specify any restrictions and prohibitions relating to the movement into and out of that area of any person or prescribed matter; and

(b) authorise the inspection of any thing in that area for the presence of any prescribed matter; and

(c) specify any restrictions and prohibitions relating to any specified activity in that area.

25. Movement and possession of prescribed matter in infected area

A person who is not an inspector must not –

(a) move or cause or allow any prescribed matter to be moved into or out of an infected area; or

(b) be in possession of any prescribed matter that has been moved into or out of an infected area –

except –

(c) in accordance with any restriction or prohibition specified under section 24; or

(d) as authorised under a permit in force under section 26.

Penalty:

Fine not exceeding 100 penalty units or a term of imprisonment not exceeding 6 months, or both.

26. Application for permit relating to infected area

(1) A person may apply to the Secretary for a permit authorising –

(a) the movement into and out of an infected area of any prescribed matter; or

(b) the possession of any prescribed matter within that area.

(2) An application is to be –

(a) in an approved form; and

(b) accompanied by the prescribed fee.

(3) The Secretary may –

(a) grant the application subject to any conditions the Secretary determines; or

(b) refuse to grant it.

(4) The Secretary may amend or revoke a permit by written notice to the holder of the permit.

27. Restricted or prohibited activity

A person who is not an inspector must not carry out any activity in an infected area that is specified under section 24(c) except in accordance with any restriction or prohibition specified under that section.

Penalty:

Fine not exceeding 100 penalty units.

28. Directions relating to infected area

(1) The Secretary may give a person in charge of an infected area directions in relation to –

(a) the management, maintenance, operation and security of the infected area; and

(b) the handling, keeping and examination of any thing detained in the infected area.

(2) A person must comply with a direction under subsection (1).

Penalty:

Fine not exceeding 100 penalty units.

Division 3 - Control areas

29. Declaration of control area

(1) The Secretary, by public notice, may declare a place to be a control area if reasonably satisfied that –

(a) it is necessary to do so to control a pest or disease present within that area that is not a List A or List B pest or a List A or List B disease; or

(b) there is a possibility that a List A or List B pest or a List A or List B disease may be introduced into the area.

(2) A declaration of a control area –

(a) takes effect on the day on which it is made public; and

(b) continues in force until whichever of the following occurs first:

(i) the day specified in the notice;

(ii) the day on which a notice revoking the declaration is made public.

(3) The Secretary may amend or revoke a declaration of a control area by public notice.

30. Restrictions and prohibitions relating to control areas

In the declaration of a control area under section 29, the Secretary may –

(a) specify any restrictions andprohibitions relating to the movement into and out of that area of any person or prescribed matter; and

(b) authorise the inspection of any vehicle in that area for the presence of any prescribed matter; and

(c) specify any restrictions and prohibitions relating to any specified activity in that area.

31. Movement and possession of prescribed matter in control area

A person who is not an inspector must not, except in accordance with any restriction or prohibition specified in section 30 –

(a) move or cause or allow any prescribed matter to be moved into or out of a control area; or

(b) be in possession of any prescribed matter that has been moved into or out of a control area.

Penalty:

Fine not exceeding 100 penalty units.

32. Restricted or prohibited activity

A person who is not an inspector must not carry out any activity in a control area that is specified under section 30(c) except in accordance with any restriction or prohibition specified in that section.

Penalty:

Fine not exceeding 100 penalty units.

33. Restrictions, regulations and prohibitions relating to prescribed matter

(1) The Secretary, by public notice, may restrict, regulate or prohibit any one or more of the following matters within the whole or any specified part of a control area:

(a) the holding of markets, fairs, sales, shows or any other gathering or competition involving any prescribed matter;

(b) the presence or exposure of any specified prescribed matter at any place where any prescribed matter is exposed for sale, exhibition, parade or any form of recreation or competition;

(c) the purpose for which any specified prescribed matter may be used;

(d) the treatment of any specified prescribed matter or any other action of a specified kind in respect of any prescribed matter;

(e) the keeping, transport or management of any specified prescribed matter.

(2) A notice –

(a) takes effect on the day on which it is made public; and

(b) continues in force until whichever of the following occurs first:

(i) the day specified in the notice;

(ii) the day on which a notice revoking the notice is made public;

(iii) the day on which a declaration of the control area to which it relates ceases to be in force.

(3) The Secretary may amend or revoke a notice by public notice.

(4) A person must not fail to comply with a notice.

Penalty:

Fine not exceeding 100 penalty units.

34. Requirements relating to control area

(1) The Secretary, by written notice, may require the owner or occupier of land within a control area to take any specified action in relation to any one or more of the following:

(a) any pest or disease;

(b) any place;

(c) any plant or plant product;

(d) any prescribed matter;

(e) any soil;

(f) any package or used package.

(2) A person must comply with a requirement made under subsection (1).

Penalty:

Fine not exceeding 50 penalty units.

Division 4 - Protected areas

35. Declaration of protected area

(1) The Secretary, by public notice, may declare a place to be a protected area if reasonably satisfied that it is necessary to do so to prevent the introduction into that area of any pest or disease.

(2) A declaration of a protected area –

(a) takes effect on the day on which it is made public; and

(b) continues in force until whichever of the following occurs first:

(i) the day specified in the notice;

(ii) the day on which a notice revoking the declaration is made public.

(3) The Secretary may amend or revoke a declaration of a protected area by public notice.

36. Restrictions and prohibitions relating to protected areas

In the declaration of a protected area under section 35, the Secretary may –

(a) specify any restrictions and prohibitions relating to the movement into that area of any person or prescribed matter; and

(b) authorise the inspection of any thing in that area for the presence of any prescribed matter; and

(c) specify any restrictions and prohibitions relating to any specified activity in that area.

37. Movement and possession of prescribed matter in protected area

A person who is not an inspector must not –

(a) move or cause or allow any person to move, or allow any prescribed matter to be moved, into a protected area; or

(b) be in possession of any prescribed matter that has been moved into or out of a protected area –

except –

(c) in accordance with any restriction or prohibition specified under section 36; or

(d) as authorised under a permit in force under section 38.

Penalty:

Fine not exceeding 100 penalty units.

38. Permit relating to protected area

(1) The Secretary, by written notice to the owner or occupier of land within a protected area, may issue a permit authorising the movement into that area of any person or prescribed matter.

(2) A permit –

(a) is subject to any conditions the Secretary determines; and

(b) may specify entry and exit points for the protected area.

(3) The Secretary may amend or revoke a permit by written notice to the holder of the permit.

39. Restricted or prohibited activity

A person who is not an inspector must not carry out any activity in a protected area that is specified under section 36(c) except in accordance with any restriction or prohibition specified in that section.

Penalty:

Fine not exceeding 100 penalty units.

Division 5 - Control programs

40. Industry control program

(1) An organisation or a body representing the interests of any industry may prepare adraft program relating to the control of any pest or disease.

(2) An industry control program is to specify the following:

(a) the name of the organisation or body that prepared the program;

(b) the pest or disease to which the program relates;

(c) the class of plant or plant product that the program affects;

(d) the composition of the management committee;

(e) the objectives of the program;

(f) the strategies and methods to be applied under the program to control the pest or disease to which the program relates;

(g) the manner in which the cost of implementing the program is to be met;

(h) the likely duration of the program;

(i) the manner in which the effectiveness of the program is to be monitored;

(j) the persons or classes of persons able to exercise powers in relation to the control of the pest or disease to which the program relates;

(k) the powers of those persons;

(l) whether compensation is payable for any loss incurred as a direct result of the program otherwise than specified in section 81;

(m) if compensation is payable –

(i) the manner in which compensation is to be determined; and

(ii) who is to pay the compensation;

(n) the manner in which any proceeds obtained from the implementation of the program is to be disposed of;

(o) the extent to which the owner of any plant or plant product affected by the implementation of the program is required to take action under the program.

(3) An industry control program may also provide for any one or more of the following matters:

(a) the identification and examination of any prescribed matter, vehicle and place;

(b) the treatment of any prescribed matter, vehicle and place;

(c) the destruction or other disposal of any prescribed matter and place if necessary to control the pest or disease;

(d) measures to –

(i) reduce the number of plants or plant products in an area or eradicate a class of plant in an area; or

(ii) restrict a class of plant or plant product to a particular area.

41. Approval of program

(1) An organisation or a body that has prepared a draft industry control program may apply to the Minister for approval of the program.

(2) An application is to be –

(a) in writing; and

(b) accompanied by a copy of the program.

(3) On receipt of an application and after consulting with any organisation or body representing persons who are likely to be affected by the implementation of the program, the Minister may –

(a) approve the program; or

(b) if the organisation or body that prepared the draft program agrees, amend the program and approve the program as amended; or

(c) refuse to approve the program.

(4) The Minister must not approve a draft industry control program if it –

(a) does not provide that the Secretary or the Secretary's nominee is a member of the management committee; or

(b) provides for the destruction or other disposal of any prescribed matter or place without the written approval of the Secretary or the owner.

42. Amendment of program

The Minister may amend an industry control program on the application of the organisation or body that prepared the draft industry control program.

43. Termination of program

The Minister may terminate an industry control program –

(a) at his or her discretion; or

(b) on the application of the organisation or body that prepared the draft industry control program.

44. Use of inspectors

The management committee may arrange for the services of an inspector to be made available to the management committee.

45. Cost of program

(1) The Minister, by written notice, may agree that the Crown is to reimburse the management committee for any specified costs incurred by it in implementing an industry control program.

(2) The notice is to –

(a) specify the costs or portion of the costs the Crown agrees to reimburse; and

(b) be provided to the management committee.

(3) Except as agreed under subsection (1) –

(a) any other costs incurred by a management committee in implementing an industry control program are to be met as provided for in the program; and

(b) the Crown is not liable in respect of those costs.

46. Government control program

(1) The Minister, by written notice, may direct the Secretary to implement a program to control any pest or disease if the Minister –

(a) has consulted with any organisation or body representing any persons who are likely to be affected by the implementation of the program; and

(b) is satisfied that it is in the interests of the State to implement the program.

(2) The Minister may give a direction without any consultation if satisfied that the interests of the State require the immediate implementation of a government control program.

(3) A direction to implement a government control program is to specify –

(a) the pest or disease to which the program relates; and

(b) whether compensation for any loss incurred as a direct result of the program is payable; and

(c) if compensation is payable, the manner in which compensation is to be determined.

(4) A government control program may also provide for any one or more of the following matters:

(a) the identification and examination of any prescribed matter and place;

(b) the treatment of any prescribed matter and place;

(c) the destruction or other disposal of any prescribed matter and place if necessary to control any pest or disease;

(d) measures to –

(i) reduce the number of plants and plant products in an area or eradicate a class of plant or plant product; or

(ii) restrict a class of plant or plant product to a particular area;

(e) any other measures the Minister considers appropriate to control any pest or disease.

Division 6 - Control agreements

47. Control agreement

(1) The Secretary may make an agreement with the owner or occupier of any place to carry out any procedure or treatment –

(a) to control and monitor pests and diseases in the place; or

(b) to prevent or minimise the dissemination of any pest or disease in the place; or

(c) to reduce the risk of any pest or disease being disseminated into the place.

(2) A control agreement –

(a) is subject to any condition the Secretary considers appropriate; and

(b) is to provide for the recovery by the Secretary of any costs incurred in carrying out the agreement.

(3) A person must not fail to comply with a condition of a control agreement.

Penalty:

Fine not exceeding 100 penalty units.

48. Suspension or revocation of agreement

The Secretary may suspend or revoke a control agreement if he or she reasonably believes that any condition of the agreement has not been complied with.

PART 4 - Inspectors

Division 1 - Appointment

49. Appointment of inspectors

(1) The Secretary may appoint as an inspector –

(a) a person employed in the Department; and

(b) with the approval of the Head of another Agency, a suitably qualified person employed in that Agency; and

(c) any other person.

(2) A person appointed as an inspector may hold that office in conjunction with any other State Service employment.

(3) An inspector is to exercise any powers subject to any conditions specified by the Secretary.

50. General functions of inspector

An inspector has the following functions:

(a) to detect and investigate pests and diseases;

(b) to prevent the introduction into Tasmania of pests and diseases;

(c) to control the spread of pests and diseases;

(d) to carry out surveillance for the presence of pests and diseases;

(e) to eradicate pests and diseases;

(f) to ensure that persons comply with this Act;

(g) to determine whether any person may have contravened this Act.

Division 2 - Powers of inspectors

51. Search and entry

(1) For the purposes of this Act, an inspector may at all reasonable times –

(a) enter and remain in any place where there is, or is suspected to be, any pest or disease; and

(b) search any place lawfully entered for the presence of any pest or disease; and

(c) stop and search any vehicle for the presence of any pest or disease; and

(d) open or break open and search any package in any vehicle or place lawfully entered; and

(e) search any person in or on any vehicle or place lawfully entered if the inspector reasonably believes any plant or plant product –

(i) has been imported in contravention of this Act; and

(ii) is on the person.

(2) An inspector may only enter premises used for residential purposes –

(a) with the consent of the owner or occupier; or

(b) under the authority of a warrant issued under section 57.

(3) An inspector may at all reasonable times enter and remain on private land to check any traps or equipment placed –

(a) for the purpose of an industry control program or a government control program; or

(b) to survey for the presence of any pest or disease.

52. Samples

(1) For the purpose of this Act, an inspector may take samples from, or specimens of, any prescribed matter or other thing the inspector reasonably believes is affected or contaminated by a pest or disease.

(2) An inspector may submit a sample or specimen for examination at a laboratory approved by the Secretary.

53. Seizure

(1) For the purposes of this Act, an inspector may –

(a) seize and retain any prescribed matter, package or vehicle if the inspector reasonably believes –

(i) a pest or disease is present; or

(ii) a direction of the inspector is not being complied with; and

(b) seize and retain any other thing that appears to indicate that an offence under this Act has been, or is being, committed.

(2) An inspector must provide the owner of anything seized with a written notice of that seizure as soon as practicable.

(3) The Secretary may retain anything seized by an inspector –

(a) for a period not exceeding 6 months commencing on the day it is seized; or

(b) if proceedings for an offence in relation to it are instituted within that period, until the proceedings are terminated.

(4) The Secretary may release anything that has been seized to the owner unconditionally or on any conditions the Secretary considers appropriate.

(5) Without the written permission of the Secretary, a person must not interfere with or remove anything that has been seized.

Penalty:

Fine not exceeding 100 penalty units or imprisonment for a term not exceeding 6 months, or both.

54. Destruction and treatment

(1) An inspector may determine that any prescribed matter, package or vehicle infected or likely to be infected with any pest or disease is to be –

(a) treated; or

(b) destroyed if effective treatment is not available; or

(c) otherwise disposed of.

(2) An inspector may destroy or cause to be destroyed any prescribed matter, package or vehicle that is imported in contravention of this Act.

(3) An inspector may only destroy or cause to be destroyed anything that, in the inspector's opinion, has a current value greater than $500 withthe written authority of the Secretary.

55. Treatment of prescribed matter and vehicles

For the purpose of this Act, an inspector may at all reasonable times –

(a) dismantle any prescribed matter, vehicle or premises if the inspector considers it necessary to do so for the purpose of –

(i) determining if it is infected; or

(ii) diagnosing a pest or disease; or

(iii) determining the cause of a pest or disease; or

(iv) determining the extent of any infection; or

(v) treating it; and

(b) repair any prescribed matter, vehicle or premises; and

(c) repair or erect premises; and

(d) examine or treat any prescribed matter, vehicle or premises; and

(e) isolate any prescribed matter, vehicle or premises; and

(f) remove any prescribed matter or vehicle; and

(g) tag or mark any prescribed matter, vehicle or premises in any manner appropriate for the purpose of identification; and

(h) return, or cause to be returned, to the place from where it came any prescribed matter, vehicle moved into, within or out of any place in contravention of this Act.

56. Directions of inspectors

(1) For the purposes of this Act, an inspector, by written notice, may give directions –

(a) to the owner or occupier of a place to take any specified action in respect of any prescribed matter, vehicle or other thing; and

(b) to any person or class of person relating to the movement into and out of any specified place of anything or person; and

(c) to any person or class of person relating to any other matter the inspector considers necessary.

(2) A person must comply with any direction of an inspector.

Penalty:

Fine not exceeding 50 penalty units.

(3) If a person fails to comply with any direction of an inspector –

(a) the inspector may do anything required by that direction; and

(b) any costs so incurred are payable by that person.

57. Warrants

(1) On the application of an inspector, a magistrate may issue a warrant if satisfied that there are reasonable grounds for believing that it is necessary for the inspector to enter a residence for the purpose of performing any function or exercising any power under this Act.

(2) A warrant is to specify the residence in respect of which it is made.

(3) A warrant has effect for a period of 30 days after the day on which it is granted.

(4) An inspector named in the warrant and any person assisting that inspector may –

(a) enter and remain in the residence, using force if necessary; and

(b) perform any function and exercise any power under this Act in or in relation to the residence.

58. Examining baggage and goods on entry into State

(1) An inspector may examine any baggage and other goods entering the State if the inspector –

(a) reasonably believes that a List A or List B pest or List A or List B disease exists in any place outside the State; or

(b) considers it necessary to prevent the importation of anything in contravention of this Act.

(2) An inspector may –

(a) require a person entering the State to have his or her baggage examined for the presence of any prescribed matter or other thing –

(i) that may have been exposed to a List A or List B pest or List A or List B disease; or

(ii) that may have been imported in contravention of this Act; and

(b) treat or require to be treated any prescribed matter or thing present in the baggage; and

(c) return or require to be returned to the place it came from any prescribed matter or thing present in the baggage; and

(d) destroy any prescribed matter or thing present in the baggage or require it to be destroyed; and

(e) seize and retain any prescribed matter or thing present in the baggage for the purpose of treatment or destruction.

(3) An inspector may only destroy or require the destruction of anything that, in the inspector's opinion, has a current value greater than $500 with the written authority of the Secretary.

59. Documents

(1) For the purpose of this Act, an inspector may –

(a) examine, make or print copies of or take extracts from any document or record; and

(b) seize any document or record that appears to indicate that an offence under this Act has been or is being committed; and

(c) take any photographs, film or video recording; and

(d) make any sketches or drawing; and

(e) make any recording by any means.

(2) The Secretary may retain any document or record seized by an inspector under subsection (1) for as long as is necessary for the purposes of this Act.

(3) An inspector must provide the owner of any document or record seized with a written notice of that seizure as soon as practicable.

(4) At the request of a person who would be entitled to possession of the document or record if it were not in the possession of the Secretary, the Secretary must provide that person with a certified copy of the document or record as soon as practicable.

60. Using reasonable force

In performing any functions and exercising any powers an inspector may use any reasonable force necessary in the circumstances.

61. Using assistants

In performing any functions or exercising any powers an inspector may be accompanied and assisted by any persons, including police officers, the inspector considers appropriate.

62. Obtaining assistance and facilities

(1) An inspector may direct any person to give the inspector any assistance the inspector considers reasonable.

(2) An inspector may direct any person to provide any facilities that –

(a) the inspector requires for the purposes of safely, effectively and efficiently performing any function or exercising any power under this Act; and

(b) the inspector considers reasonable to be provided; and

(c) are in the possession or control of the person.

(3) A person must not fail to comply with any direction under this section.

Penalty:

Fine not exceeding 50 penalty units.

63. Giving name and address

(1) An inspector may require a person to give his or her name and address.

(2) A person must not –

(a) refuse to give his or her name when required to do so; or

(b) give a false name or false address.

Penalty:

Fine not exceeding 50 penalty units.

64. Identification of inspectors

(1) An owner of a place or vehicle where an inspector is taking or about to take any action under this Act may require the inspector to produce identification as an inspector.

(2) If a requirement is made under subsection (1), the inspector may not take any action or further action until he or she has –

(a) produced the required identification; or

(b) obtained permission to do so from the owner.

65. Obstruction of inspector

(1) A person, without reasonable excuse, must not –

(a) obstruct, resist, impede or assault –

(i) an inspector who is performing or exercising a function or power under this Act; or

(ii) a person who is assisting that inspector; or

(b) threaten, abuse or insult an inspector; or

(c) fail to answer a question if required to do so by an inspector; or

(d) fail to provide a document, record or information if required to do so by an inspector; or

(e) prevent or attempt to prevent a person from giving information to, or being questioned by, an inspector; or

(f) impersonate an inspector.

Penalty:

Fine not exceeding 100 penalty units or imprisonment for a term not exceeding 6 months, or both.

(2) On convicting a person of an offence under subsection (1)(c) or (d), in addition to imposing a penalty a court may order that person to –

(a) answer the question; or

(b) provide the document, record or information.

(3) Any answer, document, record or information provided by a person under subsection (2) is not admissible against that person in any other proceedings.

PART 5 - Importation and quarantine

Division 1 - Importation

66. Prohibited plants and plant products

(1) The Secretary, by public notice, may declare –

(a) a plant or species or kind of plant to be a prohibited plant; and

(b) a plant product to be a prohibited plant product.

(2) A person must not –

(a) import or allow to be imported into the State any prohibited plant or prohibited plant product; or

(b) be in possession of any prohibited plant or prohibited plant product.

Penalty:

Fine not exceeding 200 penalty units or a term of imprisonment not exceeding 6 months, or both.

(3) The Secretary may revoke a declaration of a prohibited plant or prohibited plant product by public notice.

67. Restricted plants and plant products

(1) The Secretary, by public notice, may declare –

(a) a plant or species or kind of plant to be a restricted plant; and

(b) a plant product to be a restricted plant product.

(2) A person must not import or allow to be imported into the State any restricted plant or restricted plant product –

(a) without the written approval of the Secretary; and

(b) otherwise than in accordance with any conditions and restrictions imposed under subsection (3).

Penalty:

Fine not exceeding 100 penalty units or a term of imprisonment not exceeding 6 months, or both.

(3) The Secretary may give approval under subsection (2) subject to any conditions and restrictions the Secretary considers necessary.

(4) The Secretary may amend or revoke a declaration of a restricted plant or restricted plant product by public notice.

68. Conditions and restrictions relating to importation

(1) The Secretary, by public notice, may impose any conditions or restrictions in relation to the importation of any prescribed matter.

(2) A person must comply with any condition or restriction imposed under subsection (1).

Penalty:

Fine not exceeding 200 penalty units.

69. Importation of pests and diseases

A person must not import or allow to be imported into the State any List A pest, List B pest, List A disease or List B disease.

Penalty:

Fine not exceeding 100 penalty units.

Division 2 - Quarantine

70. Approved quarantine place

(1) The Secretary, by public notice, may declare a place to be an approved quarantine place for the purpose of examining any prescribed matter imported into or to be exported out of the State if satisfied that the place is suitable for that purpose.

(2) A declaration is to –

(a) identify the place to which it applies; and

(b) specify the period during which the declaration is in force; and

(c) specify the purpose for which the place has been approved.

(3) A person, without the authority of an inspector, must not –

(a) enter or leave the approved quarantine place; or

(b) take anything into or out of the approved quarantine place.

Penalty:

Fine not exceeding 100 penalty units.

(4) The Secretary may amend or revoke a declaration of an approved quarantine place.

71. Application for declaration of approved quarantine place

(1) A person may apply to the Secretary for a place to be declared an approved quarantine place under section 70.

(2) An application is to –

(a) be in an approved form; and

(b) specify the place to which the application relates; and

(c) specify the purpose for which the application is sought; and

(d) be accompanied by the prescribed fees and charges.

(3) The Secretary may –

(a) grant the application and make a declaration under section 70; or

(b) refuse to grant the application.

72. Quarantine of prescribed matter

(1) An inspector is to ensure that –

(a) any prescribed matter imported into the State is removed from its place of entry in the State and placed in an approved quarantine place; and

(b) any prescribed matter to be exported out of the State is placed in an approved quarantine place before it is exported.

(2) A person must not remove, or allow to be removed, any prescribed matter from an approved quarantine place except under the authority of a certificate issued under section 74.

Penalty:

Fine not exceeding 100 penalty units.

73. Examination and treatment of prescribed matter

(1) An inspector in charge of an approved quarantine place is to examine any prescribed matter placed in that place to determine whether or not it is free from any pest or disease.

(2) Subsection (1) does not apply if the inspector is satisfied from documents or records that the prescribed matter is free from any pest or disease.

(3) If the inspector reasonably believes any prescribed matter is not free from any pest or disease, the inspector is to arrange for it to be treated or dealt with in a manner the inspector considers necessary.

74. Certificate of release

(1) An inspector in charge of an approved quarantine place may issue a certificate authorising the release of prescribed matter from that place if satisfied that –

(a) the prescribed matter –

(i) is free from any pest or disease; or

(ii) has been successfully treated or dealt with under section 73(3); and

(b) all the applicable fees and charges in relation to the examination and treatment of the prescribed matter have been paid.

(2) A certificate may specify –

(a) a class of prescribed matter; and

(b) a particular prescribed matter; and

(c) the period during which it remains in force.

75. Assistance by importer

(1) An inspector may require the importer or exporter of any prescribed matter being treated or dealt with in an approved quarantine place to provide any assistance the inspector requires in relation to –

(a) the removal to, or placement in, that place of any prescribed matter; and

(b) the examination, treatment or any other process relating to any prescribed matter.

(2) A person must comply with a requirement of an inspector under this section.

Penalty:

Fine not exceeding 100 penalty units.

PART 6 - Miscellaneous

Division 1 - Protection of certain plants

76. Threatened plants

Before any power is exercised or function is performed under this Act that may affect any plant that is protected under the *Threatened Species Protection Act 1995*, the Secretary is to –

(a) consult with the Minister responsible for that Act; and

(b) approve the exercise of that power or performance of that function.

77. Protected plants

Before any power is exercised under this Act in respect of any plant that is protected under the *Nature Conservation Act 2002*, the Secretary is to consult with the Secretary of the department responsible for administering that Act.

Division 2 - Fees, costs and compensation

78. Recovery of costs

(1) The owner or occupier of any place or the owner of any thing is liable for the costs and expenses reasonably incurred in the performance of any function or exercise of any power under this Act in relation to the place or thing.

(2) The Secretary may recover the costs and expenses in a court of competent jurisdiction as a debt due to the Crown.

(3) If the Secretary receives any proceeds as a consequence of disposing of any thing under this Act, those proceeds less any reasonable costs and expenses are to be paid to the owner of the thing.

79. Sale or destruction of prescribed matter

If any fees or costs are not paid in respect of any prescribed matter, the Secretary may –

(a) sell it to recoup the unpaid fees or costs; or

(b) destroy or otherwise dispose of it as the Secretary determines appropriate.

80. Liability of Crown for costs

The Crown is not liable in respect of any costs and expenses incurred by a person in complying with a direction or a requirement made under this Act.

81. Compensation for damage during treatment

Compensation is not payable in respect of any damage that occurs to any prescribed matter or place being treated under this Act if the treatment is carried out by an inspector in accordance with reasonable standards relating to that treatment.

82. Compensation

Compensation is not payable in respect of any loss incurred in respect of any prescribed matter because it is –

(a) delayed; or

(b) transferred; or

(c) diverted; or

(d) repackaged; or

(e) dealt with in another manner.

82A. Payments under certain agreements

(1) Nothing in section 78(1) is to be taken as preventing the Crown from making, pursuant to a biosecurity (response and cost-sharing) agreement, payments that have the effect of relieving a person from all or part of a liability that the person has incurred, or is likely to incur, under that section.

(2) Nothing in section 80, 81 or 82 is to be taken as preventing the Crown from making payments to a person pursuant to a biosecurity (response and cost-sharing) agreement.

(3) In this section –

biosecurity (response and cost-sharing) agreement means an agreement that –

(a) the State is a party to; and

(b) furthers the objects of this Act; and

(c) has been certified by the Minister to be a biosecurity (response and cost-sharing) agreement for the purposes of this section.

Division 3 - Liability

83. Immunity

(1) A person does not incur any personal liability in respect of any act done or not done in good faith –

(a) in the performance or exercise, or the purported performance or exercise, of any function or power under this Act; or

(b) in the administration or execution, or the purported administration or execution, of this Act.

(2) A civil liability that would, but for subsection (1), lie against a person lies against the Crown.

84. Liability of director

If a body corporate has committed an offence against this Act, each director or other person concerned in the management of the body corporate is guilty of the offence and liable to a penalty not exceeding that prescribed for the offence unless it is proved that the director or other person could not have prevented the commission of the offence by the exercise of reasonable diligence.

Division 4 - Offences

85. Continuing offence

(1) A person who commits an offence under this Act that is a continuing offence is liable, in addition to any other penalty, to a further penalty not exceeding one-fifth of the maximum penalty prescribed for that offence for each day during which the offence continues.

(2) An obligation to do anything continues until it is done, notwithstanding that any period within which, or time before which, the thing is required to be done has ended or passed.

86. Defence

It is a defence to a charge of an offence under this Act if the defendant proves that the offence did not result from any failure on his or her part to take all reasonable actions and care to avoid the commission of the offence.

87. Penalty for body corporate

If a body corporate is convicted of an offence against this Act, the penalty that the court may impose on the body corporate is a fine not exceeding 5 times the maximum fine that the court may impose as a penalty for that offence.

88. Protection of disease control measures

A court may not prevent or restrain the Secretary or an inspector from taking any action under this Act in relation to, or in consequence of, an occurrence or suspected occurrence of a List A pest or List A disease.

Division 5 - Infringement notices

89. Infringement notices

(1) An inspector or a person authorised by the Secretary may serve an infringement notice on a person, other than a person under the age of 16 years, if of the opinion that the person has committed a prescribed offence.

(2) An infringement notice is not to relate to 4 or more offences.

(3) An infringement notice is to be in accordance with section 14 of the *Monetary Penalties Enforcement Act 2005*.

90.

91.

92.

93. Payment

(1) . . . .

(2) . . . .

(3) . . . .

(4) . . . .

(5) Any payments made in respect of an infringement notice are payable into the Consolidated Fund.

94.

95.

96.

Division 6 - General matters

97. Pests or diseases having environmental impact

(1) The Secretary, if of the opinion that any pest or disease may have a significant environmental impact, is to consult with the Secretary of the responsible Department in relation to the *Nature Conservation Act 2002* before performing any function or exercising any power under this Act in relation to that pest or disease.

(2) Inrespect of a function or power referred to in subsection (1), the Secretary may –

(a) require the assistance of a person appointed or employed for the purposes of the *Nature Conservation Act 2002* or the *National Parks and Reserves Management Act 2002* to assist in the exercise or performance of that function or power; or

(b) delegate to that person the exercise or performance of that function.

98. Directions generally

(1) A direction under this Act –

(a) may be given verbally or in writing; and

(b) may be of general or limited application; and

(c) if of a continuing nature, has effect for the period specified in the direction; and

(d) may incorporate or operate by reference to any code, standard or other document if a copy of the relevant part of that code, standard or other document is attached to the direction.

(2) An inspector may vary or revoke a direction by notice in writing given to the person to whom the direction was given.

(3) An inspector who verbally gives a direction to a person must provide the person with a written copy of the direction if the person requests it.

99. Exemptions

(1) The Secretary, by public notice, may exempt any prescribed matter, place, person or class of person from complying with this Act.

(2) An exemption –

(a) may be of general or specific application; and

(b) may be limited in its application as specified; and

(c) is subject to any specified conditions.

(3) An exemption –

(a) takes effect on the day on which it is made public; and

(b) continues in force until the day on which a notice under subsection (4) is made public.

(4) The Secretary may amend or revoke an exemption by public notice.

100. Posting signs

(1) An inspector may place a sign, in a form approved by the Secretary –

(a) at any place at or near the boundary of any infected area, control area or protected area to indicate the boundaries of the place or area or any restriction or prohibition relating to the place or area; and

(b) at any place the inspector considers appropriate to indicate the effect of any declaration or notice made under this Act; and

(c) along roadways to indicate that traffic should stop.

(2) The driver of a vehicle approaching a sign referred to in subsection (1)(c) must –

(a) stop the vehicle; and

(b) keep it stationary for the purpose of enabling an inspector to exercise any of the powers conferred under this Act.

Penalty:

Fine not exceeding 50 penalty units.

(3) A person must not damage, deface, remove or interfere with any sign.

Penalty:

Fine not exceeding 50 penalty units.

101. Survey traps and equipment

A person must not move, destroy or otherwise interfere with any trap or equipment placed under the authority of the Secretary or an inspector for the purpose of monitoring for the presence of any pest or disease.

Penalty:

Fine not exceeding 50 penalty units.

101A. False or misleading statements

(1) A person must not, in making any application or giving any information under this Act –

(a) make a statement knowing it to be false or misleading; or

(b) omit any matter from a statement knowing that without that matter the statement is misleading.

Penalty:

Fine not exceeding 50 penalty units.

(2) A person must not make any statement about a plant, plant product, agricultural or other equipment, premises, organism, pest or disease or the production, importation into the State or movement of a plant, plant product, agricultural or other equipment, organism, pest or disease that is false, or misleading, and likely to cause a person who relies on the statement to commit an offence under this Act.

Penalty:

Fine not exceeding 50 penalty units.

(3) A person must not make a statement that is false or misleading in answer to a question or inquiry by an inspector or the Secretary.

Penalty:

Fine not exceeding 50 penalty units.

102. Evidence

(1) In any proceedings, a document purporting to be a certificate signed by the Secretary and relating to any one or more of the following matters is evidence of the facts stated in the document:

(a) the appointment of an inspector under this Act;

(b) any approval under this Act;

(c) a delegation under this Act;

(d) the amount of costs and expenses incurred in the taking of any action under this Act by an inspector or the Secretary;

(e) a declaration of any infected area, control area or protected area.

(2) An allegation in a complaint of any of the following is evidence of the matter alleged:

(a) that a specified person is or was the owner or occupier of any place;

(b) that a specified person is or was the owner of any prescribed matter;

(c) that a specified prescribed matter was in a specified area or was moved into or out of a specified area;

(d) that a specified prescribed matter was infected.

(3) In any proceedings, a person is taken to have been notified by an inspector of the making of a declaration if a sign indicating the making of the declaration has been placed where the person would, in the normal course of events, have passed or seen the sign.

(4) In any proceedings, any printed or mechanically or electronically copied book, booklet, pamphlet, sheet or card purporting to contain any document, code, standard, rule, specification or method referred to in section 105 is taken to be issued by the specified body or association.

103. Records

(1) The Secretary may require any person or class of person to –

(a) keep specified records relating to any specified matter or activity; and

(b) provide copies of those records to the Secretary.

(2) A requirement may be made by –

(a) a notice published in the *Gazette*; or

(b) a written notice given to the person.

(3) A person must comply with a requirement.

Penalty:

Fine not exceeding 50 penalty units.

104. Regulations

(1) The Governor may make regulations for the purpose of this Act.

(2) Regulations under this Act may –

(a) prohibit or regulate the use, disposal, destruction or treatment of any prescribed matter or place; or

(b) prescribe fees for the examination, treatment or dealing with any prescribed matter; or

(c) prescribe fees and charges payable in respect of any other matter under this Act.

(3) Regulations may prescribe fees and charges by reference to number, weight, unit or package.

(4) Regulations may be made so as to apply differently according to any matter, limitation or restriction specified in the regulations.

(5) The regulations may authorise any matter to be determined, applied or regulated by theSecretary.

(6) Regulations under this section may –

(a) provide that a contravention of, or a failure to comply with, any of the regulations is an offence; and

(b) in respect of such an offence, provide for the imposition of a fine not exceeding 10 penalty units and, in the case of a continuing offence, a further fine not exceeding 5 penalty units for each day during which the offence continues.

(7) The regulations may contain provisions of a savings or transitional nature consequent on the enactment of this Act.

(8) A provision referred to in subsection (7) may take effect on and from the day on which this Act commences or a later day.

105. Incorporation by reference

(1) A regulation may apply, adopt or incorporate any matter contained in any document, code, standard, rule, specification or method formulated, issued, prescribed or published by any authority or body –

(a) either wholly or partially; or

(b) with or without modifications; or

(c) either specifically or by reference.

(2) If, after the application, adoption or incorporation, the document, code, standard, rule, specification or method is amended or rescinded or replaced, the regulation remains unaltered and its reference is not updated except by an amending regulation.

106. Repeal

The Acts specified in Schedule 1 are repealed and any Statutory Rules made under those Acts are rescinded or revoked.

107. Transitional and savings provisions

Schedule 2 has effect in respect of transitional and savings provisions.

108. Administration of Act

Until provision is made in relation to this Act by order under section 4 of the *Administrative Arrangements Act 1990* –

> **(a)** the administration of this Act is assigned to the Minister for Primary Industry and Fisheries; and
>
> **(b)** the Department responsible to the Minister for Primary Industry and Fisheries in relation to the administration of this Act is the Department of Primary Industry and Fisheries.

SCHEDULE 1 - Acts repealed

Section 106

1. *Noxious Insects and Molluscs Act 1951*
2. *Plant Diseases Act 1930*
3. *Plant Protection Act 1994*

SCHEDULE 2 - Transitional and savings

Section 107

1. Interpretation

In this Schedule –

> ***commencement day*** means the day on which this Act commences;
>
> ***repealed Act*** means –
>
> > **(a)** the *Noxious Insects and Molluscs Act 1951*; and
> >
> > **(b)** the *Plant Diseases Act 1930*.

2. Inspectors

Any person who, immediately before the commencement day, was an inspector for the purposes of any repealed Act is, on that commencement day, an inspector under this Act.

3. Infected areas

(1) Any place which, immediately before the commencement day, was an infested area or an infected area under any repealed Act is, on that commencement day, an infected area under this Act.

(2) Any prohibition in force immediately before the commencement day under any repealed Act in respect of the removal of anything from an infected area continues, on that commencement day, to be in force until a declaration under section 23 is made in relation to that area.

4. Recovery of expenses

Any expenses or costs incurred by any person immediately before the commencement day in respect of anything done or work carried out under any repealed Act and not recovered before the commencement day are, on and after that commencement day, recoverable in a court of competent jurisdiction under that Act.

5. Actions, proceedings and appeals

Any action, proceeding or appeal instituted or commenced under any repealed Act but not determined before the commencement day may, on that commencement, be continued under that Act until determined.

6. Agreements

Any agreement in force immediately before the commencement day under any repealed Act for carrying out work in respect of eradicating, minimising or preventing the dissemination of a pest or disease is, on that commencement day, a control agreement under this Act.

7. Exemptions

Any exemption in force under any repealed Act immediately before the commencement day is, on that commencement day, an exemption under this Act.

8. Funds

Any fund established and in existence immediately before the commencement day under any repealed Act in respect of the eradication or control of disease is abolished and any money standing to the credit of the fund –

(a) vests on that commencement day in the Crown; and

(b) is to be paid into the Consolidated Fund.

Food and Agriculture Organization of the United Nations

International Plant Protection Convention
Protecting the world's plant resources from pests

Appendix B

ISPM 11

ENG

INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES 11

Pest risk analysis for quarantine pests

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INTERNATIONAL STANDARDS FOR
PHYTOSANITARY MEASURES

ISPM 11

Pest risk analysis for quarantine pests

Produced by the Secretariat of the
International Plant Protection Convention
Adopted 2013; published 2017

Publication history

This is not an official part of the standard

1994-05 CEPM-1 added topic *PRA; Supplementary* (1994-003).

1995-02 EWG developed draft text.

1995-05 CEPM-2 postponed the discussion.

1996-05 CEPM-3 recommended for further study.

1997-10 CEPM-4 discussed and requested further review.

1998-05 CEPM-5 revised draft text and requested comments.

1999-05 CEPM-6 discussed draft text and requested further discussion.

1999-09 Supplementary CEPM revised draft text and approved for MC.

1999 Sent for MC.

2000-11 ISC-2 revised draft text for adoption.

2001-04 ICPM-3 adopted standard.

ISPM 11. 2001. *Pest risk analysis for quarantine pests*. Rome, IPPC, FAO.

1999-04 ICPM-2 added topic *GMO/Biodiversity/Invasive species* (1999-004).

1999-05 Open-ended PRA WG developed draft text

2000-06 EWG for definition the words Genetically modified organisms, LMOs and invasive species.

2001-02 IPPC-CBD joint consultation.

2001-04 ICPM-3 split topic *Risk analysis for environmental hazards of plant pests* (2001-001) and LMOs (1999-004).

2001-05 ISC approved Specification 5 *Risk analysis for environmental hazards of plants pests.*

2002-05 SC revised draft text and approved for MC.

2002-06 Sent for MC.

2002-11 SC revised draft text for adoption.

2003-04 ICPM-5 adopted Supplement 1(S1): *Analysis of environmental risks* (with Annex 1) to ISPM 11 and revised the title.

ISPM 11. 2003. *Pest risk analysis for quarantine pests including analysis of environmental risks*. Rome, IPPC, FAO.

2001-09 Open-ended WG developed draft Specification 10 *Pest risk analysis for living modified organisms* (1999-004).

2002-03 ICPM-4 approved Specification 10: *Pest risk analysis for living modified organisms.*

2002-09 EWG developed draft text.

2003-05 SC-7 revised draft text and approved for MC.

2003-06 Draft Sent for MC.

2003-11 SC revised draft text with annexes.

2004-04 ICPM-6 adopted Supplement 2 (S2): *Pest risk analysis for living modified organisms* (with Annexes 2, 3) to ISPM 11.

2004-07 SC revised and approved integrated (S1+S2) standard.

ISPM 11. 2004. *Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms*. Rome, IPPC, FAO.

2007-05 SC-7 approved Specification 44 rev. 1.

2009-05 EWG drafted.

2009-05 SC revised draft.

2010-04 SC revised draft.

2011-04 Steward revised ISPM based on comments.

2011-05 SC approved for MC.

2011-12 Steward revised ISPM based on comments.

2012-03 Submitted to SC-7.

2012-04 SC-7 revised and recommended to SC.

2012-05 Submitted for 2012 SCCP.

2012-11 SC revised and recommended for adoption by CPM.

2013-04 CPM-8 adopted Annex 4 to ISPM 11 and consequential changes to core text.

ISPM 11. 2013. *Pest risk analysis for quarantine pests.* Rome, IPPC, FAO.

2014-04 Secretariat deleted reference to previous ISPM version in the adoption section.

2015-03 CPM-10 noted ink amendments in relation to "phytosanitary status".

2015-06 IPPC Secretariat incorporated ink amendments and reformatted standards following revoking of standards procedure from CPM-10 (2015).

2017-04 CPM noted ink amendments to avoid the use of "trading partner". The IPPC Secretariat incorporated the ink amendments.

Publication history last modified: 2017-04.

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Adoption

ISPM 11 (*Pest risk analysis for quarantine pests*) was adopted by the Third Session of the Interim Commission on Phytosanitary Measures in April 2001. In April 2003, the Fifth Session of the Interim Commission on Phytosanitary Measures adopted a supplement to ISPM 11 on analysis of environmental risk and agreed that it should be integrated into ISPM 11. This resulted in ISPM 11 Rev. 1 (*Pest risk analysis for quarantine pests including analysis of environmental risks*). In April 2004, the Sixth Session of the Interim Commission on Phytosanitary Measures adopted a supplement on pest risk analysis for living modified organisms (LMOs) and agreed that it should be integrated into ISPM 11 Rev. 1 (*Pest risk analysis for quarantine pests including analysis of environmental risks and living modified organisms*). The supplementary text on environmental risks is marked with "S1" and the supplementary text on LMOs is marked with "S2".

The Interim Commission on Phytosanitary Measures acknowledges the collaboration and support of the Secretariat of the Convention on Biological Diversity, as well as the participation of experts from Parties to the Convention, in the preparation of the supplements to ISPM 11.

Annex 4 on pest risk analysis for plants as quarantine pests, together with associated changes in the core text of the standard, was adopted by the Eighth Session of the Commission on Phytosanitary Measures in April 2013.

INTRODUCTION

Scope

The standard provides details for the conduct of pest risk analysis (PRA) to determine if pests are quarantine pests. It describes the integrated processes to be used for risk assessment as well as the selection of risk management options.

S1 It also includes details regarding the analysis of risks of plant pests to the environment and biological diversity, including those risks affecting uncultivated/unmanaged plants, wild flora, habitats and ecosystems contained in the PRA area. Some explanatory comments on the scope of the IPPC in regard to environmental risks are given in Annex 1.

S2 It includes guidance on evaluating potential phytosanitary risks to plants and plant products posed by LMOs. This guidance does not alter the scope of ISPM 11 but is intended to clarify issues related to the PRA for LMOs. Some explanatory comments on the scope of the IPPC in regard to PRA for LMOs are given in Annex 2.

Specific guidance on conducting PRA for plants as quarantine pests is provided in Annex 4.

References

The present standard refers to International Standards for Phytosanitary Measures (ISPMs). ISPMs are available on the International Phytosanitary Portal (IPP) at https://www.ippc.int/core-activities/standards-setting/ispms.

CBD. 2000. *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*. Montreal, CBD.

ICPM. 2001. *Report of the Third Interim Commission on Phytosanitary Measures*, Rome, 2–6 April 2001. Rome, IPPC, FAO.

ICPM. 2005. *Report of the Seventh Interim Commission on Phytosanitary Measures*, Rome, 4–7 April 2005. Rome, IPPC, FAO.

IPPC. 1997. *International Plant Protection Convention*. Rome, IPPC, FAO.

Definitions

Definitions of phytosanitary terms used in the present standard can be found in ISPM 5 (*Glossary of phytosanitary terms*).

Outline of Requirements

The objectives of a PRA are, for a specified area, to identify pests and/or pathways of quarantine concern and evaluate their risk, to identify endangered areas, and, if appropriate, to identify risk management options. PRA for quarantine pests follows a process defined by three stages:

- Stage 1 (initiating the process) involves identifying the pest(s) and pathways that are of quarantine concern and should be considered for risk analysis in relation to the identified PRA area.
- Stage 2 (risk assessment) begins with the categorization of individual pests to determine whether the criteria for a quarantine pest are satisfied. Risk assessment continues with an evaluation of the probability of pest entry, establishment, and spread, and of their potential economic consequences (including environmental consequences – S1).
- Stage 3 (risk management) involves identifying management options for reducing the risks identified at Stage 2. These are evaluated for efficacy, feasibility and impact in order to select those that are appropriate.

PEST RISK ANALYSIS FOR QUARANTINE PESTS

1. Stage 1: Initiation

The aim of the initiation stage is to identify the pest(s) and pathways which are of quarantine concern and should be considered for risk analysis in relation to the identified PRA area.

S2 Some LMOs may present a phytosanitary risk and therefore warrant a PRA. However other LMOs will not present phytosanitary risks beyond those posed by related non-LMOs and therefore will not warrant a complete PRA. Thus, for LMOs, the aim of the initiation stage is to identify those LMOs that have the characteristics of a potential pest and need to be assessed further, and those which need no further assessment under ISPM 11.

S2 LMOs are organisms that have been modified using techniques of modern biotechnology to express one or more new or altered traits. In most cases, the parent organism is not normally considered to be a plant pest but an assessment may need to be performed to determine if the genetic modification (i.e. gene, new gene sequence that regulates other genes, or gene product) results in a new trait or characteristic that may present a plant pest risk.

S2 A plant pest risk from LMOs may be presented by:

- the organism(s) with the inserted gene(s) (i.e. the LMO)
- the combination of genetic material (e.g. gene from plant pests such as viruses) or
- the consequences of the genetic material moving to another organism.

1.1 Initiation points

The PRA process may be initiated as a result of:

- the identification of a pathway that presents a potential pest hazard
- the identification of a pest that may require phytosanitary measures
- the review or revision of phytosanitary policies and priorities.

S1 The initiation points frequently refer to “pests”. The IPPC defines a pest as “any species, strain or biotype of plant, animal, or pathogenic agent, injurious to plants or plant products”. When applying these initiation points to the specific case of plants as pests, it is important to note that the plants concerned should satisfy this definition. Pests directly affecting plants satisfy this definition. In addition, many organisms indirectly affecting plants also satisfy this definition (such as plants as pests, e.g. weeds, invasive alien plants). The fact that they are injurious to plants may be based on evidence of their impact obtained in an area in which they occur. In the case where there is insufficient evidence that they affect plants indirectly, it may nevertheless be appropriate to assess – on the basis of available pertinent information – whether they are potentially injurious in the PRA area by using a clearly documented, consistently applied and transparent system. This is particularly important for plant species or cultivars that are imported for planting.

S2 The types of LMOs that a national plant protection organization (NPPO) may be asked to assess for phytosanitary risk include:

- plants for use (a) as agricultural crops, for food and feed, ornamental plants or managed forests; (b) in bioremediation (as an organism that cleans up contamination); (c) for industrial purposes (e.g. production of enzymes or bioplastics); (d) as therapeutic agents (e.g. pharmaceutical production)
- biological control agents modified to improve their performance in that role
- pests modified to alter their pathogenic characteristic and thereby make them useful for biological control (see ISPM 3 (*Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms*))

- organisms genetically modified to improve their characteristics such as for biofertilizer or other influences on soil, bioremediation or industrial uses.

S2 In order to be categorized as a pest, an LMO has to be injurious or potentially injurious to plants or plant products under conditions in the PRA area. This damage may be in the form of direct effects on plants or plant products, or indirect effects. For guidance on the process of determining whether an LMO has the potential to be a pest, refer to Annex 3, “Determining the potential for a living modified organism to be a pest”.

1.1.1 PRA initiated by the identification of a pathway

The need for a new or revised PRA of a specific pathway may arise in the following situations:

- International trade is initiated in a commodity not previously imported into the country (usually a plant or plant product, including genetically altered plants) or a commodity from a new area or new country of origin.
- New plant species are imported for selection and scientific research purposes.
- A pathway other than commodity import is identified (natural spread, packing material, mail, garbage, passenger baggage etc.).

A list of pests likely to be associated with the pathway (e.g. carried by the commodity) may be generated by any combination of official sources, databases, scientific and other literature, or expert consultation. It is preferable to prioritize the listing, based on expert judgement on pest distribution and types of pests. If no potential quarantine pests are identified as likely to follow the pathway, the PRA may stop at this point.

S2 The phrase “genetically altered plants” is understood to mean plants obtained through the use of modern biotechnology.

1.1.2 PRA initiated by the identification of a pest

A requirement for a new or revised PRA on a specific pest may arise in the following situations:

- An emergency arises on discovery of an established infestation or an outbreak of a new pest within a PRA area.
- An emergency arises on interception of a new pest on an imported commodity.
- A new pest risk is identified by scientific research.
- A pest is introduced into an area.
- A pest is reported to be more damaging in an area other than in its area of origin.
- A pest is repeatedly intercepted.
- A request is made to import an organism.
- An organism is identified as a vector for other pests.
- An organism is genetically altered in a way which clearly identifies its potential as a plant pest.

S2 The phrase “genetically altered” is understood to include obtained through the use of modern biotechnology.

1.1.3 PRA initiated by the review or revision of a policy

A requirement for a new or revised PRA originating from policy concerns will most frequently arise in the following situations:

- A national decision is taken to review phytosanitary regulations, requirements or operations.
- A proposal made by another country or by an international organization (regional plant protection organization, FAO) is reviewed.
- A new treatment or loss of a treatment system, a new process, or new information impacts on an earlier decision.

- A dispute arises on phytosanitary measures.
- The phytosanitary situation in a country changes, a new country is created, or political boundaries have changed.

1.2 Identification of PRA area

The PRA area should be defined as precisely as possible in order to identify the area for which information is needed.

1.3 Information

Information gathering is an essential element of all stages of PRA. It is important at the initiation stage in order to clarify the identity of the pest(s), its/their present distribution and association with host plants, commodities etc. Other information will be gathered as required to reach necessary decisions as the PRA continues.

Information for PRA may come from a variety of sources. The provision of official information regarding pest status is an obligation under the IPPC (Article VIII.1(c)) facilitated by official contact points (Article VIII.2).

S1 For environmental risks, the variety of sources of information will generally be wider than traditionally used by NPPOs. Broader inputs may be required. These sources may include environmental impact assessments, but it should be recognized that such assessments usually do not have the same purpose as PRA and cannot substitute for PRA.

S2 For LMOs, information required for a full risk analysis may include:

- name, identity and taxonomic status of the LMO (including any relevant identifying codes) and the risk management measures applied to the LMO in the country of export
- taxonomic status, common name, point of collection or acquisition, and characteristics of the donor organism
- description of the nucleic acid or the modification introduced (including genetic construct) and the resulting genotypic and phenotypic characteristics of the LMO
- details of the transformation process
- appropriate detection and identification methods and their specificity, sensitivity and reliability
- intended use including intended containment
- quantity or volume of the LMO to be imported.

S2 Information regarding pest status is an obligation under the IPPC (Article VIII.1(c)) facilitated by official contact points (Article VIII.2). A country may have obligations to provide information about LMOs under other international agreements such as the *Cartagena Protocol on Biosafety to the Convention on Biological Diversity* (CBD, 2000). The Cartagena Protocol has a Biosafety Clearing-house that may contain relevant information. Information on LMOs is sometimes commercially sensitive and applicable obligations with regard to release and handling of information should be observed.

1.3.1 Previous PRA

A check should also be made as to whether pathways, pests or policies have already been subjected to the PRA process, either nationally or internationally. If a PRA exists, its validity should be checked as circumstances and information may have changed. The possibility of using a PRA from a similar pathway or pest, that may partly or entirely replace the need for a new PRA, should also be investigated.

1.4 Conclusion of initiation

At the end of Stage 1, the initiation point, the pests and pathways of concern and the PRA area will have been identified. Relevant information has been collected and pests have been identified as possible candidates for phytosanitary measures, either individually or in association with a pathway.

S2 For LMOs at the end of Stage 1 an NPPO may decide that the LMO:

- is a potential pest and needs to be assessed further in Stage 2 or
- is not a potential pest and needs no further analysis under ISPM 11 (but see also the following paragraph).

S2 PRA under the IPPC only relates to the assessment and management of phytosanitary risks. As with other organisms or pathways assessed by an NPPO, LMOs may present other risks not falling within the scope covered by the IPPC. For LMOs, PRA may constitute only a portion of the required overall risk analysis. For example, countries may require the assessment of risks to human or animal health or to the environment beyond that covered by the IPPC. When an NPPO discovers potential for risks that are not phytosanitary it may be appropriate to notify the relevant authorities.

2. Stage 2: Pest Risk Assessment

The process for pest risk assessment can be broadly divided into three interrelated steps:

- pest categorization
- assessment of the probability of introduction and spread
- assessment of potential economic consequences (including environmental impacts).

In most cases, these steps will be applied sequentially in a PRA but it is not essential to follow a particular sequence. Pest risk assessment needs to be only as complex as is technically justified by the circumstances. This standard allows a specific PRA to be judged against the principles of necessity, minimal impact, transparency, equivalence, pest risk analysis, managed risk and non-discrimination set out in ISPM 1 (*Phytosanitary principles for the protection of plants and the application of phytosanitary measures in international trade*).

S2 For LMOs, from this point forward in PRA, it is assumed that the LMO is being assessed as a pest, and therefore “LMO” refers to an LMO that is a potential quarantine pest due to new or altered characteristics or properties resulting from the genetic modification. The risk assessment should be carried out on a case-by-case basis. LMOs that have pest characteristics unrelated to the genetic modification should be assessed using the normal procedures.

2.1 Pest categorization

At the outset, it may not be clear which pest(s) identified in Stage 1 require a PRA. The categorization process examines for each pest whether the criteria in the definition for a quarantine pest are satisfied.

In the evaluation of a pathway associated with a commodity, a number of individual PRAs may be necessary for the various pests potentially associated with the pathway. The opportunity to eliminate an organism or organisms from consideration before in-depth examination is undertaken is a valuable characteristic of the categorization process.

An advantage of pest categorization is that it can be done with relatively little information; however information should be sufficient to adequately carry out the categorization.

2.1.1 Elements of categorization

The categorization of a pest as a quarantine pest includes the following primary elements:

- identity of the pest
- presence or absence in the PRA area

- regulatory status
- potential for establishment and spread in PRA area
- potential for economic consequences (including environmental consequences) in the PRA area.

2.1.1.1 Identity of pest

The identity of the pest should be clearly defined to ensure that the assessment is being performed on a distinct organism, and that biological and other information used in the assessment is relevant to the organism in question. If this is not possible because the causal agent of particular symptoms has not yet been fully identified, then it should have been shown to produce consistent symptoms and to be transmissible.

The taxonomic unit for the pest is generally species. The use of a higher or lower taxonomic level should be supported by scientifically sound rationale. In the case of levels below the species, this should include evidence demonstrating that factors such as differences in virulence, host range or vector relationships are significant enough to affect pest risk.

Specific guidance on the consideration of identity of plants as pests is provided in Annex 4.

In cases where a vector is involved, the vector may also be considered a pest to the extent that it is associated with the causal organism and is required for transmission of the pest.

S2 In the case of LMOs, identification requires information regarding characteristics of the recipient or parent organism, the donor organism, the genetic construct, the gene or transgene vector and the nature of the genetic modification. Information requirements are set out under section 1.3.

2.1.1.2 Presence or absence in PRA area

The pest should be absent from all or a defined part of the PRA area.

Specific guidance on determining the presence or absence of plants as pests is provided in Annex 4.

S2 In the case of LMOs, this should relate to the LMO of phytosanitary concern.

2.1.1.3 Regulatory status

If the pest is present but not widely distributed in the PRA area, it should be under official control or expected to be under official control in the near future.

S1 Official control of pests presenting an environmental risk may involve agencies other than the NPPO. However, it is recognized that ISPM 5 Supplement 1 (*Guidelines on the interpretation and application of the concepts of "official control" and "not widely distributed"*) applies, in particular its provisions regarding NPPO authority and involvement in official control.

S2 In the case of LMOs, official control should relate to the phytosanitary measures applied because of the pest nature of the LMO. It may be appropriate to consider any official control measures in place for the parent organism, donor organism, transgene vector or gene vector.

2.1.1.4 Potential for establishment and spread in PRA area

Evidence should be available to support the conclusion that the pest could become established or spread in the PRA area. The PRA area should have ecological/climatic conditions including those in protected conditions suitable for the establishment and spread of the pest and where relevant, host species (or near relatives), alternate hosts and vectors should be present in the PRA area.

S2 For LMOs, the following should also be considered:

- changes in adaptive characteristics resulting from the genetic modification that may increase the potential for establishment and spread

- gene transfer or gene flow that may result in the establishment and spread of pests, or the emergence of new pests
- genotypic and phenotypic instability that could result in the establishment and spread of organisms with new pest characteristics, e.g. loss of sterility genes designed to prevent outcrossing.

S2 For more detailed guidance on the assessment of these characteristics, see Annex 3.

2.1.1.5 Potential for economic consequences in PRA area

There should be clear indications that the pest is likely to have an unacceptable economic impact (including environmental impact) in the PRA area.

S1 Unacceptable economic impact is described in ISPM 5 Supplement 2 (*Guidelines on the understanding of* potential economic importance *and related terms including reference to environmental considerations*).

S2 In the case of LMOs, the economic impact (including environmental impact) should relate to the pest nature (injurious to plants and plant products) of the LMO.

2.1.2 Conclusion of pest categorization

If it has been determined that the pest has the potential to be a quarantine pest, the PRA process should continue. If a pest does not fulfil all of the criteria for a quarantine pest, the PRA process for that pest may stop. In the absence of sufficient information, the uncertainties should be identified and the PRA process should continue.

2.2 Assessment of the probability of introduction and spread

Pest introduction is comprised of both entry and establishment. Assessing the probability of introduction requires an analysis of each of the pathways with which a pest may be associated from its origin to its establishment in the PRA area. In a PRA initiated by a specific pathway (usually an imported commodity), the probability of pest entry is evaluated for the pathway in question. The probabilities for pest entry associated with other pathways need to be investigated as well.

For risk analyses that have been initiated for a specific pest, with no particular commodity or pathway under consideration, the potential of all probable pathways should be considered.

The assessment of probability of spread is based primarily on biological considerations similar to those for entry and establishment.

S1 With respect to a plant being assessed as a pest with indirect effects, wherever a reference is made to a "host" or "host range", these terms should be understood to refer to a suitable habitat[1] in the PRA area.

S1 In the case of plants as pests, the concepts of entry, establishment and spread may have to be considered differently.

S1 For plants for planting proposed for import, the probability of entry need not be assessed. Following import, the plants may be planted and maintained in a particular location. The pest risk may arise if there is a possibility that the plants may spread from the location where they are intended to grow and establish in the endangered area. Accordingly, section 2.2.3 may be considered before section 2.2.2.

S1 Imported plants not intended to be planted may be used for various purposes (e.g. as bird seed, as fodder, or for processing). The pest risk of such plants may arise if there is a possibility that the plants may escape or be diverted from the intended use and establish in the endangered area.

[1] In the case of organisms that affect plants indirectly, through effects on other organisms, the terms host/habitat will extend also to those other organisms.

Specific guidance on the consideration of habitats, locations and endangered area for plants as pests is provided in Annex 4.

S2 Assessing the probability of introduction of an LMO requires an analysis of both intentional or unintentional pathways of introduction, and intended use.

2.2.1 Probability of entry of a pest

The probability of entry of a pest depends on the pathways from the exporting country to the destination, and the frequency and quantity of pests associated with them. The higher the number of pathways, the greater the probability of the pest entering the PRA area.

Documented pathways for the pest to enter new areas should be noted. Potential pathways, which may not currently exist, should be assessed. Pest interception data may provide evidence of the ability of a pest to be associated with a pathway and to survive in transport or storage.

S1 The probability of entry need not be assessed for plants that are proposed for import. However, the probability of entry needs to be assessed for pests that may be carried by such plants (e.g. contaminating seeds carried with seeds imported for planting).

Specific guidance on assessing the probability of entry for plants as pests is provided in Annex 4.

S2 This section is not relevant to LMOs imported for intentional release into the environment.

2.2.1.1 Identification of pathways for a PRA initiated by a pest

All relevant pathways should be considered. They can be identified principally in relation to the geographical distribution and host range of the pest. Consignments of plants and plant products moving in international trade are the principal pathways of concern and existing patterns of such trade will, to a substantial extent, determine which pathways are relevant. Other pathways such as other types of commodities, packing materials, persons, baggage, mail, conveyances and the exchange of scientific material should be considered where appropriate. Entry by natural means should also be assessed, as natural spread is likely to reduce the effectiveness of phytosanitary measures.

S2 For LMOs, all relevant pathways of introduction should be considered (intentional and unintentional).

2.2.1.2 Probability of the pest being associated with the pathway at origin

The probability of the pest being associated, spatially or temporally, with the pathway at origin should be estimated. Factors to consider are:

- prevalence of the pest in the source area
- occurrence of the pest in a life stage that would be associated with commodities, containers, or conveyances
- volume and frequency of movement along the pathway
- seasonal timing
- pest management, cultural and commercial procedures applied at the place of origin (application of plant protection products, handling, culling, roguing, grading).

2.2.1.3 Probability of survival during transport or storage

Examples of factors to consider are:

- speed and conditions of transport and duration of the life cycle of the pest in relation to time in transport and storage
- vulnerability of the life stages during transport or storage
- prevalence of pest likely to be associated with a consignment

- commercial procedures (e.g. refrigeration) applied to consignments in the country of origin, country of destination, or in transport or storage.

2.2.1.4 Probability of pest surviving existing pest management procedures

Existing pest management procedures (including phytosanitary procedures) applied to consignments against other pests from origin to end use, should be evaluated for effectiveness against the pest in question. The probability that the pest will go undetected during inspection or survive other existing phytosanitary procedures should be estimated.

2.2.1.5 Probability of transfer to a suitable host

Factors to consider are:

- dispersal mechanisms, including vectors to allow movement from the pathway to a suitable host
- whether the imported commodity is to be sent to a few or many destination points in the PRA area
- proximity of entry, transit and destination points to suitable hosts
- time of year at which import takes place
- intended use of the commodity (e.g. for planting, processing and consumption)
- risks from by-products and waste.

Some uses are associated with a much higher probability of introduction (e.g. planting) than others (e.g. processing). The probability associated with any growth, processing, or disposal of the commodity in the vicinity of suitable hosts should also be considered.

S2 For LMOs, the probability of gene flow and gene transfer should also be considered, when there is a trait of phytosanitary concern that may be transferred.

2.2.2 Probability of establishment

In order to estimate the probability of establishment of a pest, reliable biological information (life cycle, host range, epidemiology, survival etc.) should be obtained from the areas where the pest currently occurs. The situation in the PRA area can then be compared with that in the areas where it currently occurs (taking account also of protected environments such as glass- or greenhouses) and expert judgement used to assess the probability of establishment. Case histories concerning comparable pests can be considered. Examples of the factors to consider are:

- availability, quantity and distribution of hosts in the PRA area
- environmental suitability in the PRA area
- potential for adaptation of the pest
- reproductive strategy of the pest
- method of pest survival
- cultural practices and control measures.

In considering probability of establishment, it should be noted that a transient pest (see ISPM 8 (*Determination of pest status in an area*)) may not be able to establish in the PRA area (e.g. because of unsuitable climatic conditions) but could still have unacceptable economic consequences (see IPPC Article VII.3).

S1 In the case of plants as pests, assessment of the probability of establishment concerns their establishment in habitats other than those in which they are intended to grow.

Specific guidance on assessing the probability of establishment of plants as pests is provided in Annex 4.

S2 For LMOs, the survival capacity without human intervention should also be considered.

S2 In addition, where gene flow is a concern in the PRA area, the probability of expression and establishment of a trait of phytosanitary concern should be considered.

S2 Case histories concerning comparable LMOs or other organisms carrying the same construct can be considered.

2.2.2.1 Availability of suitable hosts, alternate hosts and vectors in the PRA area

Factors to consider are:

- whether hosts and alternate hosts are present and how abundant or widely distributed they may be
- whether hosts and alternate hosts occur within sufficient geographic proximity to allow the pest to complete its life cycle
- whether there are other plant species, which could prove to be suitable hosts in the absence of the usual host species
- whether a vector, if needed for dispersal of the pest, is already present in the PRA area or likely to be introduced
- whether another vector species occurs in the PRA area.

The taxonomic level at which hosts are considered should normally be the “species”. The use of higher or lower taxonomic levels should be justified by scientifically sound rationale.

2.2.2.2 Suitability of environment

Factors in the environment (e.g. suitability of climate, soil, pest and host competition) that are critical to the development of the pest, its host and if applicable its vector, and to their ability to survive periods of climatic stress and complete their life cycles, should be identified. It should be noted that the environment is likely to have different effects on the pest, its host and its vector. This needs to be recognized in determining whether the interaction between these organisms in the area of origin is maintained in the PRA area to the benefit or detriment of the pest. The probability of establishment in a protected environment, e.g. in glasshouses, should also be considered.

Climatic modelling systems may be used to compare climatic data on the known distribution of a pest with that in the PRA area.

2.2.2.3 Cultural practices and control measures

Where applicable, practices employed during the cultivation/production of the host crops should be compared to determine if there are differences in such practices between the PRA area and the origin of the pest that may influence its ability to establish.

S2 For plants that are LMOs, it may also be appropriate to consider specific cultural, control or management practices.

Pest control programmes or natural enemies already in the PRA area which reduce the probability of establishment may be considered. Pests for which control is not feasible should be considered to present a greater risk than those for which treatment is easily accomplished. The availability (or lack) of suitable methods for eradication should also be considered.

2.2.2.4 Other characteristics of the pest affecting the probability of establishment

Other characteristics of the pest affecting the probability of establishment include:

- *Reproductive strategy of the pests and method of pest survival*. Characteristics, which enable the pest to reproduce effectively in the new environment, such as parthenogenesis/self-crossing, duration of the life cycle, number of generations per year, resting stage etc., should be identified.
- *Genetic adaptability*. Whether the species is polymorphic and the degree to which the pest has demonstrated the ability to adapt to conditions like those in the PRA area should be considered,

e.g., host-specific races or races adapted to a wider range of habitats or to new hosts. This genotypic (and phenotypic) variability facilitates a pest's ability to withstand environmental fluctuations, to adapt to a wider range of habitats, to develop pesticide resistance and to overcome host resistance.

- *Minimum population needed for establishment*. If possible, the threshold population that is required for establishment should be estimated.

S2 For LMOs, if there is evidence of genotypic and phenotypic instability, this should be considered.

S2 It may also be appropriate to consider proposed production and control practices related to the LMO in the country of import.

2.2.3 Probability of spread after establishment

A pest with a high potential for spread may also have a high potential for establishment, and possibilities for its successful containment and/or eradication are more limited. In order to estimate the probability of spread of the pest, reliable biological information should be obtained from areas where the pest currently occurs. The situation in the PRA area can then be carefully compared with that in the areas where the pest currently occurs and expert judgement used to assess the probability of spread. Case histories concerning comparable pests can usefully be considered. Examples of the factors to consider are:

- suitability of the natural and/or managed environment for natural spread of the pest
- presence of natural barriers
- the potential for movement with commodities or conveyances
- intended use of the commodity
- potential vectors of the pest in the PRA area
- potential natural enemies of the pest in the PRA area.

S1 In the case of plants as pests, assessment of spread concerns spread from the location where the plants are intended to grow or from the intended use to the endangered area.

Specific guidance on assessing the probability of spread of plants as pests is provided in Annex 4.

The information on probability of spread is used to estimate how rapidly a pest's potential economic importance may be expressed within the PRA area. This also has significance if the pest is liable to enter and establish in an area of low potential economic importance and then spread to an area of high potential economic importance. In addition it may be important in the risk management stage when considering the feasibility of containment or eradication of an introduced pest.

S1 Certain pests may not cause injurious effects on plants immediately after they establish, and in particular may only spread after a certain time. In assessing the probability of spread, this should be considered, based on evidence of such behaviour.

2.2.4 Conclusion on the probability of introduction and spread

The overall probability of introduction should be expressed in terms most suitable for the data, the methods used for analysis, and the intended audience. This may be quantitative or qualitative, since either output is in any case the result of a combination of both quantitative and qualitative information. The probability of introduction may be expressed as a comparison with that obtained from PRAs on other pests.

2.2.4.1 Conclusion regarding endangered areas

The part of the PRA area where ecological factors favour the establishment of the pest should be identified in order to define the endangered area. This may be the whole of the PRA area or a part of the area.

2.3 Assessment of potential economic consequences

Requirements described in this step indicate what information relative to the pest and its potential host plants should be assembled, and suggest levels of economic analysis that may be carried out using that information in order to assess all the effects of the pest, i.e. the potential economic consequences. Wherever appropriate, quantitative data that will provide monetary values should be obtained. Qualitative data may also be used. Consultation with an economist may be useful.

In many instances, detailed analysis of the estimated economic consequences is not necessary if there is sufficient evidence or it is widely agreed that the introduction of a pest will have unacceptable economic consequences (including environmental consequences). In such cases, risk assessment will primarily focus on the probability of introduction and spread. It will, however, be necessary to examine economic factors in greater detail when the level of economic consequences is in question, or when the level of economic consequences is needed to evaluate the strength of measures used for risk management or in assessing the cost-benefit of exclusion or control.

Specific guidance on assessing the potential economic consequences of plants as pests is provided in Annex 4.

S2 In the case of LMOs, the economic impact (including environmental impact) should relate to the pest nature (injurious to plants and plant products) of the LMO.

S2 For LMOs, the following evidence should also be considered:

- potential economic consequences that could result from adverse effects on non-target organisms that are injurious to plants or plant products
- economic consequences that could result from pest properties.

S2 For more detailed guidance on the assessment of these characteristics, see Annex 3.

2.3.1 Pest effects

In order to estimate the potential economic importance of the pest, information should be obtained from areas where the pest occurs naturally or has been introduced. This information should be compared with the situation in the PRA area. Case histories concerning comparable pests can usefully be considered. The effects considered may be direct or indirect.

S1 The basic method for estimating the potential economic importance of pests in this section also applies to:

- pests affecting uncultivated/unmanaged plants
- plants as pests
- pests affecting plants through effects on other organisms.

S1 In the case of direct and indirect environmental effects, specific evidence is needed.

S1 In the case of plants for planting that may be pests, the long-term consequences for the habitat in which the plants are intended to grow may be included in the assessment because planting may affect further use of or have a harmful effect on that habitat.

S1 Environmental effects and consequences considered should result from effects on plants. Such effects, however, on plants may be less significant than the effects and/or consequences on other organisms or systems. For example, a plant as a pest that has only a minor impact on plants may be significantly allergenic for humans or a minor plant pathogen may produce toxins that seriously affect livestock. However, the regulation of plants solely on the basis of their effects on other organisms or systems (e.g. on human or animal health) is outside the scope of this standard. If the PRA process reveals evidence of a potential hazard to other organisms or systems, this should be communicated to the appropriate authorities that have the legal responsibility to deal with the issue.

2.3.1.1 Direct pest effects

For identification and characterization of the direct effects of the pest on each potential host in the PRA area, or those effects which are host-specific, the following are examples that could be considered:

- known or potential host plants (in the field, under protected cultivation, or in the wild)
- types, amount and frequency of damage
- crop losses, in yield and quality
- biotic factors (e.g. adaptability and virulence of the pest) affecting damage and losses
- abiotic factors (e.g. climate) affecting damage and losses
- rate of spread
- rate of reproduction
- control measures (including existing measures), their efficacy and cost
- effect on existing production practices
- environmental effects.

For each of the potential hosts, the total area of the crop and area potentially endangered should be estimated in relation to the elements given above.

S1 In the case of the analysis of environmental risks, examples of direct pest effects on plants and/or their environmental consequences that could be considered include:

- reduction of keystone plant species
- reduction of plant species that are major components of ecosystems (in terms of abundance or size), and endangered native plant species (including effects below species level where there is evidence of such effects being significant)
- significant reduction, displacement or elimination of other plant species.

S1 The estimation of the area potentially endangered should relate to these effects.

2.3.1.2 Indirect pest effects

For identification and characterization of the indirect effects of the pest in the PRA area, or those effects that are not host-specific, the following are examples that could be considered:

- effects on domestic and export markets, including in particular effects on export market access (The potential consequences for market access which may result if the pest becomes established, should be estimated. This involves considering the extent of any phytosanitary regulations imposed (or likely to be imposed) by importing countries.)
- changes to producer costs or input demands, including control costs
- changes to domestic or foreign consumer demand for a product resulting from quality changes
- environmental and other undesired effects of control measures
- feasibility and cost of eradication or containment
- capacity to act as a vector for other pests
- resources needed for additional research and advice
- social and other effects (e.g. tourism).

S1 In the case of the analysis of environmental risks, examples of indirect pest effects on plants and/or their environmental consequences that could be considered include:

- significant effects on plant communities
- significant effects on designated environmentally sensitive or protected areas
- significant change in ecological processes and the structure, stability or processes of an ecosystem (including further effects on plant species, erosion, water table changes, increased fire hazard, nutrient cycling)

- effects on human use (e.g. water quality, recreational uses, tourism, animal grazing, hunting, fishing)
- costs of environmental restoration.

S1 Effects on human and animal health (e.g. toxicity, allergenicity), water tables, tourism etc. could also be considered, as appropriate, by other agencies/authorities.

2.3.2 Analysis of economic consequences

2.3.2.1 Time and place factors

Estimations made in the previous section related to a hypothetical situation where the pest is supposed to have been introduced and to be fully expressing its potential economic consequences (per year) in the PRA area. In practice, however, economic consequences are expressed with time, and may concern one year, several years or an indeterminate period. Various scenarios should be considered. The total economic consequences over more than one year can be expressed as net present value of annual economic consequences, and an appropriate discount rate selected to calculate net present value.

Other scenarios could concern whether the pest occurs at one, few or many points in the PRA area and the expression of potential economic consequences will depend on the rate and manner of spread in the PRA area. The rate of spread may be envisaged to be slow or rapid; in some cases, it may be supposed that spread can be prevented. Appropriate analysis may be used to estimate potential economic consequences over the period of time when a pest is spreading in the PRA area. In addition, many of the factors or effects considered above could be expected to change over time, with the consequent effects of potential economic consequences. Expert judgement and estimations will be required.

2.3.2.2 Analysis of commercial consequences

As determined above, most of the direct effects of a pest, and some of the indirect effects will be of a commercial nature, or have consequences for an identified market. These effects, which may be positive or negative, should be identified and quantified. The following may usefully be considered:

- effect of pest-induced changes to producer profits that result from changes in production costs, yields or prices
- effect of pest-induced changes in quantities demanded or prices paid for commodities by domestic and international consumers. This could include quality changes in products and/or quarantine-related trade restrictions resulting from a pest introduction.

2.3.2.3 Analytical techniques

There are analytical techniques which can be used in consultation with experts in economics to make a more detailed analysis of the potential economic effects of a quarantine pest. These should incorporate all of the effects that have been identified. These techniques may include:

- *Partial budgeting.* This will be adequate, if the economic effects induced by the action of the pest to producer profits are generally limited to producers and are considered to be relatively minor.
- *Partial equilibrium.* This is recommended if, under point 2.3.2.2, there is a significant change in producer profits, or if there is a significant change in consumer demand. Partial equilibrium analysis is necessary to measure welfare changes, or the net changes arising from the pest impacts on producers and consumers.
- *General equilibrium.* If the economic changes are significant to a national economy, and could cause changes to factors such as wages, interest rates or exchange rates, then general equilibrium analysis could be used to establish the full range of economic effects.

The use of analytical techniques is often limited by lack of data, by uncertainties in the data, and by the fact that for certain effects only qualitative information can be provided.

2.3.2.4 Non-commercial and environmental consequences

Some of the direct and indirect effects of the introduction of a pest determined in sections 2.3.1.1 and 2.3.1.2 will be of an economic nature, or affect some type of value, but not have an existing market which can be easily identified. As a result, the effects may not be adequately measured in terms of prices in established product or service markets. Examples include in particular environmental effects (such as ecosystem stability, biodiversity, amenity value) and social effects (such as employment, tourism) arising from a pest introduction. These impacts could be approximated with an appropriate non-market valuation method. More details on environment are given below.

If quantitative measurement of such consequences is not feasible, qualitative information about the consequences may be provided. An explanation of how this information has been incorporated into decisions should also be provided.

S1 Application of this standard to environmental hazards requires clear categorization of environmental values and how they can be assessed. The environment can be valued using different methodologies, but these methodologies are best used in consultation with experts in economics. Methodologies may include consideration of "use" and "non-use" values. "Use" values arise from consumption of an element of the environment, such as accessing clean water, or fishing in a lake, and also those that are non-consumptive, such as use of forests for leisure activities. "Non-use" values may be subdivided into:

- "option value" (value for use at a later date)
- "existence value" (knowledge that an element of the environment exists)
- "bequest value" (knowledge that an element of the environment is available for future generations).

S1 Whether the element of the environment is being assessed in terms of use or non-use values, methods exist for their valuation, such as market-based approaches, surrogate markets, simulated markets, and benefit transfer. Each has advantages, disadvantages and situations where it is particularly useful.

S1 The assessment of consequences may be either quantitative or qualitative and in many cases, qualitative data is sufficient. A quantitative method may not exist to address a situation (e.g. catastrophic effects on a keystone species), or a quantitative analysis may not be possible (no methods available). Useful analyses can be based on non-monetary valuations (number of species affected, water quality), or expert judgement, if the analyses follow documented, consistent and transparent procedures.

S1 Economic impact is described in ISPM 5 Supplement 2.

2.3.3 Conclusion of the assessment of economic consequences

Wherever appropriate, the output of the assessment of economic consequences described in this step should be in terms of a monetary value. The economic consequences can also be expressed qualitatively or using quantitative measures without monetary terms. Sources of information, assumptions and methods of analysis should be clearly specified.

2.3.3.1 Endangered area

The part of the PRA area where presence of the pest will result in economically important loss should be identified as appropriate. This is needed to define the endangered area.

2.4 Degree of uncertainty

Estimation of the probability of introduction of a pest and of its economic consequences involves many uncertainties. In particular, this estimation is an extrapolation from the situation where the pest occurs to the hypothetical situation in the PRA area. It is important to document the areas of uncertainty and the degree of uncertainty in the assessment, and to indicate where expert judgement has been used. This is necessary for transparency and may also be useful for identifying and prioritizing research needs.

S1 It should be noted that the assessment of the probability and consequences of environmental hazards of pests of uncultivated and unmanaged plants often involves greater uncertainty than for pests of cultivated or managed plants. This is due to the lack of information, additional complexity associated with ecosystems, and variability associated with pests, hosts or habitats.

2.5 Conclusion of the pest risk assessment stage

As a result of the pest risk assessment, all or some of the categorized pests may be considered appropriate for pest risk management. For each pest, all or part of the PRA area may be identified as an endangered area. A quantitative or qualitative estimate of the probability of introduction of a pest or pests, and a corresponding quantitative or qualitative estimate of economic consequences (including environmental consequences), have been obtained and documented or an overall rating could have been assigned. These estimates, with associated uncertainties, are utilized in the pest risk management stage of the PRA.

3. Stage 3: Pest Risk Management

The conclusions from pest risk assessment are used to decide whether risk management is required and the strength of measures to be used. Since zero-risk is not a reasonable option, the guiding principle for risk management should be to manage risk to achieve the required degree of safety that can be justified and is feasible within the limits of available options and resources. Pest risk management (in the analytical sense) is the process of identifying ways to react to a perceived risk, evaluating the efficacy of these actions, and identifying the most appropriate options. The uncertainty noted in the assessments of economic consequences and probability of introduction should also be considered and included in the selection of a pest management option.

S1 In considering the management of environmental risks, it should be stressed that phytosanitary measures are intended to account for uncertainty and should be designed in proportion to the risk. Pest risk management options should be identified, taking account of the degree of uncertainty in the assessment of economic consequences, probability of introduction, and the respective technical justification of those options. In this respect, the management of risks to the environment caused by plant pests does not differ from the management of other plant pest risks.

Specific guidance on pest risk management for plants as pests is provided in Annex 4.

3.1 Level of risk

In implementing the principle of managed risk (ISPM 1), countries should decide what level of risk is acceptable to them.

The acceptable level of risk may be expressed in a number of ways, such as:

- reference to existing phytosanitary requirements
- indexed to estimated economic losses
- expressed on a scale of risk tolerance
- compared with the level of risk accepted by other countries.

S2 For LMOs, the acceptable level of risk may also be expressed by comparison to the level of risk associated with similar or related organisms, based on their characteristics and behaviour in a similar environment to the PRA area.

3.2 Technical information required

The decisions to be made in the pest risk management process will be based on the information collected during the preceding stages of PRA. This information will be composed of:

- reasons for initiating the process
- estimation of the probability of introduction to the PRA area
- evaluation of potential economic consequences in the PRA area.

3.3 Acceptability of risk

Overall risk is determined by the examination of the outputs of the assessments of the probability of introduction and the economic impact. If the risk is found to be unacceptable, then the first step in risk management is to identify possible phytosanitary measures that will reduce the risk to, or below an acceptable level. Measures are not justified if the risk is already acceptable or must be accepted because it is not manageable (as may be the case with natural spread). Countries may decide that a low level of monitoring or audit is maintained to ensure that future changes in the pest risk are identified.

3.4 Identification and selection of appropriate risk management options

Appropriate measures should be chosen based on their effectiveness in reducing the probability of introduction of the pest. The choice should be based on the following considerations, which include several of the phytosanitary principles of ISPM 1:

- *Phytosanitary measures shown to be cost-effective and feasible*. The benefit from the use of phytosanitary measures is that the pest will not be introduced and the PRA area will, consequently, not be subjected to the potential economic consequences. The cost-benefit analysis for each of the minimum measures found to provide acceptable security may be estimated. Those measures with an acceptable benefit-to-cost ratio should be considered.
- *Principle of "minimal impact"*. Measures should not be more trade restrictive than necessary. Measures should be applied to the minimum area necessary for the effective protection of the endangered area.
- *Reassessment of previous requirements*. No additional measures should be imposed if existing measures are effective.
- *Principle of "equivalence"*. If different phytosanitary measures with the same effect are identified, they should be accepted as alternatives.
- *Principle of "non-discrimination"*. If the pest under consideration is established in the PRA area but of limited distribution and under official control, the phytosanitary measures in relation to import should not be more stringent than those applied within the PRA area. Likewise, phytosanitary measures should not discriminate between exporting countries where the status of the relevant pest is the same.

S1 The principle of non-discrimination and the concept of official control also apply to:

- pests affecting uncultivated/unmanaged plants
- plants as pests
- pests affecting plants through effects on other organisms.

S1 If any of these become established in the PRA area and if official control is applied, then phytosanitary measures at import should not be more stringent than the official control measures.

The major risk of introduction of plant pests is with imported consignments of plants and plant products, but (especially for a PRA performed on a particular pest) it is necessary to consider the risk of introduction with other types of pathways (e.g. packing materials, conveyances, travellers and their luggage, and the natural spread of a pest).

The measures listed below are examples of those that are most commonly applied to traded commodities. They are applied to pathways, usually consignments of a host, from a specific origin. The measures should be as precise as possible as to consignment type (hosts, parts of plants) and origin so as not to act as barriers to trade by limiting the import of products where this is not justified. Combinations of two or more measures may be needed in order to reduce the risk to an acceptable level. The available measures can be classified into broad categories which relate to the pest status of the pathway in the country of origin. These include measures:

- applied to the consignment
- applied to prevent or reduce original infestation in the crop

- to ensure the area or place of production is free from the pest
- concerning the prohibition of commodities.

Other options may arise in the PRA area (restrictions on the use of a commodity), control measures, introduction of a biological control agent, eradication and containment. Such options should also be evaluated and will apply in particular if the pest is already present but not widely distributed in the PRA area.

3.4.1 Options for consignments

Measures may include any combinations of the following:
- inspection or testing for freedom from a pest or to a specified pest tolerance – sample size should be adequate to give an acceptable probability of detecting the pest
- prohibition of parts of the host
- a pre-entry or post-entry quarantine system – this system could be considered to be the most intensive form of inspection or testing where suitable facilities and resources are available, and may be the only option for certain pests not detectable on entry
- specified conditions of preparation of the consignment (e.g. handling to prevent infestation or reinfestation)
- specified treatment of the consignment – such treatments are applied post-harvest and could include chemical, thermal, irradiation or other physical methods
- restrictions on end use, distribution and periods of entry of the commodity.

Measures may also be applied to restrict the import of consignments of pests.

S1 The concept of consignments of pests may be applied to the import of plants considered to be pests. These consignments may be restricted to species or varieties posing less risk.

S2 For LMOs, as for other organisms, information may have been obtained concerning the risk management measures applied to the LMO in the country of export (see section 1.3). These should be assessed to determine if they are appropriate for the conditions in the PRA area and, if appropriate, the intended use.

S2 For LMOs, measures may also include procedures for the provision of information on the phytosanitary integrity of consignments (e.g. tracing systems, documentation systems, identity preservation systems).

3.4.2 Options preventing or reducing infestation in the crop

Measures may include:
- treatment of the crop, field, or place of production
- restriction of the composition of a consignment so that it is composed of plants belonging to resistant or less susceptible species
- growing plants under specially protected conditions (glasshouse, isolation)
- harvesting of plants at a certain age or a specified time of year
- production in a certification scheme. An officially monitored plant production scheme usually involves a number of carefully controlled generations, beginning with nuclear stock plants of high health status. It may be specified that the plants be derived from plants within a limited number of generations.

S2 Measures may be applied to reduce the probability that LMOs (or genetic material from LMOs) that pose a phytosanitary risk could be in other crops. These include:
- management systems (e.g. buffer zones, refugia)
- management of trait expression
- control of reproductive ability (e.g. male sterility)

- control of alternative hosts.

3.4.3 Options ensuring that the area, place or site of production or crop is free from the pest

Measures may include:

- pest-free area – requirements for pest-free area status are described in ISPM 4 (*Requirements for the establishment of pest free areas*)
- pest-free place of production or pest-free production site – requirements are described in ISPM 10 (*Requirements for the establishment of pest free places of production and pest free production sites*)
- inspection of crop to confirm pest freedom.

3.4.4 Options for other types of pathways

For many types of pathways, the measures considered above for plants and plant products to detect the pest in the consignment or to prevent infestation of the consignment, may also be used or adapted. For certain types of pathways, the following factors should be considered:

- Natural spread of a pest includes movement of the pest by flight, wind dispersal, transport by vectors such as insects or birds and natural migration. If the pest is entering the PRA area by natural spread, or is likely to enter in the immediate future, phytosanitary measures may have little effect. Control measures applied in the area of origin could be considered. Similarly, containment or eradication, supported by suppression and surveillance, in the PRA area after entry of the pest could be considered.
- Measures for human travellers and their baggage could include targeted inspections, publicity and fines or incentives. In a few cases, treatments may be possible.
- Contaminated machinery or modes of transport (ships, trains, planes, road transport) could be subjected to cleaning or disinfestation.

3.4.5 Options within the importing country

Certain measures applied within the importing country may also be used. These could include careful surveillance to try and detect the entry of the pest as early as possible, eradication programmes to eliminate any foci of infestation and/or containment action to limit spread.

S1 For plants to be imported, where there is a high level of uncertainty regarding pest risk, it may be decided not to take phytosanitary measures at import, but only to apply surveillance or other procedures after entry (e.g. by or under the supervision of the NPPO).

S2 The potential for risk from LMO pests depends in part on the intended use. As for other organisms, certain intended uses (such as high security contained use) may significantly manage risk.

S2 For LMOs, as with other pests, options within the country also include the use of emergency measures related to phytosanitary risks. Any emergency measures should be consistent with Article VII.6 of the IPPC.

3.4.6 Prohibition of commodities

If no satisfactory measure to reduce risk to an acceptable level can be found, the final option may be to prohibit importation of the relevant commodities. This should be viewed as a measure of last resort and should be considered in light of the anticipated efficacy, especially in instances where the incentives for illegal import may be significant.

3.5 Phytosanitary certificates and other compliance measures

Risk management includes the consideration of appropriate compliance procedures. The most important of these is export certification (see ISPM 7 (*Phytosanitary certification system*)). The issuance of phytosanitary certificates (see ISPM 12 (*Phytosanitary certificates*)) provides official assurance that a consignment is "considered to be free from the quarantine pests specified by the importing contracting party and to conform with the current phytosanitary requirements of the importing contracting party." It thus confirms that the specified risk management options have been followed. An additional declaration may be required to indicate that a particular measure has been carried out. Other compliance measures may be used subject to bilateral or multilateral agreement.

S2 Information on phytosanitary certificates regarding LMOs (as with any other regulated articles) should only be related to phytosanitary measures (see ISPM 12).

3.6 Conclusion of pest risk management

The result of the pest risk management procedure will be either that no measures are identified which are considered appropriate or the selection of one or more management options that have been found to lower the risk associated with the pest(s) to an acceptable level. These management options form the basis of phytosanitary regulations or requirements.

The application and maintenance of such regulations is subject to certain obligations in the case of contracting parties to the IPPC.

S1 Phytosanitary measures taken in relation to environmental hazards should, as appropriate, be notified to relevant competent authorities responsible for national biodiversity policies, strategies and action plans.

S1 It is noted that the communication of risks associated with environmental hazards is of particular importance to promote awareness.

Specific guidance on risk communication for plants as pests is provided in Annex 4.

3.6.1 Monitoring and review of phytosanitary measures

In accordance with the principle of modification (ISPM 1) the implementation of particular phytosanitary measures should not be considered to be permanent. After application, the success of the measures in achieving their aim should be determined by monitoring during use. This is often achieved by inspection of the commodity on arrival, noting any interceptions or any entries of the pest to the PRA area. The information supporting the pest risk analysis should be periodically reviewed to ensure that any new information that becomes available does not invalidate the decision taken.

4. Documentation of Pest Risk Analysis

4.1 Documentation requirements

The IPPC and the principle of transparency (ISPM 1) require that countries should, on request, make available the rationale for phytosanitary requirements. The whole process from initiation to pest risk management should be sufficiently documented so that when a review or a dispute arises, the sources of information and rationale used in reaching the management decision can be clearly demonstrated.

The main elements of documentation are:

- purpose for the PRA
- pest, pest list, pathways, PRA area, endangered area
- sources of information
- categorized pest list
- conclusions of risk assessment
  - probability
  - consequences
- risk management
  - options identified

. options selected.

This annex was adopted as part of a supplement by the Fifth Session of the Interim Commission on Phytosanitary Measures in April 2003.

The annex is a prescriptive part of the standard.

S1 ANNEX 1: Comments on the scope of the IPPC in regard to environmental risks

The range of pests covered by the IPPC extends beyond pests directly affecting cultivated plants. The coverage of the IPPC definition of pests includes plants as pests and other species that have indirect effects on plants, and the Convention applies to the protection of wild flora. The scope of the IPPC also extends to organisms that are pests because they:

- *directly affect uncultivated/unmanaged plants*

Introduction of these pests may have few commercial consequences, and therefore they have been less likely to be evaluated, regulated and/or placed under official control. An example of this type of pest is Dutch elm disease (*Ophiostoma novo-ulmi*).

- *indirectly affect plants*

In addition to pests that directly affect host plants, there are those, like most plants as pests (e.g. weeds and invasive plants), that affect plants primarily by other processes such as competition.

- *indirectly affect plants through effects on other organisms*

Some pests may primarily affect other organisms, but thereby cause deleterious effects on plant species, or plant health in habitats or ecosystems. Examples include parasites of beneficial organisms, such as biological control agents.

To protect the environment and biological diversity without creating disguised barriers to trade, environmental risks and risks to biological diversity should be analysed in a PRA.

This annex was adopted by the Sixth Session of the Interim Commission on Phytosanitary Measures in March–April 2004.
The annex is a prescriptive part of the standard.

S2 ANNEX 2: Comments on the scope of the IPPC in regard to pest risk analysis for living modified organisms

Phytosanitary risks that may be associated with a living modified organism are within the scope of the International Plant Protection Convention and should be considered using pest risk analysis to make decisions regarding pest risk management.

The analysis of LMOs includes consideration of the following:

- Some LMOs may present a phytosanitary risk and therefore warrant a PRA. However other LMOs will not present a phytosanitary risks beyond those posed by related non-LMOs and therefore will not warrant a complete PRA. For example, modifications to change the physiological characteristics of a plant (e.g. ripening time, storage life) may not present any phytosanitary risk. The pest risk that may be posed by an LMO is dependent on a combination of factors, including the characteristics of the donor and recipient organisms, the genetic alteration, and the specific new trait or traits. Therefore, part of the supplementary text (see Annex 3) provides guidance on how to determine if an LMO is a potential pest.
- PRA may constitute only a portion of the overall risk analysis for import and release of a LMO. For example, countries may require the assessment of risks to human or animal health, or to the environment, beyond that covered by the IPPC. This standard only relates to the assessment and management of phytosanitary risks. As with other organisms or pathways assessed by an NPPO, LMOs may present other risks not falling within the scope of the IPPC. When an NPPO discovers potential for risks that are not of phytosanitary concern it may be appropriate to notify the relevant authorities.
- Phytosanitary risks from LMOs may result from certain traits introduced into the organism, such as those that increase the potential for establishment and spread, or from inserted gene sequences that do not alter the pest characteristics of the organism but that might act independently of the organism or have unintended consequences.
- In cases of phytosanitary risks related to gene flow, the LMO is acting more as a potential vector or pathway for introduction of a genetic construct of phytosanitary concern rather than as a pest in and of itself. Therefore, the term “pest” should be understood to include the potential of an LMO to act as a vector or pathway for introduction of a gene presenting a potential phytosanitary risk.
- The risk analysis procedures of the IPPC are generally concerned with phenotypic characteristics rather than genotypic characteristics. However, genotypic characteristics may need to be considered when assessing the phytosanitary risks of LMOs.
- Potential phytosanitary risks that may be associated with LMOs could also be associated with non-LMOs. It may be useful to consider risks associated with LMOs in the context of risks posed by the non-modified recipient or parental organisms, or similar organisms, in the PRA area.

This annex was adopted by the Sixth Session of the Interim Commission on Phytosanitary Measures in March–April 2004. The annex is a prescriptive part of the standard.

S2 ANNEX 3: Determining the potential for a living modified organism to be a pest

This annex is relevant for living modified organisms only where there is potential for phytosanitary risks from the LMO associated with some characteristic or property related to the genetic modification. Other phytosanitary risks associated with the organism should be assessed under other appropriate sections of ISPM 11 or under other appropriate ISPMs.

The information requirements outlined in section 1.3 may be needed in determining the potential for an LMO to be a pest.

Potential phytosanitary risks for LMOs

Potential phytosanitary risks for LMOs may include:

a. Changes in adaptive characteristics which may increase the potential for introduction or spread, for example alterations in:

- tolerance to adverse environmental conditions (e.g. drought, freezing, salinity)
- reproductive biology
- dispersal ability of pests
- growth rate or vigour
- host range
- pest resistance
- pesticide (including herbicide) resistance or tolerance.

b. Adverse effects of gene flow or gene transfer including, for example:

- transfer of pesticide or pest resistance genes to compatible species
- the potential to overcome existing reproductive and recombination barriers resulting in pest risks
- potential for hybridization with existing organisms or pathogens to result in pathogenicity or increased pathogenicity.

c. Adverse effects on non-target organisms including, for example:

- changes in host range of the LMO, including the cases where it is intended for use as a biological control agent or organism otherwise claimed to be beneficial
- effects on other organisms, such as biological control agents, beneficial organisms, or soil fauna and microflora, nitrogen-fixing bacteria, that result in a phytosanitary impact (indirect effects)
- capacity to vector other pests
- negative direct or indirect effects of plant-produced pesticides on non-target organisms beneficial to plants.

d. Genotypic and phenotypic instability including, for example:

- reversion of an organism intended as a biocontrol agent to a virulent form.

e. Other injurious effects including, for example:

- phytosanitary risks presented by new traits in organisms that do not normally pose phytosanitary risk
- novel or enhanced capacity for virus recombination, trans-encapsidation and synergy events related to the presence of virus sequences
- phytosanitary risks resulting from nucleic acid sequences (markers, promoters, terminators etc.) present in the insert.

The potential phytosanitary risks identified above can also be associated with non-LMOs. The risk analysis procedures of the IPPC are generally concerned with phenotypic characteristics rather than genotypic characteristics. However, genotypic characteristics may need to be considered when assessing the phytosanitary risks of LMOs.

If there is no indication that new traits resulting from genetic modifications have phytosanitary risks, the LMO may require no further consideration.

It may be useful to consider potential risks in the context of risks posed by the non-modified recipients or parental organisms, or similar organisms, in the PRA area.

In cases of phytosanitary risks related to gene flow, the LMO is acting more as a potential vector or pathway for introduction of a genetic construct of phytosanitary concern rather than as a pest in and of itself. Therefore, the term "pest" should be understood to include the potential of an LMO to act as a vector or pathway for introduction of a gene presenting a potential phytosanitary risk.

Factors that may result in the need to subject a LMO to Stage 2 of the PRA include:

- lack of knowledge about a particular modification event
- the credibility of information if it is an unfamiliar modification event
- insufficient data on the behaviour of the LMO in environments similar to the PRA area
- field experience, research trials or laboratory data indicating that the LMO may pose phytosanitary risks (see subsections a. to e. above)
- where the LMO expresses characteristics that are associated with pests under ISPM 11
- existing conditions in the country (or PRA area) that may result in the LMO being a pest
- where there are PRAs for similar organisms (including LMOs) or risk analyses carried out for other purposes that indicate a pest potential
- experience in other countries.

Factors that may lead to the conclusion that an LMO is not a potential pest and/or requires no further consideration under ISPM 11 include:

- where the genetic modification in similar or related organisms has previously been assessed by the NPPO (or other recognized experts or agencies) as having no phytosanitary risk
- where the LMO is to be confined in a reliable containment system and not be released
- evidence from research trials that the LMO is unlikely to be a pest under the use proposed
- experience in other countries.

This annex was adopted by the Eighth Session of the Commission on Phytosanitary Measures in April 2013.
The annex is a prescriptive part of the standard.

ANNEX 4: Pest risk analysis for plants as quarantine pests

Introduction

This annex provides specific guidance on conducting PRA to determine if a plant is a pest of cultivated or wild plants, whether it should be regulated, and to identify phytosanitary measures that reduce the pest risk to an acceptable level. It focuses primarily on plants proposed for import, whether as plants for planting or for other intended uses. It does not cover the unintentional introduction of plants as contaminants in commodities or conveyances.

The number and diversity of plants being moved between and within countries is increasing as opportunities for trade increase and markets develop for new plants. Movements of plants may imply two types of pest risk: the plant (as a pathway) may carry pests, or the plant itself may be a pest. The risk of introducing pests with plants as a pathway has long been recognized and widely regulated. However, pest risk posed by plants as pests requires specific consideration.

Plants as pests

Plants as pests may affect other plants through competition for space and resources, such as light, nutrients and water, or through parasitism or allelopathy. Plants introduced to a new area may also become pests by hybridizing with cultivated plants or wild plants.

Thus, the protection of plants as pursued through the IPPC may include considering certain plants as pests, and taking phytosanitary measures to prevent their introduction and spread. Determining which plants are pests is context-specific and may vary with geography, habitat, land use, time and the perceived value of the natural resources in the endangered area. PRA should form the basis of such a determination and subsequent decisions regarding possible regulation of the plant species as a quarantine pest. It should be noted that plants having undergone such analysis may also require assessment of their potential to be pathways for other pests.

The IPPC has recognized the importance of plants as pests by underscoring that the definition of “pest” includes weeds (ICPM, 2001), and by specifically including “plants that are invasive alien species” in a range of recommendations for action for those invasive alien species that are pests of plants (ICPM, 2005). This annex provides some specific guidance on how to apply these recommendations. The 2004 revision of ISPM 11 introduced specific elements of conducting a PRA for plants as pests that are further elaborated in this annex.

The IPPC is concerned with pests injurious to cultivated and wild plants (see Annex 1 of this standard), and therefore weeds and invasive plants that are injurious to other plants should be considered pests in the IPPC context. Henceforth in this annex, the terms “weed” and “invasive plants” are not used, but only the single term “plants as pests”[2].

The remainder of the text generally follows the sequence of ISPM 11, with the corresponding sections of the standard indicated in parentheses. In each section, guidance is provided on the analytical aspects particular to plants as pests.

Stage 1: Initiation

Initiation points

The PRA process for plants as quarantine pests will most frequently arise in situations such as:

- a request is made to import a plant not previously imported

[2] “Invasive plants” are often taken to mean invasive alien species in the CBD sense (see ISPM 5, Appendix 1). The term “weed” usually refers to pests of cultivated plants. However, some countries use the term “weed” irrespective of whether cultivated plants or wild flora are at risk, and other countries use the term “noxious weed”, “landscape weed”, “environmental weed” or similar terms to distinguish them from plants only affecting crops.

- a plant already available and used in a country is suspected of posing a pest risk, e.g. because of new evidence or anticipated changes in its intended use
- a decision is made to review or revise phytosanitary policies.

Pre-selection

ISPM 2 (*Framework for pest risk analysis*) describes, as part of the initiation stage, a pre-selection step intended for determining whether or not an organism is a pest, and provides some indicators that a plant may be a pest. Particular attention is needed for plants that have proven to be pests elsewhere or that have intrinsic characteristics such as high propagation rate or strong competitive or propagule dispersal abilities. In most cases, consideration of these factors in Stage 1 of the PRA may not be sufficient to terminate the process; however, in cases where it is clearly determined that the plant is only suited to a specific type of habitat that does not exist in the PRA area, it may be concluded that the plant cannot become a pest in that area and the PRA process may stop at that point.

Stage 2: Pest risk assessment

Identity of the plant (refer to section 2.1.1.1)

The species is the taxonomic level usually considered in PRA. However, in the case of cultivated plants that may be pests, lower taxonomic levels may be used where there are scientifically sound rationales. The taxonomic level appropriate for conducting the PRA for a particular plant as a pest should be determined by the NPPO.

Some particular considerations regarding the identity of plants as pests may include the following:

- The taxonomic identity of the plant may be unclear because it has been obscured by breeding or hybridization or is the subject of plant breeders' rights. This is particularly relevant for horticultural plants. The NPPO should acquire the best possible information about the identity and parentage of the plant from various sources (e.g. the prospective importer, plant breeders, scientific literature).
- The use of taxonomic levels below the species (i.e. subspecies, variety, cultivar) may be justified if there is scientific evidence demonstrating that differences in characteristics are stable and significantly affect phytosanitary status. Examples may include differences in adaptability to environmental conditions, ability to exploit resources, ability to defend against herbivores, and methods of reproduction or propagule dispersal.
- The evaluation of a hybrid should be based on information specific to that hybrid where available. Where such information does not exist, PRA may be conducted on the parent species to determine their pest risk. If either parent is determined to be a pest and the associated risk is deemed unacceptable, this information may form the basis of the risk assessment for the hybrid. However, as hybrids do not always express similar characteristics to their parent species, that approach may significantly increase the assessment uncertainty and should be used with caution.

Presence or absence in the PRA area (refer to section 2.1.1.2)

Determination of presence or absence in the PRA area is a particular challenge for NPPOs when plants are proposed for import because the plants may already be growing in locations (e.g. botanical gardens, home gardens) that may not be reported. Sources of information may include horticultural, agricultural, forestry and aquaculture publications and databases. The NPPO may need to carry out particular surveys to obtain information on presence and distribution.

The presence or absence of wild or cultivated relatives in the PRA area should also be determined in the case where there is scientific evidence that the plant may hybridize with such local relatives.

Intended use

The PRA should include consideration of the intended use (refer to ISPM 32 (*Categorization of commodities according to their pest risk*)) of the plants as this may affect the probability of establishment, spread and economic consequences. However, it should also be recognized that plants, once entered, may escape or be diverted from the use for which they were originally intended.

In the case of plants for planting, significant human effort is made to ensure their continuous survival and, in some cases, successful reproduction because of their perceived benefits. Furthermore, the plants for planting have often been selected to be well suited for growing in the importing country. This significantly increases the likelihood of establishment and spread. Therefore, plants for planting are generally considered to pose the highest risk. Examples of uses, broadly in the order of decreasing risk at the time of planting, are:

- planting in the open landscape without management (e.g. for soil erosion control, waste water treatment and carbon dioxide uptake, or as aquatic plants in watercourses or ponds)
- planting in the open landscape with management (e.g. in forestry, agriculture (including for biofuel), horticulture, land reclamation and golf courses, or as cover crops)
- planting outdoors in urban areas (e.g. for amenity purposes in roadsides, parks or gardens)
- planting indoors only.

Plants for intended uses other than planting may be considered, including for human consumption or animal feed, processing, combustion for energy production, or research.

Habitats, locations and endangered areas

Plants imported for planting may be destined for a particular geographic location of a particular habitat. However, the NPPO should assess:

- the probability that the plants could establish in habitats in the PRA area other than where they were intended to grow (i.e. to what degree other habitats are suitable for the plant)
- the probability that the plants could spread from the location where they were intended to grow.

The overall area of suitable habitats where the presence of the plant would result in economically important loss constitutes the endangered area.

The analysis of suitable habitats is analogous to the analysis of host plants for other pests (in the case of parasitic plants, both host and habitat need to be considered). The guidance provided in section 2.2.2 (and its subsections) of this standard can generally be used, substituting the terms “host” and “host range” with “suitable habitat”.

Probability of entry (refer to section 2.2.1)

For imported plants, the probability of entry need not be assessed. Nevertheless, an estimation of the volume, frequency and destinations of prospective imports may be needed in order to assess the likelihood of establishment and spread.

Historical evidence of pest behaviour

The most reliable predictor of establishment, spread and potential economic consequences of a plant as a pest is the history of that plant as a pest when introduced into new areas with similar habitats and climate. Where such a history is documented, the assessment should use this information, comparing whether the habitat and climate conditions are sufficiently similar in the PRA area. However, a plant may never have been moved out of its native range where it may be controlled by naturally occurring enemies or other biotic or abiotic factors. In such cases, no historical evidence exists of establishment, spread or economic consequences.

Probability of establishment (refer to section 2.2.2)

The assessment of the probability of establishment should consider the suitability of the climate, other abiotic and biotic factors (see section 2.2.2.2), and cultural practices (see section 2.2.2.3). The assessment should compare the conditions in habitats within the PRA area to the conditions in habitats in which the plant currently occurs. Depending on the information available, the following may be incorporated:

- *climate:* suitability of current climates and, for long-lived plants, future projected climates
- *other abiotic factors:* soil characteristics, topography, hydrology, natural fires, etc.

- *biotic factors:* current vegetation, degree of disturbance, presence or absence of natural enemies and competitors
- *cultural practices in crops or managed plant communities:* herbicide usage, harvesting, soil cultivation, burning, etc. (including side-effects such as aerial deposition of nitrogen or pesticides).

Where the history of a particular plant as a pest is not well documented, the assessment should consider intrinsic characteristics of the plant that may predict establishment (refer to section 2.2.2.4). Although intrinsic characteristics have sometimes been shown to be poor predictors, the following may be considered:

- *reproductive characteristics:* sexual and asexual mechanisms, dioecism, duration of flowering, self-compatibility, reproduction frequency, generation time
- *adaptive potential (of individuals and populations):* genotypic or phenotypic plasticity, hybridization potential
- *propagule attributes:* volume and viability, dormancy
- *tolerance or resistance:* response to pests, herbicides, grazing and other cultural practices, drought, flooding, frost, salinity, climate changes.

Many plants as pests are opportunists with a strong potential to become established in disturbed habitats. Plants with a robust dormancy combined with a prolific reproductive ability are particularly suited for such an opportunistic strategy. Disturbed habitats are common; therefore, plants with such opportunistic adaptations may encounter many opportunities for establishment and spread.

Probability of spread (refer to section 2.2.3)

The likelihood and extent of spread depends on natural and human-mediated factors. Natural factors may include:

- intrinsic characteristics of the plant species (in particular regarding reproduction, adaptation and propagule dispersal)
- existence of natural means of spread (e.g. birds and other animals, water, wind)
- existence and spatial pattern of suitable habitats and dispersal corridors connecting them.

Human-mediated factors, whether intentional or unintentional, may include:

- intended use, consumer demand, economic value and ease of transport
- the movement of propagules as a contaminant of soil or other materials (e.g. clothing, conveyances, machinery, tools, equipment)
- the discarding of plants (e.g. after flowering or when private aquaria are emptied)
- disposal procedures (e.g. composting) for waste that contains plants.

There are often long time lags between a plant’s initial introduction and its later spread. As a consequence, even in the cases where establishment may be well documented, the potential for later spread may be less known. If evidence exists, the following factors may need to be considered:

- changes in abiotic factors (e.g. an increase in aerial deposition of nitrogen or sulphur)
- changes in the genetic profile of the plant species (e.g. through natural selection, genetic drift)
- long generative time or time to maturity
- emergence of novel uses for the plant
- relatively rare dispersal events that move propagules from suboptimal to optimal habitats
- changes in land use or disturbance pattern (e.g. following natural floods, natural fires)
- changes in climate (e.g. warmer climate changes in precipitation patterns).

Assessment of potential economic consequences (refer to section 2.3)

Plants as pests may have a variety of economic consequences, including yield losses in agriculture, horticulture and forestry; reduction of recreational value; or reduction of biodiversity and negative effects on other parts of the ecosystem. Assessment of economic consequences of plants as pests may be inherently difficult because they may have broad agricultural, environmental and social consequences that may be non-specific, not readily apparent or not easily quantified (e.g. changes in the soil's nutrient profile).

It is important to consider the potential long-term economic consequences for the entire PRA area, including where the plants are intended to grow. The most reliable predictor of potential economic consequences is evidence of consequences elsewhere, particularly in areas with similar habitats. However, in some cases, plants have never been moved out of their native ranges and therefore may not have had an opportunity to express any potential consequences. In the absence of evidence of economic consequences elsewhere, consideration may be given to whether or not the plant possesses intrinsic characteristics that predict pest potential, such as those discussed above and in section 2.2.2.4 related to establishment and spread.

Stage 3: Pest risk management (refer to section 3.4)

Plants for planting will usually be introduced into habitats suitable for their establishment and growth. In such cases, most pest risk management options would be counterproductive to the intended use. In general, for plants for planting considered quarantine pests, the most effective risk management option is prohibition (refer to section 3.4.6). However, those plants may at the same time have a perceived benefit that may be considered in the decision-making process following the PRA.

For specific situations, other pest risk management options may be pursued, including:

- requirements for growing plants under confinement
- requirements for harvesting plants at a certain stage or specified time to prevent opportunities for reproduction
- restriction of plants to particular locations, such as those that are marginally suitable
- restriction of import to specified cultivars or clones
- restrictions on the disposal of excess or waste plant material
- other restrictions on planting, growing, sale, holding, transport or disposal
- considering the use of codes of conduct for sale, holding, transport, planting or disposal, for example, in the form of internal rules or guidelines within the plant industry to refrain from or restrict the selling of particular plants for specific intended uses.

For plants imported for consumption or processing, risk management options may include restrictions on transport, storage, locations of import and use, sale, waste disposal, time of year import takes place, and requirements regarding the processing or treatments (e.g. devitalization).

In identifying risk management options, the suitability of control measures, ease of detection, identification of and access to the plants, time needed for effective control and difficulty of eradication or containment should be considered. For example, plants in highly managed systems such as cropping systems may be more easily controlled than plants in natural or semi-natural habitats, or in private gardens. Many of the factors considered under "establishment" and "spread" also influence a plant's response to control measures and thus the feasibility of control.

In cases where the assessed plants are present in collections (e.g. botanical gardens) and import regulation is considered, phytosanitary measures may have to be applied to those collections.

Irrespective of risk management options, where the import of a plant is allowed, it may be appropriate to develop post-entry systems such as surveillance in the PRA area, contingency plans, and systems to report new occurrences.

Aspects common to all PRA stages

Risk communication (refer to ISPM 2)

Plants intentionally introduced for planting may not be perceived as a threat by the public, or by particular stakeholders, who may perceive the plants as purely beneficial. Furthermore, in many countries authorities other than the NPPO have responsibilities under the Convention of Biological Diversity with regard to plants intentionally introduced for planting. Therefore, risk communication may be particularly important in relation to plants as pests.

Risk communication may include for example:

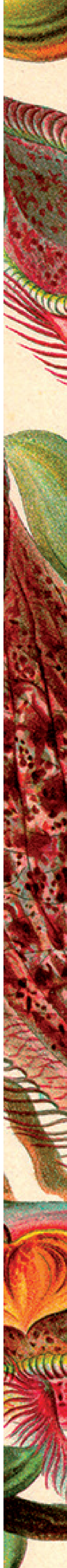
- consultation with importers, research institutes and other governmental and non-governmental organizations (e.g. environmental protection agencies, parks departments, nurseries, landscapers) to exchange information on plants as potential pests
- publication of lists of plants as quarantine pests
- labelling of plants in commerce (e.g. explaining the pest risk the plants may pose and under which conditions the pest risk may occur).

IPPC

The International Plant Protection Convention (IPPC) is an international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. International travel and trade are greater than ever before. As people and commodities move around the world, organisms that present risks to plants travel with them.

Organization

- There are over 180 contracting parties to the IPPC.
- Each contracting party has a national plant protection organization (NPPO) and an Official IPPC contact point.
- Nine regional plant protection organizations (RPPOs) work to facilitate the implementation of the IPPC in countries.
- IPPC liaises with relevant international organizations to help build regional and national capacities.
- The Secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).



Food and Agriculture Organization of the United Nations

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PLANT QUARANTINE MANUAL
TASMANIA

REQUIREMENTS AND PROCEDURES FOR THE IMPORT AND EXPORT OF PLANTS, PLANT PRODUCTS AND OTHER PRESCRIBED MATTER FOR THE PURPOSE OF THE PLANT QUARANTINE ACT 1997 (TASMANIA)

Tasmania

DEPARTMENT *of* PRIMARY INDUSTRIES, WATER *and* ENVIRONMENT

Appendix C

DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT

Tasmania

PLANT QUARANTINE MANUAL TASMANIA

(FOR THE USE OF BUSINESSES AND INDIVIDUALS INVOLVED IN IMPORTING AND EXPORTING)

ISSUED BY:

DATE: 23 September 2005

Danny Reardon
STATE MANAGER
QUARANTINE TASMANIA

APPROVED:……………………………………..

DATE:…………………………….

KIM EVANS
SECRETARY
DEPARTMENT of PRIMARY INDUSTRIES WATER and ENVIRONMENT

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1. INTRODUCTION

1.1 Authority

Section 105 of the *Plant Quarantine Act 1997* provides for the making of regulations that "may apply, adopt or incorporate any matter contained in any document, code, standard, rule, specification or method formulated, issued, prescribed or published by any authority or body...".

The Plant Quarantine Manual (Tasmania) is produced and issued by Quarantine Tasmania, a branch of the Department of Primary Industries, Water and Environment Tasmania, in accordance with these provisions and under the authority of the Secretary of this Department. Regulation 7 of the *Plant Quarantine Regulations 1998* brings this Manual into force.

The Act gives the Secretary wide-ranging powers for dealing with "prescribed matter". This is defined in the Act and includes such things as plants, vehicles, soil and disease agents (see Section 1.4.1 of this Manual for the Act's definition of the term "prescribed matter"). The Secretary's powers include the imposition of prohibitions and restrictions on certain materials and activities.

Section 98(1)(d) of the Act provides for directions made by an Inspector (Quarantine Officer) to incorporate or refer to a code or standard or other document, if a copy of the relevant part is attached to the direction.

1.2 Purpose

The purpose of the Plant Quarantine Manual is to give practical expression to the law, to enable timely changes to be made in response to new situations, and to assist commercial enterprises and the general public to comply with the Act. It details or refers to all the practical measures needed to fulfil the requirements of the Act.

1.3 References

PLANT QUARANTINE ACT 1997

PLANT QUARANTINE REGULATIONS 1998

TASMANIAN GOVERNMENT GAZETTE, p 1931, 20 December 2000:
- *Notice under Sections 66 and 67 - PROHIBITED AND RESTRICTED PLANTS AND PLANT PRODUCTS*
- *Notice under Section 68 - CONDITIONS AND RESTRICTIONS RELATING TO PRESCRIBED MATTER*

LIST OF DECLARED PESTS AND DISEASES (PUBLISHED ANNUALLY)

1.4 Definition of Terms

1.4.1 Terms Used in the Act

Terms used in this Plant Quarantine Manual that are identical to those used in the *Plant Quarantine Act 1997* have the same interpretation as those in the Act. The definitions of some commonly used terms are given below.

DEFINITION OF TERMS

"agricultural equipment" means-
any equipment or vehicle used for the culture, harvesting, packing or processing of any plant or plant product;

"approved" means-
approved by the Secretary;

“approved quarantine place” means-
any place approved by the Secretary for the purpose of examining any prescribed matter imported into or to be exported out of the State (see Section 70.(1) of the Plant Quarantine Act 1997 for more information);

"disease" means-
any disease of plant or plant product declared by the Secretary by public notice to be a disease; and any disease agent that may cause such disease;

"inspector" means-
any person appointed as such by the Secretary under section 49 of the *Plant Quarantine Act 1997*;

"package" means-
anything in, or by, which a plant or plant product may be contained, wrapped or packed; and anything on which a plant or plant product may be located;

"pest" means-
any organism declared by the Secretary by public notice to be a pest;

"place" includes-
any land, road, premises, river, lake or other body of water;

"plant" means-
any organism other than an organism within the animal kingdom;

"plant product" includes-
the whole or part of any flower, fruit, nut, seed, leaf, bulb, corm, tuber or stem that has been separated from a plant; and any dried plant material and timber that has been sawn or dressed;

"premises" includes-
any building or structure;

"prescribed matter" means-
any plant, plant product, new or used package, vehicle, new or used agricultural equipment, soil and disease agent;

"public notice" means-
a notice published in any newspaper, magazine or the Gazette or broadcast on radio or television or affixed to any premises or fence;

"Secretary" means-
the Secretary of the Department of Primary Industries, Water and Environment;

"soil" includes-
any substance that may be contaminated by any pest or disease.

1.4.2 Supplementary Terms

“accompanied” includes-
information transmitted in an electronic format approved by the Secretary.

"approved person" means-
a person who is either:

a. an officer of the Department of Agriculture or equivalent organisation in a State or Territory of Australia or in another country; **or**

b. a person approved by the Secretary for the signing of certificates or declarations and employed in a business operating under a protocol, assurance arrangement or other agreement made with the Department of Primary Industries, Water and Environment.

“certificate” includes-
a certificate or information provided in an electronic format approved by the Secretary.

“signed” includes-
information in an electronic format approved by the Secretary as being sufficient to identify an approved person.

1.5 Distribution

1.5.1 Printed Copies

Interested individuals or businesses may obtain a printed copy of the Manual by applying to the **Manual Distribution Officer** at the **Hobart Quarantine Centre** (**see "Quarantine Offices and Points of Contact" above**). A fee will be charged for this service. Amendments to the manual will be issued to individuals and businesses on application and payment of a fee. Organisations and businesses may copy any parts of the Manual issued to them for use by their staff, however the organisation or business is responsible for ensuring that their staff receive updates for the manual when amendments are issued.

1.5.2 Electronic Copy

A complete version of the Manual is available on the Department of Primary Industries, Water and Environment web site at: www.dpiwe.tas.gov.au.

Go to the above site, select ‘Quarantine’; on this page select ‘Plant Quarantine Manual’ then follow the prompts.

This will be updated regularly as changes to import requirements occur in response to changes in the pest and disease status of other States and Territories and as developments occur in acceptable methods of treatment for quarantinable pests and diseases.

2. GENERAL PROCEDURES

2.1 Fees and Charges

Part 2 of the Regulations, made under Section 104 (2)(b), (c) and (3) of the Act, covers fees and charges. Schedule 1 of the Regulations details the fees and charges, which are applicable to a wide range of Quarantine services. They are calculated on a cost-recovery basis in accordance with the Department of Primary Industries, Water and Environment Pricing Policy.

The following is a summary of conditions in the Regulations relating to fees and charges:

- Fees and charges paid within 30 days of invoicing attract a 4% discount (Regulation 4).

- Fees and charges are payable for each person required to perform the task (Regulation 5 (1)).

- Fees and charges are payable by the importer or an agent of the importer (Regulation 5, Part 3 (a), (b)).

2.2 Infringement Notices

Division 5 of the Act covers the serving of infringement notices. These may be served for the offences that are prescribed in Schedule 2 of the Regulations. Infringement notices are used by a wide range of Government agencies, including Parks and Wildlife, Police, Marine Police, Inland Fisheries and now Quarantine Officers. They are intended to allow simple finalisation of less complex cases, where proceedings may be agreed by all parties to be unnecessary.

For the serving of infringement notices, Schedule 2 of the Regulations distinguishes between fines payable by a "body corporate" and a “natural person”.

The serving of an infringement notice effectively charges the person or company with violating one or more of the requirements of the *Plant Quarantine Act 1997*.

The person or company may accept an infringement notice and pay the fine. This is equivalent to pleading guilty, and avoids court proceedings. However, if they decline to accept the notice, criminal proceedings can be taken against them under Section 93(4) of the Act. It should be noted that this may result in a harsher penalty being imposed.

Section 89(2) of the Act allows for one infringement notice to include up to three offences.

A penalty (fine) under an infringement notice cannot be paid "on the spot". It must be paid by one of the methods as stated on the reverse of the recipient’s copy of the infringement notice.

Sections 91, 92, 93 and 94 of the Act cover acceptance and payment procedures for penalties under infringement notices.

2.3 Audits

Audits of quality assurance arrangements, and of other types of arrangement between Quarantine Tasmania and accredited businesses, are undertaken on a regular basis. The procedures for performing audits and the frequency of audits will be discussed at the time the business enters into an arrangement with Quarantine Tasmania.

3. CONDITIONS OF ENTRY FOR PLANTS AND PLANT PRODUCTS

3.1 General Conditions of Entry

3.1.1 Permitted Entry Points

Any plants or plant products imported or brought into this State may be landed only:

a. at the following ports:

Hobart	Lady Baron
Risdon	Bridport
Port Huon	St. Helens
Spring Bay	Devonport
Strahan	Burnie
Launceston	Port Latta
Bell Bay	Wynyard
Inspection Head	Stanley
Longreach	Smithton
Whitemark	Grassy
Naracoopa	Currie

or
b. at the following airports

Hobart Airport	Whitemark Airport
Cambridge Airport	Devonport Airport
Launceston Airport	Wynyard Airport
St. Helens Aerodrome	Smithton Airport
Bridport Aerodrome	King Island Aerodrome

3.1.2 Inspection of Plants and Plant Products

Any person who brings or imports plants or plant products into Tasmania at any one of the ports or airports listed above must:

a. **present them for inspection** prior to their removal from the port or airport; **and**

b. **present the following documentation** to the inspector:

(i) a notice in accordance with a **Notice of Intention to Import Plants or Plant Products or Grain/Seed into Tasmania** (see Appendix 3); **and**

(ii) the **certificate(s) as prescribed** in Section 3.2 - Specific Conditions of Entry.

c. when the inspector has examined any plants or plant products and is satisfied that they meet the import requirements detailed in Section 3.2 - Specific Conditions of Entry, the inspector will release them by issuing the **Certificate of Release** (see Appendix 3).

d. if the inspector is not satisfied that the plants or plant products meet the import requirements the inspector will order the plants or plant products into quarantine by issuing a **Quarantine Notice** (see Appendix 3). Section 3.1.3, below, outlines the options for the inspector once plants or plant products have been ordered into quarantine.

3.1.3 Breach of Conditions

Any person who imports plants or plant products into Tasmania in breach of these conditions is liable to prosecution under the *Plant Quarantine Act 1997* including, where appropriate, a penalty (fine) under an infringement notice, as detailed in the *Plant Quarantine Regulations 1998*; **and**

the plants or plant products will:

a. at the direction of an inspector be held in quarantine for up to 72 hours to allow the importer to present the prescribed certificates; **or**

b. at the discretion of the inspector:

(i) be re-shipped from the port of entry or returned from the airport at which they were landed; **or**

(ii) be destroyed by an inspector or a person authorised by an inspector to do so.

3.1.4 Condition of Packages

All packages containing plants or plant products imported into the State must be:

a. in good repair and clean; **and**

b. free from any pest or disease; **and**

c. free from any plant residue, soil or other growing medium which harbours, or is likely to harbour, any pest or disease; **and**

d. clearly labelled or branded so that the contents and the name and address of the grower(s) are readily identifiable.

3.2 Specific Conditions of Entry

3.2.1 All *prescribed matter and anything else that may harbour injurious pests or diseases must be presented for inspection on arrival in the State and will be seized and denied entry, treated or destroyed if necessary to prevent the incursion of any pest or disease or the possibility of any pest or disease gaining entry to the State.

(for definition of prescribed matter see page 7)

3.2.2 Import Requirements Table

Following is a table of plants, plant products and other *prescribed matter that refers to the import requirements for each. The table also shows the disease and/or pest risks associated with each plant, fruit or vegetable.

The Import Requirements are detailed in **Section 3.2.3 - Import Requirement Details**

Pest and Disease Risk Key for Import Requirements Table

AA	Argentine Ant (*Linepithema humile*)	GS	Green Snail (*Helix aperta*)
ANTH	Anthracnose of Lupins (*Colletotrichum acutatum* VCG 1 or 2)	PCN	Potato Cyst Nematode (*Globodera rostochiensis* and *Globodera pallida)*
AWF	Ash Whitefly (*Siphoninus phillyreae*)	PHY	Phylloxera (*Daktulosphaira vitifolii*)
BR / BW	Brown Rot / Bacterial Wilt (*Pseudomonas solanacearum*)	PW	Pea Weevil (*Brucchus pisorum)*
BBR	Blueberry Rust *(Pucciniastrum vaccinii)*	RIFA	Red Imported Fire Ant *(Solenopsis invicta)*
BS	Boil Smut (*Ustilago maydis)*	S	Onion Smut *(Urocystis cepulae)*
CC	Citrus Canker (*Xanthomonas axonopodis pv. citri*)	SJS	San Jose Scale (*Comstockaspis perniciosus*)
CPB	Chickpea Blight *(Ascochyta rabiei)*	PSTV	Potato Spindle Tuber Viroid
CWR	Chrysanthemum White Rust (*Puccinia horiana*)	SWF	Spiralling Whitefly (*Aleurodicus dispersus*)
FB	Fire Blight (*Solenopsis invicta*)	TBM	Tobacco Blue Mould (*Peronospora hyoscyami*)
FF	Fruit Fly (Qfly, Med fly) *(Bactrocera tryoni, Ceratitis capitata)*:	TP	*Thrips palmi* (Melon Thrips)
W	Declared Weeds	WFT	Western Flower Thrips (Frankliniella occidentalis)

NOTE:

- ***ALL PLANTS, PLANT PRODUCTS, OTHER PRESCRIBED MATTER SUCH AS VEHICLES AGRCULTURAL MACHINERY AND EARTH-MOVING EQUIPMENT AND ANY OTHER THING THAT MAY HARBOUR PLANT PESTS OR DISEASES ARE SUBJECT TO INSPECTION ON ARRIVAL AND TREATMENT IF NECESSARY.***

- ***CONDITIONS FOR IMPORTING AGRICULTURAL MACHINERY AND VEHICLES ARE LISTED IN SECTION 4.2 AND IN INDIVIDUAL IMPORT REQUIREMENTS WHERE APPLICABLE.***

Notes:
(1) A "/" between numbers indicates alternative requirements.
(2) ALL PLANT MATERIAL MUST IN GENERAL BE FREE FROM SOIL.

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
ABALONE MUSHROOM				INSECTS, SOIL
AGRICULTURAL MACHINERY			9, 10, 11, 15, 22, 27, 28, 31	PCN, PSTV, BR/BW, PHY, S, FB, ANTH, CPB, BBR, CC, W, SOIL
ANISEED (FRESH HERB)	19, 23, 24, 25			WFT, SWF, AWF, GS, RIFA
APPLE	1/2A/4A/5, 18,	15, 16, 18, 19, 23, 24, 25, 26, 29		FF, FB, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
APPLE CUCUMBER	20,	15, 19, 23, 24, 25, 26, 29		TP, WFT, SWF, AWF, GS, AA, PCN, RIFA
APPLE (toffee)	1/2A/4A/5, 18			FF, FB
APRICOT	1/2A/4A/5,	15, 16, 19, 23, 24, 25, 29		FF, SJS, WFT, SWF, AWF, GS, PCN, RIFA
ARTICHOKE (GLOBE)	19, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
ARTICHOKE (JERUSALEM)	29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
ASPARAGUS	19, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
AVOCADO	1/2A/2B/4B/5/6A/8C	15, 19, 23, 24, 25, 26, 29		FF, SWF, AWF, GS, AA, PCN, RIFA
BABACO	1/2A/4A/5/7B	15, 19, 23, 24, 25, 26		FF, WFT, SWF, AWF, GS, AA, RIFA
BANANA	1/2A/2B/5/7A/7B/8A/8B	15, 19, 23, 24, 25, 26		FF, WFT, SWF, AWF, GS, AA, RIFA
BARLEY			(GRAIN, SEED) ❖12 III., ▲22, 30	❖PW, ▲ANTH, INSECTS, W, SOIL
BEAN	20	15, 19, 20, 23, 24, 25, 26, 29		TP, WFT, SWF, AWF, GS, AA, PCN, RIFA
BERRY (*RUBUS spp*)	1/2A/4A/5, *18	15, *18, 19, 23, 24, 25, 26, 29		FF, *FB, WFT, SWF, AWF, GS, AA, PCN, RIFA
BERRY (NOT OTHERWISE SPECIFIED, inc. *Ribes spp, Vaccinium spp* and *Gaylussacia*)	1/2A/4A/5, ♦28	15, ✤16,19, 23, 24, 25, 26, ♦28, 29		FF, ✤SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA, ♦BBR
BEETROOT (*with top)	*19, *24, *25, 29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
BROCCOLI	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA,
BRUSSELS SPROUTS	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
BULBS (DORMANT) NOT OTHERWISE SPECIFIED			26, 29	AA, PCN, W, SOIL
CABBAGE	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
CAPSICUM	1/2A/3C/4A/5, 17, 20	15, 17, 19, 20, 23, 24, 25, 26, 29	(SEED) 17, 30	FF, TP, TBM, WFT, SWF, AWF, GS, AA, PCN, RIFA, W

* Thornless blackberry and raspberry
✤ All *Ribes spp* including blackcurrant, redcurrant, whitecurrant, josterberry,

gooseberry and ornamentals

❖ For seed or grain that may contain peas as a contaminant

♦ All *Vaccinium spp* including blueberry, huckleberry, cranberry, bilberry*; Gaylussacia* (huckleberry)

▲ For seed or grain that may contain lupins as a contaminant

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
CARAMBOLA (starfruit)	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT. SWF, AWF, GS, AA, PCN, RIFA
CASHEW (fresh)	(1/2A/4A/5)	15, 19, 23, 24, 25, 26, 29		FF, WFT. SWF, AWF, GS, AA, PCN, RIFA
CARROT (*with top)	*19, *24, *25, 29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
CASSAVA	29	15, 19, 23, 24, 25, 26, 29		SWF, WFT, SWF, AWF, GS, AA, PCN, SOIL, RIFA
CAULIFLOWER	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA,
CELERY	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
CHERRY	1/2A/4A/5	15, 16, 19, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
CHERRY TOMATO (SEE TOMATO)				
CHICK PEA		15, 19, 23, 24, 25, 26, 27, 29	(GRAIN, SEED) ❖12 III., ▲22, 27, 30	PW❖, ▲ANTH, SWF, AWF, GS, AA, CPB, PCN, RIFA, W
CHILLI (PEPPER)	1/2A/2B/4A/5, 17, 20	15, 19, 20, 17, 23, 24, 25, 26, 29	(SEED) 17	FF, TP, TBM, WFT, SWF, AWF, GS, AA, PCN, RIFA
CHIVES (SEE ONION)				
CHOKO		15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
CITRUS - not otherwise specified	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
COCONUT		15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
COMPOST			15	RIFA, W, SOIL, OTHER DECLARED PESTS & DISEASES
CONTAINERS – USED (CARTONS, BOXES, BINS ETC.)				W, SOIL, LIVE INSECTS
CONTAINERS - SHIPPING				W, SOIL, LIVE INSECTS
CORN - Including: MAIZE, SWEET CORN & POPCORN (*fresh husks)	*19, *24, *25	15, 19, 23, 24, 25, 26, 29	(GRAIN, SEED) ❖12 III., ▲22, 30 (SEED) 13	WFT, PW❖, ▲ANTH, BS, SWF, AWF, GS, AA, PCN, RIFA, W
CUCUMBER	20	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA
CUMQUAT (KUMQUAT) (SEE ORANGE)				
CURRANT	1/2A/4A/5	15, 16, 19, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
CUSTARD APPLE	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
CUT FLOWERS NOT OTHERWISE SPECIFIED		19, 24, 25		WFT, AWF*(INFESTED PROPERTY)*, GS *(WA)*
DATE - fresh - *dried (Medfly only)	1/2A/4A/5 *1/*4A/*5	15, 19, 23, 24, 25 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
EGG FRUIT (AUBERGINE)	1/2A/4A/5, 17, 20	15, 19, 20, 23, 24, 25, 26, 29	(SEED) 17, 30	FF, TP, WFT, TBM, SWF, AWF, GS, AA, PCN, RIFA, W

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
ENDIVE	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
FEIJOA (PINEAPPLE GUAVA)	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
FIG	1/2A/4A/5, 25	15, 19, 23, 24, 25, 26, 29		FF. WFT. SWF, AWF, GS, AA, PCN, RIFA
FRUIT OF FRUIT FLY HOSTS NOT OTHERWISE SPECIFIED	1/2A/2B/4A/5			FF
GARLIC (SEE ONION)				
GINGER	29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, SOIL, RIFA
GOLD NUGGET (SEE PUMPKIN)				
GOOSEBERRY	1/2A/4A/5	15, 19, 16, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
GOOSEBERRY TOMATO (SEE TOMATO)				
GOURD (hairy squash) (SEE PUMPKIN)				
GRAIN or SEED (not otherwise specified)			❖12 III., ▲22, 30	❖PW, ▲ANTH, INSECTS, W, SOIL
GRANADILLA	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
GRAPEFRUIT	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, PCN, RIFA, CC
GRAPE	1/2A/4A/5, 10	10 (cuttings only permitted)		FF, PHY, RIFA
GUAVA	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
HAY			15	RIFA, W, SOIL, OTHER DECLARED PESTS & DISEASES
HERBS (FRESH)	19, 24, 25			WFT, AWF, GS
HONEYDEW MELON (SEE MELON)				
KIWANO	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
KIWI FRUIT	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
KOHL RABBI	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
KUMQUAT (CUMQUAT) (SEE ORANGE)				
LEAFY VEG. (not otherwise specified)	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
LEEK (SEE ONION)				
LEMON	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
LETTUCE	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
LIME (*Tahitian lime only)	1/2A/4A/5/(*7B), 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
LONGAN	1/2A/2B/4A/5 /7C	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
LOQUAT	1/2A/4A/5, 18	15, 18, 19, 23, 24, 25, 26, 29		FF, FB, WFT, SWF, AWF, GS, AA, PCN, RIFA
LUPIN		15, 19, 22, 23, 24, 25, 26, 29	(GRAIN, SEED) ❖12 III., 22, 30	ANTH, WFT, ❖PW, SWF, AWF, GS, AA, PCN, RIFA, W
LYCHEE	1/2A/2B/4A/5 /7C	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
MANDARIN (SEE ORANGE)				
MANGO	1/2A/2B/3C/4A /5/6B	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
MANGOSTEEN	1/2A/2B/4A/5 /7C	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
MARROW	20	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA
MEDLAR	1/2A/4A/5, 18	15, 18, 19, 23, 24, 25, 26, 29		FF, FB, WFT, SWF, AWF, GS, AA, PCN, RIFA
MELON	20	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA
MINT (FRESH HERB)	19, 24, 25			WFT, AWF, GS
MONSTERA	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
MULBERRY	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
MULCH			15	RIFA, W, SOIL, OTHER DECLARED PESTS & DISEASES
MUSHROOM				LIVE INSECTS, SOIL
NASHI	1/2A/4A/5, 18, 20	15, 16, 18, 19, 20, 23, 24, 25, 26, 29		FF, TP, FB, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
NECTARINE	1/2A/4A/5	15, 16, 19, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
NUTS				INSECTS, SOIL
OATS			(GRAIN, SEED) ❖12 III., ▲22, 30	❖PW, ▲ANTH, INSECTS, W, SOIL
OKRA	20	15, 23, 24, 25, 26, 29		TP, SWF, AWF, GS, AA, PCN, RIFA
OLIVE	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
ONION - including SPRING ONION, SHALLOT, CHIVES, LEEK (*additional requirements with top)	11, *19, *24, *25, 29	15, 11, 19, 23, 24, 25, 26, 29	(SEED) 11, 30	S, WFT, SWF, AWF, GS, AA, PCN, RIFA, W
ORANGE	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
PAPAYA (pawpaw, papaw)	1/2A/2B/4A/5/ 6C/7A/7B	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
PARSLEY (FRESH HERB)	19, 24, 25			WFT, AWF, GS
PARSNIP (*additional requirements with top)	*19, *24, *25, 29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
PASSION FRUIT	1/2A/2B/4A/5/ 7B	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
PAPAW (SEE PAPAYA)				
PAWPAW (SEE PAPAYA)				

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
PEACH	1/2A/4A/5	15, 16, 19, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
PEAR	1/2A/4A/5, 18	15, 16, 18, 19, 23, 24, 25, 26, 29		FF, FB, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
PEA	12 II.(a)/12 II.(b)	15, 12, 19, 23, 24, 25, 26, 29	(GRAIN, SEED) 12 I.(a)/12 I.(b)/ 12 I.(c), ▲22, 30	PW, ▲ANTH, SWF, AWF, GS, WFT, AA, PCN, RIFA, W
PEPINO (TREE TOMATO)	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
PEPPER (SEE CHILLI)				
PINEAPPLE (*with top)	(*24, *25)	15, 23, 24, 25, 26, 29		SWF, AWF, GS, AA, PCN, RIFA
PERSIMMON	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
PLANT MATERIALS and PLANT PRODUCTS NOT OTHERWISE SPECIFIED				SOIL, W, OTHER DECLARED PESTS & DISEASES
PLUM	1/2A/4A/5	15, 16, 19, 23, 24, 25, 26, 29		FF, SJS, WFT, SWF, AWF, GS, AA, PCN, RIFA
POMEGRANATE	1/2A/2B/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
POTATO	9, 17	15, 9, 17, 19, 20, 23, 24, 25, 26, 29		PCN, PSTV, BW, BR, TBM, WFT, TP, SWF, AWF, GS, AA, RIFA, SOIL
POTTING MEDIA, POTTING MIXES			15	RIFA, W, SOIL, OTHER DECLARED PESTS & DISEASES
PRICKLY PEAR	1/2A/2B/4A/5	15, 23, 24, 25, 26, 29		FF, SWF, AWF, GS, AA, PCN, RIFA
PRUNE (SEE PLUM)				
PUMPKIN - ALL TYPES	20	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA, SOIL
PYRETHRUM SEED			21	W, OTHER PESTS & DISEASES, SOIL
QUINCE	1/2A/4A/5, 18	15, 16, 18, 19, 23, 24, 25, 26, 29		FF, SJS, FB, WFT, SWF, AWF, GS, AA, PCN, RIFA
RADISH (*with top)	*19, *24, *25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
RAMBUTAN	1/2A/2B/4A/5/ 7C	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
RASPBERRY (SEE BERRY, *RUBUS spp*)				
RHUBARB (*with leaves)	*19, *24, *25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
ROCKMELON (SEE MELON)				
SANTOL	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
SAPOTE (*Black Sapote only)	1/2A/2B/4A/5/ (*7B)	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
SHALLOT (SEE ONION)				
SILVER BEET	19, 20, 24, 25	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA

COMMODITY	FRUIT & VEGETABLES	PLANTS & FLOWERS	OTHER PRODUCTS	DISEASE OR PEST RISK
SNOW PEA (SEE PEA)				
SPINACH	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
SPRING ONION (SEE ONION)				
SQUASH (including scallopini etc.) - (SEE PUMPKIN)				
STRAW (SEE HAY)				
STRAWBERRY	1/2A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
STRAWBERRY TOMATO (SEE TOMATO)				
SWEDE – (*with top)	*19, *24, *25, 29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
SWEET POTATO	29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
TAMARILLO	1/2A/3A/4A/5	15, 19, 23, 24, 25, 26, 29		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA
TANGERINE	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
TANGELO	1/2A/4A/5, 31	15, 19, 23, 24, 25, 26, 29, 31		FF, WFT, SWF, AWF, GS, AA, PCN, RIFA, CC
TARO	29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
TOMATO	1/2A/3B/4A/5/ 7B/8B, 17, 20	15, 17, 19, 20, 23, 24, 25, 26, 29	(SEED) 17	FF, TBM, WFT, TP, SWF, AWF, GS, AA, PCN, RIFA
TRITICALE			(GRAIN, SEED) ❖12 III., ▲22, 30	❖PW, ▲ANTH, W, INSECTS, SOIL
TURNIP (*with top)	*19, *24, *25, 29	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA, SOIL
VACCINIUM spp (SEE BERRY NOT OTHERWISE SPECIFIED)				
WATERMELON (SEE MELON)				
WHEAT			(GRAIN, SEED) ❖12 III., ▲22, 30	❖PW, ▲ANTH, W, INSECTS, SOIL
WITLOF	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
WOMBOC	19, 24, 25	15, 19, 23, 24, 25, 26, 29		WFT, SWF, AWF, GS, AA, PCN, RIFA
ZUCCHINI	20	15, 19, 20, 23, 24, 25, 26, 29		WFT, TP, SWF, AWF, GS, AA, PCN, RIFA

3.2.2 Import Requirement Details

NOTE

- Most plants and plant products must meet more than one of the following Import Requirements.

- Plants, Plant Products and other prescribed matter must comply with each Import Requirement that relates to them. Where a number of alternative Import Requirements are listed for a plant, plant product or other prescribed matter, compliance with any one of those Import Requirements meets that particular condition of entry.

- The Import Requirements Table in Section 3.2.1 above summarises all the requirements for each plant, plant product, and other prescribed matter.

- Contact the nearest Regional Quarantine Centre in Tasmania or the Department responsible for Quarantine and/or Plant Health in your State if you are unsure about the requirements for a particular plant, plant product or other prescribed matter.

IMPORT REQUIREMENT 1 *(See also Import requirements 2A, 2B, 3A, 3B, 4A, 4B, 5, 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C)*

AREA FREEDOM (QFLY, MED FLY)

I. The following plant products are hosts of Qfly *(Bactrocera tryoni)* and Med fly *(Ceratitis capitata)*:

Apples	Currants black, red white	Loquats	Persimmons
Apricots	Custard Apples	Lychees	Plums
Avocados	Dates	Mandarins	Pomegranates
Babaco	Egg Fruit	Mangoes	Prickly pears (opunta)
Bananas	Feijoas	Mangosteens	Quinces
Berries - Rubus spp	Figs	Medlars	Rambutan
Bilberries	Fruit of Fruit Fly hosts not otherwise listed	Monstera	Raspberries
Blackberries	Grapes	Mulberries	Santol
Boysenberries	Granadillas	Nashis	Sapote (casimiroa)
Cape gooseberries	Grapefruit	Nectarines	Strawberries
Capsicums	Guavas	Olives	Tamarillos (tree tomatoes)
Cranberrries	Kiwi fruit (Chinese gooseberries)	Oranges	Tomatoes
Carambola (Star Fruit)	Kumquats (Cumquats)	Passionfruit	Vaccinium spp- Blueberries Huckleberries and others of the genus
Cashews (fresh)	Lawtonberries	Pawpaws (papaya, papaw)	Youngberries
Cherries	Lemons	Peaches	
Chillies	Limes	Pears	
Citrus fruits (not otherwise specified)	Loganberries	Pepinos	
Coffee berries (fresh)	Longans	Peppers	

II. The fruit or vegetables must be accompanied by a certificate signed by an approved person stating that to the best of their knowledge:

(a) the fruit or vegetables were grown on a property that has been free from fruit fly for at least 12 months before the date of the certificate; **and**

(b) no fruit fly has existed for at least 12 months before the date of the certificate within a radius of 80 km from any boundary of that property;

and

III. For transportation either through an area known to be infested with fruit fly or within 80 kilometres of the outer boundary of such an area, the fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure.

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THE FOLLOWING IMPORT REQUIREMENTS 2A THROUGH 8C ARE ACCEPTABLE ALTERNATIVES TO IMPORT REQUIREMENT 1 FOR THE SPECIFIED PRODUCE.

IMPORT REQUIREMENT 2A

TREATMENT WITH DIMETHOATE (400 ppm and 200 ppm) FOR QFLY

I. The fruit[1] must be accompanied by a certificate signed by an approved person stating it has been treated with dimethoate by one of the following methods:

(a) full immersion in a dip mixture containing **dimethoate** maintained at a concentration of **400 mg/L** for at least **60 seconds. (Carambola, longan, lychee, passionfruit, star apple and rambutan may** be dipped for **10 seconds** but must remain **wet** for a further **60 seconds); or**

(b) flood spraying in a single layer with a mixture containing **dimethoate** maintained at a concentration of **400 mg/L** at the rate of **16 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for **at least 10 seconds** and then allowing to remain **wet** with the mixture for a further **60 seconds**.

II. For **peaches:**

(a) full immersion in a dip mixture containing **dimethoate** maintained at a concentration of **200 mg/L** for **at least 60 seconds**; **or**

(b) flood spraying in a single layer with a mixture containing **dimethoate** maintained at a concentration of **200 mg/L** at the rate of at least **32 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for **at least 12 second**s and then allowing to remain **wet** with the mixture for a further **60 seconds**.

(c) **Other stone fruit** may be treated as for peaches.

III. For **capsicums:** - flood spraying in a single layer with a mixture containing **dimethoate** maintained at a concentration of **400 mg/L** at the rate of **9.2 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for **at least 60 seconds**.

IV. **Citrus** fruit may either:

(a) have a non-recovery gloss (wax) coating applied not less than 60 seconds after treatment with Dimethoate; **or**

(b) the fruit may be washed and treated with a fungicide and/or a gloss coating applied not less than 24 hours after treatment with Dimethoate

V. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport immediately after treatment.

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[1]Dimethoate treatment is acceptable for all fruit listed in Import Requirement 1 except for bananas and Defective Flower End-type papaya.

IMPORT REQUIREMENT 2B

TREATMENT WITH FENTHION (412.5 ppm) FOR QFLY

I. Fruit classified on the registered label as being suitable for treatment with fenthion (other than Defective Flower End-type papaya) must be accompanied by a certificate signed by an approved person stating it has been treated with fenthion by one of the following methods:

(a) full immersion in a dip mixture containing **fenthion** maintained at a concentration of **412.5 mg/L** for **at least 60 seconds. (Longan, lychee, passionfruit and rambutan may** be dipped for **10 seconds** but must remain **wet** for a further **60 seconds); or**

(b) flood spraying in a single layer with a mixture containing **fenthion** maintained at a concentration of **412.5 mg/L** at the rate of at least **16 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for at least **10 seconds** and then allowing to remain **wet** with the mixture for a further **60 seconds**.

II. For **Avocados and Mangoes** only:
spraying the fruit in a single layer in a non-recirculating system with a mixture containing **fenthion** maintained at a concentration of **412.5 mg/l** at the rate of **0.6 L per minute** for **avocados** and **1.2 L per minute** for **mangoes, per square metre** of the area being sprayed, providing complete coverage of the fruit for **at least 10 seconds** and then allowing to remain **wet** for a further **60 seconds**.

III. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport immediately after treatment.

<u>IMPORT REQUIREMENT 3A</u>

TREATMENT WITH FENTHION (500 ppm) for MEDFLY (TAMARILLO)

I. The fruit must be accompanied by a certificate signed by an approved person stating they have been fully immersed in a dip mixture containing **Fenthion** maintained at **500 mg/L** for **not less than 60 seconds; and**

II. **Tamarillo** fruit may be washed and/or treated with a fungicide no sooner than 24 hours after dipping.

III. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport immediately after treatment.

<u>IMPORT REQUIREMENT 3B</u>

TREATMENT WITH FENTHION (412.5 ppm) FOR MEDFLY (TOMATO)

I. The tomatoes must be accompanied by a certificate signed by an approved person stating they have been treated when mature green (less than twenty-five percent breaking colour) with fenthion by one of the following methods:

(a) full immersion in a dip mixture containing **fenthion** maintained at a concentration of **412.5 mg/L** for **at least 60 seconds; or**

(b) flood spraying in a single layer with a mixture containing **fenthion** maintained at a concentration of **412.5 mg/L** at the rate of at least **16 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for **at least 10 seconds** and then allowing to remain **wet** with the mixture for a further **60 seconds**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport immediately after treatment.

IMPORT REQUIREMENT 3C

TREATMENT WITH FENTHION (412.5 ppm) FOR MEDFLY (MANGO and CAPSICUM)

I. The fruit must be accompanied by a certificate signed by an approved person stating they have been treated with fenthion by one of the following methods:

(a) full immersion in a dip mixture containing **fenthion** maintained at a concentration of **400 mg/L** for **at least 60 seconds; or**

(b) flood spraying in a single layer with a mixture containing **fenthion** maintained at a concentration of **412.5 mg/L** at the rate of at least **16 L per minute per square metre** of the area being flood-sprayed providing complete coverage of the fruit for **at least 10 seconds** and then allowing to remain **wet** with the mixture for a further **60 seconds**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport immediately after treatment.

IMPORT REQUIREMENT 4A

FUMIGATION WITH METHYL BROMIDE (QFLY, MED FLY)

I. Fruit or vegetables[1] must be accompanied by a certificate signed by an approved person stating they have been fumigated with methyl bromide at the rate of **32 grams per cubic metre** for **two hours** at **21^0 C**.

II. **Defective Flower End (*Solo*-type) Papaya** must be in no more than mature green condition[2] at the time of fumigation.

III. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or after treatment for storage, handling and transport.

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[1] Fumigation with methyl bromide is acceptable for the following produce:
any fruit or vegetable listed in Import Requirement 1 above except for bananas and avocados (avocados require cold storage as well - see Import Requirement 4B).

[2] Mature green condition means:
the fruit are hard and have no more than 25% of their ripe coloration when assessed over their entire surface area at the time of packing.

IMPORT REQUIREMENT 4B

METHYL BROMIDE FUMIGATION PLUS COLD TREATMENT FOR QFLY (AVOCADO)

I. **Avocado fruit** may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating they have been treated under the following conditions:

(a) they have been subjected to methyl bromide fumigation at a rate of **32 grams** per cubic metre for **two hours** at **21^0 C**; **and**

(b) following this fumigation, they have been **stored** continuously for **11 days at 7^0 C**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or after treatment for storage, handling and transport.

IMPORT REQUIREMENT 5

COLD STERILISATION (QFLY, MEDFLY)

I. Fruit or vegetables approved for cold sterilisation must be accompanied by a certificate signed by an approved person stating they have been subjected to cold sterilisation at **0.0^0 C** $\pm$ **0.5^0 C** for at least **14 days**.

II. Cold sterilisation is acceptable for the following fruits:
all fruit and vegetables listed in Import Requirement 1 above.

III. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or immediately after treatment for storage, handling and transport.

NOTE: Tropical and semi-tropical fruit may be subject to chilling injury.

IMPORT REQUIREMENT 6A

HEAT TREATMENT FOR QFLY and MEDFLY (AVOCADO)

I. **Avocado fruit** may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating they have been treated under the following conditions:

(a) subjected to immersion in **hot water** maintained at **46^{o} Celsius** for at least **3 minutes** in an approved treatment facility under the supervision of the approved person; **and**

(b) following this heat treatment they have been stored continuously for **16 days at 1^{o}±0.5^{o} C**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or immediately after treatment for storage, handling and transport.

IMPORT REQUIREMENT 6B

HEAT TREATMENT FOR QFLY (MANGO)

I. **Mango fruit** may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating they have been subjected to heating either:

(a) in an **approved vapour heat treatment facility** under the supervision of the approved person at:

(i) **47^{o} Celsius** for at least **15 minutes; or**

(ii) **46.5^{o} Celsius** for at least **20 minutes;**

or

(b) in an **approved hot water treatment facility** under the supervision of the approved person and the flesh temperature (measured as close to the seed as practicable) has been maintained at a minimum of **46^{o} Celsius** for at least **10 minutes**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or immediately after treatment for storage, handling and transport.

III.

<u>IMPORT REQUIREMENT 6C</u>

HEAT TREATMENT FOR QFLY (PAPAYA/PAPAW/PAWPAW FRUIT)

I. **Papaya fruit** may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating:

(a) they have been subjected to heating in an approved high temperature forced air chamber for at least **3.5 hours** and until the **seed cavity** reaches a temperature of **47.2^{o}C** as monitored in the **heaviest fruit** in each batch;

(b) the **flesh** of the fruit was **firm and did not distort** when packed into the chamber

(c) **t**he fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure either before or immediately after treatment for storage, handling and transport.

NOTE: The fruit may be hydro-cooled immediately after treatment.

IMPORT REQUIREMENT 7A

CONDITION OR MATURITY FOR QFLY (HARD GREEN CONDITION)

I. **Papaya and Banana** fruit may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that:

(a) at the time of packing they were **hard** and **green** with **no sign of colouration** when assessed over the entire surface area; **or**

(b) for **bananas,** they were **hard** and **green** in colour **before** being **artificially ripened** in a properly constructed and operated ripening chamber immediately before shipment to Tasmania.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

or

III. **Papaya and Banana** fruit may be **examined on arrival** in Tasmania by an inspector and found to be green in colour with intact skin and firm flesh.

IMPORT REQUIREMENT 7B

CONDITION OR MATURITY FOR QFLY (MATURE GREEN CONDITION)

I. **Tomato, Babaco, Banana, Black Sapote, Papaya (non-Defective Flower End types), Passionfruit, and Tahitian Lime** fruit may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that the fruit was **harvested** and **packed** in a **mature-green** condition.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

Mature-green condition means in the case of:

- **Tomato:** the fruit has no more than a two centimetre diameter area of pink to red colour at the stylar end at the time of colour sorting after harvest;

- **Babaco and Papaya:** the fruit are hard and have no more than 25% of their ripe coloration when assessed over their entire surface area at the time of packing;
- **Tahitian Lime:** no yellow coloration of the skin and the skin is unbroken;
- **Black Sapote:** the skin is free from any black colouring;
- **Passionfruit:** refers to purple and yellow types only and means they have a smooth and unwrinkled skin;

- **Banana:** the flesh is hard and not flexible, the skin is green and shows no yellow coloration except for areas towards the flower end of a fruit in which the sun has bleached the skin to a yellow to white colour but the flesh beneath is still hard; also the skin has no pre-harvest cracks, splits, punctures or other breaks that penetrate through to the flesh.

<u>IMPORT REQUIREMENT 7C</u>

CONDITION OR MATURITY FOR QFLY (UNBROKEN SKIN)

I. **Mangosteen, lychee, longan and rambutan** fruit may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that the fruit was **harvested and packed with unbroken skin**.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

Unbroken skin means:
the skin has no pre-harvest crack, puncture, pulled stem or other break that penetrates through to the flesh and has not healed with callus tissue.

<u>IMPORT REQUIREMENT 8A</u>

CONDITION OR MATURITY FOR MEDFLY (HARD GREEN CONDITION)

I. **Banana** fruit may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that:

(a) at the time of packing they were **hard** and **green** with **no sign of colouration** when assessed over the entire surface area; **or**

(b) they were **hard** and **green** in colour **before being artificially ripened** in a properly constructed and operated ripening chamber immediately before shipment to Tasmania.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

or

III. **Banana** fruit may be examined on arrival in Tasmania by an inspector and found to be green in colour with intact skin and firm flesh.

<u>IMPORT REQUIREMENT 8B</u>

CONDITION OR MATURITY FOR MEDFLY (MATURE GREEN CONDITION)

I. **Banana and tomato** fruit may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that the fruit was **harvested** and **packed** in a **mature-green** condition.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

Mature-green condition means in the case of:

- **Tomato:** the fruit has no more than a two centimetre diameter area of pink to red colour at the stylar end at the time of colour sorting after harvest;

- **Banana:** the flesh is hard and not flexible, the skin is green and shows no yellow coloration except for areas towards the flower end of a fruit in which the sun has bleached the skin to a yellow to white colour but the flesh beneath is still hard; also the skin has no pre-harvest cracks, splits, punctures or other breaks that penetrate through to the flesh.

<u>IMPORT REQUIREMENT 8C</u>

CONDITION OR MATURITY plus COLD STORAGE FOR MEDFLY

I. **Avocado** fruit (**Hass, Sharwill and Fuerte** varieties) may be imported or brought into Tasmania if they are accompanied by a certificate signed by an approved person stating that the fruit was harvested in a **hard green** condition and then **stored continuously** at **less than 10^{o}C within 48 hours** of harvest.

II. The fruit must be placed in fruit fly-proof packaging or in a fruit fly-proof enclosure for storage, handling and transport.

IMPORT REQUIREMENT 9 *(See also Import Requirement Nos. 17, 20)*

IMPORTATION OF POTATOES

I. The potatoes must be free of soil and accompanied by a certificate signed by an approved person stating that:

(a) to the best of their knowledge the declared disease known as **Potato Spindle Tuber Viroid** and the declared pests *Globodera rostochiensis* and *Globodera pallida*, causal organisms of **Potato Cyst Nematode** are not known to exist in the State or Territory in which the potatoes were grown; **and**

(b) the potatoes were grown at least 20 km from the location of any outbreak in the last 5 years of the disease **Bacterial Wilt or Brown Rot** (*Pseudomonas solanacearum*); **and**

(c) equipment and premises used in handling these potatoes have not been used to handle potatoes grown within 20 km of the location of any outbreak in the last 5 years of the disease Bacterial Wilt or Brown Rot (*Pseudomonas solanacearum*); **and**

II. The potatoes must be packed in sound, new packages with the full name and address of the grower on each package or on a label inside each package.

IMPORT REQUIREMENT 10 *(See also Import Requirement Nos. 1, 2A, 4A, 5)*

IMPORTATION OF GRAPES, GRAPE PLANTS AND POTENTIAL CARRIERS OF GRAPE PHYLLOXERA *(Daktulosphaira vitifolii)*

I. **Grapes,** being the fruit of the *Vitis* spp. must be accompanied by a certificate signed by an approved person stating they were taken from plants grown on a property outside a 40 km radius of any land on which grape phylloxera (*Daktulosphaira vitifolii*) is known to occur.

II. **Grape Plants** must be:

(a) in the form of: **(i)** uncallused cuttings; **or**

(ii) callused cuttings (grafted or ungrafted); **or**

(iii) tissue-cultured material from an approved source.

and

(b) in the case of **uncallused cuttings**, accompanied by a certificate signed by an approved person stating they were taken from plants grown on a property outside a 40 km radius of any land on which grape phylloxera (Daktulosphaira vitifolii) is known to occur; **or**

(c) in the case of **callused cuttings**, accompanied by a certificate as in **(b)** above with an additional declaration stating all the plant material has been grown continuously in soil-free media.

III. **Callused cuttings** (grafted or ungrafted) shall be grown-on in an approved quarantine place in Tasmania.

IV. **Agricultural machinery and equipment** including tools, bins, containers and used posts that have been used for the production and processing of grapes and grapevines in any area where grape Phylloxera exists or has ever been known to exist must be accompanied by a certificate signed by an approved person in the originating State or Territory that the machinery and/or equipment has been:

(a) cleaned free of all soil, fruit, leaves and any other grapevine material by thorough treatment with steam; **or**

(b) cleaned of all material as in (a) above by another method and disinfested for Phylloxera by the application of heat so that all parts of the machinery or equipment is subjected to a minimum temperature of 45^{o} Celsius for at least 2 hours; **or**

(c) used in an area known to be free of Phylloxera for at least the last two weeks of use.

NOTE: **Callused cuttings** permitted entry under this requirement must be free of roots (some small amount of early root development will be tolerated).

Rootlings are not permitted entry into Tasmania, where rootlings are defined as plants that have been callused and grown-on in soil or any other medium.

IMPORT REQUIREMENT 11 *(See also Import Requirement Nos. 19, 25 and Conditions of Entry 4.2)*

HOSTS AND VECTORS OF ONION SMUT *(Urocystis cepulae)*

I. **Allium spp.* may be imported into Tasmania from any State or Territory of Australia in which the disease Onion Smut (*Urocystis cepulae*) is known not to occur provided they are packed in sound, clean packages with the grower's name and address on the package or on a tag inside the package.

II. *Allium spp.* from any State or Territory of Australia in which the disease Onion Smut is known to occur (currently South Australia) must be accompanied by a certificate signed by an approved person stating:

(a) the plants, bulbs and seeds were grown at least 3 km from the location of any outbreak, at any time, of the disease Onion Smut (*Urocystis cepulae*); **and**

(b) that the crop was inspected during the growing season and found free of Onion Smut; **and**

(c) equipment and premises used in handling these *Allium spp* have not been used to handle *Allium spp* grown within 3 km of any outbreak of Onion Smut that occurred at any time.

III. Agricultural machinery and any other prescribed matter from any State or Territory of Australia in which the disease Onion Smut is known to occur (currently South Australia) must be accompanied by a certificate signed by an approved person stating that the machinery or other prescribed matter has not been used within 3 km of the location of any outbreak that occurred at any time of the disease Onion Smut (Urocystis cepulae).

**Allium spp.* means onions, garlic, leeks, chives and shallots

IMPORT REQUIREMENT 12 *(See also Import Requirement No. 30)*

HOSTS AND VECTORS OF PEA WEEVIL *(Bruchus pisorum)*

NOTE: *THIS REQUIREMENT IS ADDITIONAL TO THE OTHER REQUIREMENTS FOR THE IMPORTING OF GRAIN AND SEED INTO TASMANIA.*

"Peas" means all varieties of the plants *Pisum sativum* and *Pisum arvense.*

I. **Dried peas** that are intended for seed or fodder must be accompanied by a certificate signed by an approved person stating that:

(a) the State or Territory of Australia or of the other country in which the peas were grown is free of Pea Weevil (*Brucchus pisorum L*); **or**

(b) the peas have been fumigated with methyl bromide for 16 to 24 hours at atmospheric pressure according to the following dose/temperature schedule:

i) 40 grams per m^3 at 4^0 - 9^0 Celsius;

ii) 32 grams per m^3 at 10^0 - 14^0 Celsius;

iii) 24 grams per m^3 at 15^0 - 20^0 Celsius;

iv) 16 grams per m^3 at 21^0 Celsius or higher; **or**

(c) the peas have been fumigated with phosphine in a [1]gas-tight structure or enclosure at the rate of at least 1.5 grams per m^3 at a temperature of at least 15^0 C for at least 21 days.

II. **Green peas in the pod** must be accompanied by a certificate signed by an approved person stating that:

(a) the State or Territory of Australia or of the other country in which the peas were grown is free of Pea Weevil; **or**

(b) they have been fumigated with methyl bromide for 2 hours at atmospheric pressure according to the following dose/temperature schedule:

i) 64 grams per m^3 at 4^0 - 7^0 Celsius;

ii) 56 grams per m^3 at 8^0 - 10^0 Celsius;

iii) 48 grams per m^3 at 11^0 - 15^0 Celsius;

iv) 40 grams per m^3 at 16^0 - 20^0 Celsius;

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[1] 'Gas-tight' means that the storage must meet at least the minimum standard required, that is a pressure decay from 250 Pa to 125 Pa in five minutes, as measured by an accepted pressure test.

v) 32 grams per m^3 at 21^0 Celsius or higher.

III. **Other Grains and Seeds** must either:

(a) be processed at an approved premises so as to destroy any pea weevil that may be present; **or**

(b) contain less than one pea seed per kilogram of grain or seed; **or**

(c) if the grain or seed contains one or more pea seeds per kilogram it must either be:

(i) accompanied by a certificate signed by an approved person stating that the State or Territory of Australia or of the other country in which the peas were grown is free of Pea Weevil; **or**

(ii) fumigated with methyl bromide according to requirement I.(b) above; or

(iii) fumigated with phosphine according to requirement 1.(c) above.

IV. Conditions I, II and III do not apply where there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person, stating that the whole or that part of the State or Territory of Australia or of another country is free of Pea Weevil.

IMPORT REQUIREMENT 13 *(See also Import Requirement No. 12)*

SEED OF CORN, MAIZE, SWEET CORN AND POPCORN *(Zea mays)* INTENDED FOR SOWING (Boil Smut)

NOTE: *THIS REQUIREMENT IS ADDITIONAL TO THE OTHER REQUIREMENTS FOR THE IMPORTING OF GRAIN AND SEED into Tasmania.*

I. The seed must be accompanied by a certificate signed by an approved person stating the seed:

(a) was grown in an area in which boil smut (*Ustilago maydis*) is not known to occur and the crop has been inspected prior to harvest and found free of boil smut; **and**

(b) has been cleaned, graded and packed in premises that have not been used for processing seed affected by boil smut; **and**

(c) the seed has been treated with an approved fungicide.

__IMPORT REQUIREMENT 14__ *(See also Import Requirement Nos. 19, 23, 24, 25, 26, 29)*

HOSTS OF CHRYSANTHEMUM WHITE RUST (CWR) (*Puccinia horiana* Henn)

I. Florist Chrysanthemum plants must be accompanied by a certificate signed by an approved person stating that the plants or plant products:

(a) were inspected by the approved person and found to be free of the disease CWR; **or**

(b) have been treated with a fungicide registered by the NRA for the control of CWR in those plants or plant products according to the directions stated on the manufacturer's label.

Or

II. Florist Chrysanthemum plants or plant products may be treated on arrival under the supervision of an approved person with a fungicide registered by the NRA for the control of CWR in those plants or plant products according to the directions stated on the manufacturer's label.

IMPORT REQUIREMENT 15 *(See also all other Import Requirements for plants, plant products and other prescribed matter)*

HOSTS OF RED IMPORTED FIRE ANT (*Solenopsis invicta* Buren)

This Import Requirement currently applies to the State of Queensland.

The following are hosts of red imported fire ant:
plants with attached potting media, potting media, organic mulch, [1]soil, [1]turf, hay, straw, [2]agricultural machinery and [3]used containers.

I. **Host material from within 5 kilometres of a known infestation** of the pest *Solenopsis invicta*:

(a) must be accompanied by a Plant Health Certificate or Plant Health Assurance Certificate from the State or Territory of origin stating that the host material:

(i) originates from a property that has been inspected and accredited by an authorised officer of the Queensland Department of Primary Industries (QDPI) as being free of the fire ant; **and**

(ii) the property has been inspected within the past four weeks by an authorised officer of the QDPI or a person accredited by the QDPI under an approved ICA arrangement and no fire ants detected; **and**

(iii) the property does not share host material with another property known to be infested with the fire ant unless that host material has been given an approved treatment.

Or

(b) must be accompanied by a Plant Health Certificate or Plant Health Assurance Certificate from the State or Territory of origin stating that the host material has been given one of the following approved treatments:

(i) for containerised plants in potting medium or with potting medium attached:

- the plants and container have been inspected and found free of fire ants; **and**

- the plants have been treated by full immersion or drenching of the container or the root ball with a mixture containing 40 ml of a 500 g/L chlorpyrifos concentrate per 100 L of water and a commercial wetting agent; **and**

- the plants have been isolated in a secure area and consigned within 48 hours of the treatment.

(ii) for agricultural machinery and used containers:

- the machinery or containers have been inspected and found free of fire ants; **and**

- the machinery or containers have been cleaned free of organic matter and soil by brushing, use of a high-pressure hose or steam cleaning.

(iii) for potting media and organic mulch, the material has been:

- fumigated with Methyl Bromide at the rate of 48 grams per cubic metre at 21^{o} C for 24 hours; **or**

- heat treated so as to bring the entire mass to a minimum temperature of 65.5^{o}C; **and**

- stored, handled and consigned after treatment so as to prevent infestation with fire ant.

or

- produced, stored, handled and consigned in such a manner that would prevent infestation or destroy all life stages of the fire ant; **and**

- packed in the original sealed bag or other container in which it was commercially packed.

(iv) for hay and straw:

- the hay or straw has been fumigated with Methyl Bromide at the rate of 48 grams per cubic metre at 21^{o}C for 24 hours.

II. Host material from places more than 5 kilometres from a known infestation of the pest *Solenopsis invicta* must be accompanied by:

(a) a Plant Health Certificate stating that the material originates from a property that is more than 5 kilometres from any known infestation of fire ant; **or**

(b) a Grower Declaration stating that the material originates from a property that has been accredited by an authorised officer of the

QDPI as being located more than 5 kilometres from any known infestation of fire ant.

Notes:

1. **Soil** and **Turf** are not permitted entry into Tasmania as freedom from soil is a condition of entry for any item.

2 **Agricultural machinery** includes: machinery, vehicles or equipment used in cultivation, spraying, harvesting, earth moving, packing and transport of host material.

3. **Used container** includes: pots, bins, crates and pallets used in growing, harvesting, packing or transport of host material.

IMPORT REQUIREMENT 16 *(See also Import Requirement Nos. 18, 19, 23, 24, 25, 26, 29)*

HOSTS OF SAN JOSE SCALE (*Comstockaspis perniciosus* Comstock)

I. The following plants are hosts of **San Jose Scale** and require fumigation with methyl bromide:

Botanical Name	Common Name Examples	Botanical Name	Common Name Examples
Chaenomeles ***spp.***	Japonica	*Prunus spp.*	Almond, Apricot, Plum, Cherry, Peach, Nectarine and ornamentals
Cotoneaster spp.		*Pyrus spp.*	Pear, Nashi. and ornamentals
Crataegus spp.		*Quercus spp.*	Oak etc.
Cydonia oblonga	Quince	*Ribes spp.*	Blackcurrant, Redcurrant, Whitecurrant, Josterberry, Gooseberry and ornamentals
Fagus spp.	Beech	*Salix spp.*	Willow
Fraxinus spp.	Ash	*Ulmus spp.*	Elm etc.
Juglans spp.	Walnut	*Vaccinium spp*	Blueberry
Malus spp	Apple including ornamentals		

***spp.* = All members of the genus**

II. These plants must be accompanied by a certificate signed by an approved person stating the plants have been fumigated as prescribed in **III.(a)** or **III.(b)** below; **or**

III. these plants will be fumigated as follows:

(a) in the case of deciduous trees and plants in a **dormant state** at a rate of 32 grams per m^3 of chamber space at 21^0 Celsius for 2½ hours; **or**

(b) in the case of deciduous trees and plants **in foliage** at a rate of 32 grams per m^3 of chamber space at 21^0 Celsius for 1½ hours.

IMPORT REQUIREMENT 17 *(See also import Requirement Nos. 1 or 2A or 3B or 4A or 5 or 7B or 8B or 9, 19, 20, 23, 24, 25, 26, 29)*

HOSTS OF TOBACCO BLUE MOULD FUNGUS (*Peronospora hyoscyami*)

I. The following plants are hosts of Tobacco Blue Mould Fungus (TBM):

***Atropa belladonna**,* Belladonna, deadly nightshade;
***Capsicum annuum**,* Bell capsicum, sweet capsicum, green capsicum, red capsicum, chilli capsicum, cayenne capsicum, pepper capsicum; ***C. frutescens**,* Tabasco pepper;
Dunalia ramiflora;
***Hyoscyamus muticus; H. niger**,* Henbane, black henbane, stinking nightshade;
Lehmannia otophora;
Lycopersicon esculentum, Tomato; ***L pimpinellifolium**,* Currant tomato;
***Nicandra physalodes**,* Apple of Peru, shoo-fly plant;
All *Nicotiana spp* including Jasmine tobacco, Tobacco, Wild tobacco, Tree tobacco (Mustard tree) and ornamentals;
***Petunia x hybrida**,* Common garden petunia;
Physalis alkekangi**,* Chinese lantern, Japanese lantern, winter cherry, strawberry tomato; ***P. lanceifolia**; **P. lanciflora; P. peruviana, Cape gooseberry, gooseberry tomato, strawberry tomato, cherry tomato;
Schizanthus pinnatus, Butterfly flower, poor man's orchid;
Solanum boerhaavii; S. melongena**,* Eggfruit, Jew's apple, aubergine; ***S. nigrum, Black nightshade, common nightshade; ***S. tuberosum,*** Potato

II. **Plants, plant parts and seeds intended for propagation** purposes must be free from trash and soil and:

(a) accompanied by a certificate signed by an approved person stating that:

(i) those plants, plant parts or seeds have been given the ❃approved treatment to eradicate that disease; **or**

(ii) those plants are free from that disease.

❃The approved treatment is:
For plants and plant parts other than seeds: spraying with a phenylalanine-containing fungicide (eg *Ridomil MZ* or *Galben M*) no less than 14 days before transport to Tasmania.
For seeds: dusting with a phenylalanine dust (eg. *Ridomil SD*) or with *Thiram.*

NOTE: Plant varieties should be checked for phytotoxicity before widespread use of the chemical.

III. **Plants or plant products intended for human consumption** must be:

(a) accompanied by a certificate signed by an approved person stating that the property on which the plants or plant products were grown has been free from Tobacco Blue Mould Fungus (TBM) for at least 12 months; **and**

(b) transported in clean containers; **and**

(c) given the ✡approved treatment prior to arrival to prevent or eradicate that disease if an outbreak of TBM has been recorded within a 50 km radius of any boundary of that property within the last 12 months.

✡**The approved treatment is either:**

(i) washing in a bath containing water and a surfactant (surfactant may be a detergent and/or hypochlorite solution ; **or**

(ii) an insecticide treatment approved for fruit fly (other than treatment with Methyl Bromide).

<u>IMPORT REQUIREMENT 18</u> *(See also import Requirement Nos. 1 or 2A or 4A or 5, 16, 19, 23, 24, 25, 26, 29)*

HOSTS OF FIRE BLIGHT

Other countries:
A plant or plant product **other than the fruit*** of a plant listed below may be imported into Tasmania from any country in which the disease Fire Blight (*Erwinia amylovora)* exists or has been known to exist under conditions approved by the Secretary and subject to the provisions of the (Australian) Quarantine Act 1908

***Fruit** of fire blight hosts is prohibited from countries or places where the disease exists (refer to "Notice under Section 66 of the Plant Quarantine Act 1997", Tasmanian Government Gazette, p 1931, 20 December 2000 or Appendix 4 of this document).

Other States and Territories of Australia:
A plant listed below may be imported into Tasmania from another State of Australia in which the disease Fire Blight *(Erwinia amylovora)* exists or has been known to exist under the following conditions:

I. Plants and plant products, other than fruit, of a genus of plants in the host list that have been **grown in or consigned from** a location **within twenty (20) kilometres** of the site of a confirmed detection of *Erwinia amylovora* that is under active quarantine control are permitted entry to Tasmania under the following conditions:

(a) they have been grown in a nursery that has been certified by the Department of Agriculture or equivalent organisation in the State or Territory in which the nursery is located, as being:

(i) located more than ten (10) kilometres from the infected site(s); **and**

(ii) inspected by an approved person in the previous spring and autumn and no evidence of *E. amylovora* was found;

and

(b) they are accompanied by a declaration from the nursery that the plants were grown on that nursery for the previous twelve (12) months.

II. **Fruit** of a genus of plants in the list below that were grown within five (5) kilometres of the infected site(s) is not permitted entry to Tasmania.

III. The acceptance of these conditions by Tasmania is conditional on the establishment and policing of a quarantine area, by any State where Fire Blight has been detected, which prevents the movement of host plants or plant products (other than fruit) out of the 0 to 10 kilometre zone and fruit of host plants out of the 0 to 5 kilometre zone to other parts of that State.

The following plants are hosts of Fire Blight:

Botanical Name	**Common Name**	**Botanical Name**	**Common Name**
Amelanchier	Serviceberry, Juneberry	*Prunus salicina*	Japanese Plum
Cotoneaster spp	Cotoneaster	*Pyracantha spp*	Firethorn
Crataegus spp	Hawthorn	*Pyrus spp*	Pear
Cydonia	Quince	*Rubus ideus*	Raspberry
Eriobotrya spp	Loquat	*Rubus*	Thornless Blackberry (derived from crosses among a range of Rubus cultivars)
Malus spp	Apple	*Sorbus spp*	Mountain Ash
Mespilus spp	Medlar	*Stranvaesia spp*	

IMPORT REQUIREMENT 19 *(See also import Requirement Nos. 14, 16, 17, 18, 20, 23, 24, 25, 26, 28, 29)*

HOSTS OF WESTERN FLOWER THRIPS (*Frankliniella occidentalis* Pergande)

All plants and plant products, other than tissue cultures, fruits, seeds, underground parts, dormant deciduous plants or cuttings -excluding rose plants and cuttings; and dried or otherwise suitably processed plant products, being hosts of Western Flower Thrips, must be:

I. accompanied by a certificate or declaration signed by an approved person of the place in which they were grown stating that:

(a) the plants or plant products were grown and packed in a place known to be free from Western Flower Thrips (*Frankliniella occidentalis* Pergande); **or**

(b) the plants or plant products have been fumigated with methyl bromide gas for 2 hours at atmospheric pressure according to the following dose temperature schedule:

i) 56 grams per m^3 at 5^0 - 10^0 Celsius;

ii) 48 grams per m^3 at 11^0 - 15^0 Celsius;

iii) 40 grams per m^3 at 16^0 - 20^0 Celsius;

iv) 32 grams per m^3 at 21^0 -25^0 Celsius;

v) 24 grams per m^3 at 26^0 - 30^0 Celsius;

vi) 16 grams per m^3 at 31^0 Celsius or higher.

and

II. packed in a way that prevents infestation with Western Flower Thrips during transport.

IMPORT REQUIREMENT 20 *(See also import Requirement Nos. 1 or 2A or 3B or 4A or 5 or 7B or 8B or 9, 17, 19, 23, 24, 25, 26, 29)*

HOSTS OF *Thrips palmi* (Melon Thrips)

I. The following plants are hosts of *Thrips palmi*:

Bean	Hairy Gourd	Silverbeet
Capsicum	Melon	Squash
Cow Pea	Okra	Tomato
Cucumber	Potato *(tops only)*	Watermelon
Eggplant	Pumpkin	Zucchini

II. A host plant or a host plant product from a place in which the pest *Thrips palmi* exists or has been known to exist must be accompanied by a certificate or declaration signed by an approved person of the place in which it was grown stating that:

(a) **(i)** the plant or plant product was grown on a property free from *Thrips palmi*; **and**

(ii) the area within a 1 km radius of the property is free from *Thrips palmi*; **and**

(iii) the crop most susceptible to *Thrips palmi* on the property has been trapped and monitored weekly for Thrips palmi;

or

(b) the plant or plant product has been fumigated with methyl bromide gas for 2 hours at atmospheric pressure according to the following dose-temperature schedule:

i) 56 grams per m^3 at 5^0 - 10^0 Celsius;

ii) 48 grams per m^3 at 11^0 - 15^0 Celsius;

iii) 40 grams per m^3 at 16^0 - 20^0 Celsius;

iv) 32 grams per m^3 at 21^0 -25^0 Celsius;

vi) 24 grams per m^3 at 26^0 - 30^0 Celsius;

vii) 16 grams per m^3 at 31^0 Celsius or higher.

or

(c) the plant or plant product has been inspected at a sampling rate of 600 items per lot and no melon thrips found.

III. Condition II(a), II(b) or II(c) does not apply if the property where the plant or plant product was grown and packed is more than 100 km from any known occurrence of the pest.

IMPORT REQUIREMENT 21 *(See also 3.1 General Conditions of Entry)*

SEED OF PYRETHRUM (*Tanacetum cinerariifolium*)

NOTE: THIS REQUIREMENT IS ADDITIONAL TO THE OTHER REQUIREMENTS FOR THE IMPORT OF SEED FOR SOWING INTO TASMANIA.

I. Seed must be sourced from a crop that has been grown from certified seed under an [1]approved scheme by an accredited grower;

or

II. Seed may be imported from a source that is not accredited if accompanied by the following:

(a) records demonstrating that the crop has been inspected during the growing season and found free of disease; **and**

(b) a Certificate of Analysis issued by an [2]approved laboratory that identifies any contaminating seeds present.

[1] "approved" means approved by the Government Department or Authority responsible for Agriculture in the State or Country of origin.

[2]an approved laboratory is one that is accredited by the International Seed Testing Association (ISTA)

IMPORT REQUIREMENT 22 *(See also import Requirement Nos. 12, 19, 23, 24, 25, 26, 29, 30,)*

HOSTS AND VECTORS OF LUPIN ANTHRACNOSE DISEASE (*Colletotrichum acutatum* VCG 1 or 2)

NOTE: *THIS REQUIREMENT IS ADDITIONAL TO THE OTHER REQUIREMENTS FOR THE IMPORTING OF GRAIN, SEED AND OTHER PRESCRIBED MATTER (eg agricultural machinery) INTO TASMANIA.*

I. **Lupin seed for sowing** must be accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and packed stating that:

(a) the seed is from a crop examined during the growing season when the crop was mature, but the pods and stems were still green, by an inspector of the Department responsible for Agriculture in the State or Territory where the plants were grown and found to be free of Lupin Anthracnose; **and**

(b) the seed is from a lot that has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose; **and**

(c) the seed has been treated with an ✣approved fungicide under the supervision of the approved person; **and**

(d) the seed must be accompanied by a statutory declaration issued by the grower of the crop stating that the plants or plant products:

(i) Originate from mother stock not known to have been infected with Lupin Anthracnose; **and**

(ii) the property has not received any plants or plant products of *Lupinus* species or shared agricultural machinery, used packages or containers with any property on which Lupin Anthracnose has been detected unless that plant material or machinery has, or those used packages or containers have been given an approved treatment;

or

II. **Lupin seed for sowing** must originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person certifying that the whole of the State or Territory or that part of it where the seed was grown is free of Lupin Anthracnose.

III. **Lupin grain intended for processing or use as *stock feed**:

(a) must be accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose; **or**

(b)

(i) must have been subjected to an approved process in an approved premises in the exporting State or Territory such that it is unlikely for any spores of the disease to have survived; **and**

(ii) must be consigned to an approved premises in Tasmania for processing prior to release;

or

(c) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Lupin Anthracnose

IV. **Other Grains and Seeds** must either:

(a) contain less than one lupin seed per kilogram of grain or seed; **or**

(b) if the grain or seed contains one or more lupin seeds per kilogram it must either be:

(i) accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose; **or**

(ii) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Lupin Anthracnose; **or**

(c) the grain or seed must be processed at an approved premises within Tasmania so as to destroy any Lupin Anthracnose that may be present.

V. **Lupin plants and plant products (other than seed or grain)** may only be imported with the written permission of the Secretary.

VI. **Agricultural machinery, used packages or containers** that have been **used** in the **harvesting, handling** or **processing** of any **plant or plant product** of the ***Lupinus*** **species** in a State or Territory where Lupin Anthracnose occurs must be accompanied by a certificate signed by an approved person of that State or Territory stating that the agricultural machinery or other prescribed matter has been cleaned under their supervision and is free of lupin plants, plant products, lupin trash and soil.

*An approved fungicide is a mixture of *Rovral* (*iprodione*, 0.25 g per kg seed) and *Thiram* (1 g per kg seed) or an equivalent formulation applied at the specified rates of active ingredients.

***Whole grain should be fed out only in controlled situations. Volunteer plants that appear after whole grain has been fed out should be destroyed.

IMPORT REQUIREMENT 23 *(See also import Requirement Nos. 14, 16, 17, 18, 19, 20, 24, 25, 26, 29)*

PLANTS FROM PLACES INFESTED WITH SPIRALLING WHITEFLY (*Aleurodicus dispersus*)

I. Any plant or plant product from a place infested with spiralling whitefly and intended for cultivation in a glasshouse or hothouse or indoors must be accompanied by a certificate or declaration signed by an approved person of the place in which it was grown stating that:

(a) the plant or plant product was grown on a property that is free of Spiralling Whitefly; **or**

(b) the plant or plant product has been inspected at the time of dispatch and found free of Spiralling Whitefly; **or**

(c) the plant or plant product has been given an approved treatment for Spiralling Whitefly then inspected and found free of the pest at the time of dispatch.

II. Condition **I.** does not apply if a current area freedom certificate exists, certifying that the State or Territory or that part of it where the plant or plant product was grown is free of Spiralling Whitefly.

IMPORT REQUIREMENT 24 *(See also import Requirement Nos. 16, 18, 19, 23, 25, 26, 29)*

PLANTS FROM PLACES INFESTED WITH ASH WHITEFLY (*Siphoninus phillyreae*)

I. The following plants are hosts of Ash Whitefly:

FAMILY	SPECIES	COMMON NAME
Bignoniaceae	*Catalpa x Chilopsis*	catalpa hybrid
Fabaceae	*Afzelia sp.*	pod mahogany
	Cercis occidentalis	western redbud
	Cercis siliquastrum	Judas-tree
Lythraceae	*Lagerstroemia indica*	crape myrtle
Magnoliaceae	*Liriodendron tulipifera*	tulip tree
	Magnolia stellata	star magnolia
Oleaceae	*Fraxinus excelsior*	ash
	Fraxinus latifolia	Oregon ash
	Fraxinus ornus	ash
	Fraxinus syriaca	Shamel ash
	Fraxinus uhdei "Tomlinson"	Tomlinson ash
	Fraxinus velutina "Modesto"	Modesto ash
	Fraxinus velutina var. glabra	Arizona ash
	Fraxinus velutina var. coriaceae	western ash
	Ligustrum spp.	privet
	Olea chrysophylla	wild olive
	Olea europea	common olive
	Phillyrea latifolia	phillyrea
	Phillyrea media	phillyrea
	Syringa hyacinthiflora	common lilac
	Syringa laciniata	cut-leaf lilac
	Syringa vulgaris	common lilac
Punicaceae	*Punica granatum*	pomegranate
Rhamnaceae	*Rhamnus alaternus*	buckthorn
	Zizyphus spina-christi	crown of thorns
Rosaceae	*Amelanchier*	service berry
	Chaenomeles speciosa	flowering quince
	Crataegus mollis	hawthorn
	Crataegus monogyna	hawthorn
	Crataegus oxyacantha	hawthorn
	Cydonia oblonga	quince
	Eriobotrya deflexa	golden loquat
	Heteromeles arbutifolia	California Christmas berry
	Malus domestica	apple
	Malus floribunda	Japanese flowering crabapple
	Malus fusca	Oregon crabapple
	Malus spp.	other species of crabapple
	Mesplius sp.	
	Prunus armeniaca	apricot
	Prunus blireiana	blue plum hybrid
	Prunus persica	peach
	Prunus salicina	Santa Rosa plum, Japanese plum

Ash Whitefly Host List (contd.)

FAMILY	SPECIES	COMMON NAME
	Prunus virginiana var. melanocarpa	choke berry
	Pyracantha sp.	
	Pyrus calleryana	ornamental pear
	Pyrus communis	pear
	Pyrus kawakamii	flowering pear
	Pyrus pyrifolia	Japanese sand pear
	Pyrus sativa	
	Photinia	
Rubiaceae	*Cephalanthus occidentalis var. californicus*	buttonbush
Rutaceae	*Citrus sp*	tangerine
	Citrus limon	lemon
	Citrus sinensis	navel and valencia orange
	Fortunella sp.	kumquat

NOTE: All fruit, non-leafy vegetables and deciduous plants not in leaf are exempt from this Requirement.

II. A **host plant in leaf or leafy host plant material** must be accompanied by a certificate or declaration signed by an approved person of the place in which it was grown stating that it was:

(a) grown and packed on a property known to be free of Ash Whitefly and inspected and found free of Ash Whitefly; **or**

(b) treated according to the label with a product registered by the NRA for use on whiteflies and then inspected and found free of Ash Whitefly; **or**

(c) fumigated with Methyl Bromide at the rate of 32 grams per cubic metre at 21^{O} Celsius for 1.5 hours immediately before packing and dispatch.

III. A **non-host plant in leaf or leafy non-host plant material** from a property infested with Ash Whitefly must not be imported or brought into Tasmania unless the plant or leafy plant material is accompanied by a certificate or declaration signed by an approved person of the place in which it was grown stating that it was:

(a) thoroughly inspected and found free of Ash Whitefly immediately before packing and dispatch.

IV. plants and plant material must be packed in such a way as to prevent infestation with Ash Whitefly during transport.

V. Condition II. does not apply if there exists a current Area Freedom Certificate for the State or Territory or for that part of it where the plant or plant material was grown and packed.

This Certificate must be updated at least monthly from the beginning of September through to the end of May each year.

IMPORT REQUIREMENT 25 *(See also Import Requirement Nos.14, 16, 17, 18, 19, 20, 22, 23, 24, 26, 27)*

GREEN SNAIL INFESTATION (*Helix aperta,* Born) (Western Australia)

Cut flowers, leafy vegetables, cuttings, nursery stock, hay and straw imported from Western Australia:

I. must be accompanied by a declaration stating those plants or plant products have been grown and packed more than 25 kilometres from a known Green Snail infestation in accordance with the "Protocol for Green Snail (*Helix Aperta*) Requirements to Other States" as published by Agriculture Western Australia;

Or

II. must be accompanied by a certificate stating those plants or plant products were grown and packed on a property or properties operating in accordance with the "Protocol for Green Snail (Helix Aperta) Requirements to Other States" as published by Agriculture Western Australia.

III. Cut flowers, cuttings, bare-rooted stock, hay and straw do not require a declaration or certificate for Green Snail if grown and packed during the period December to March inclusive.

NOTE: *This requirement does not apply to plants imported as tissue culture.*

IMPORT REQUIREMENT 26 *(See also import Requirement Nos. 9, 11, 14, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29)*

ARGENTINE ANT (*Linepithema humile Mayr*)

I. Plants with any growing medium attached that can harbour Argentine Ant, must be accompanied by a certificate signed by an approved person of the place in which they were grown stating that:

(a) the Argentine Ant does not exist on the property where the plants were grown; **or**

(b) the plants and attached growing medium have been thoroughly treated under the supervision of the approved person with a 0.5 % Chlorpyrifos solution or fumigated with methyl bromide as per Import Requirement 19 I. (b).

II. Condition I does not apply if there exists a current Area Freedom Certificate for the State or Territory or for that part of it where the plants were grown and packed.

IMPORT REQUIREMENT 27 *(See also import Requirement Nos.12, 19, 23, 24, 25, 26, 29, Section 3.2.3 - Feed Grain & Conditions of Entry 4.2)*

HOSTS AND VECTORS OF CHICKPEA BLIGHT *(Ascochyta rabiei)*

NOTE: *THIS REQUIREMENT IS ADDITIONAL TO THE OTHER REQUIREMENTS FOR THE IMPORTING OF GRAIN, SEED AND OTHER PRESCRIBED MATTER (eg agricultural machinery) into Tasmania.*

I. **Chickpea plants and plant products** and any **other prescribed matter** that is a potential vector of the chickpea blight disease caused by the exotic fungus *Ascochyta rabiei* must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown and packed or used stating that:

(a) *Ascochyta rabiei* is not known to occur on the property on which the prescribed matter has been grown and packed or used; **and**

(b) the property is at least 50 km from any place in which the fungus is known to occur; **and**

(c) the property has not received any chickpea plants or plant products or shared agricultural machinery with a property on which chickpea blight has been detected unless that plant material or machinery has been given an approved treatment; **and**

(d) **Seed for sowing** has been:

(i) tested for the fungus by an approved method and found free of *Ascochyta* pathogens; **and**

(ii) treated with an *approved fungicide.

II. **Other Grains and Seeds** must either:

(a) contain **less than one chickpea seed per kilogram** of grain or seed; **or**

(b) if the grain or seed contains one or more chickpea seeds per kilogram it must either be:

(i) accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Chickpea Blight; **or**

(ii) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Chickpea Blight; **or**

(c) the grain or seed must be processed at an approved premise within Tasmania so as to destroy any Chickpea Blight that may be present.

III. **Agricultural machinery and other prescribed matter** that has been used or stored on properties within 50 km of any occurrence of the chickpea blight fungus may be imported if it is accompanied by a certificate signed by an approved person stating that the prescribed matter has been cleaned under their supervision and is free of chickpea plants, plant products, chickpea trash and soil.

*An approved fungicide is *"P-PickleT"* or an equivalent formulation applied at the rate of 200 ml per 100 kg of seed as per the NRA protocol.

IMPORT REQUIREMENT 28 *(See also Import Requirement Nos. 1, 2A, 4A, 5, 15, 16, 19, 24, 25, 26, 29)*

HOSTS AND VECTORS OF BLUEBERRY RUST *(Pucciniastrum vaccinii)*

I. The following are hosts of Blueberry Rust:

Vaccinium spp (including blueberry, cranberry and huckleberry), Gaylussacia (huckleberry), Tsuga (hemlock, hemlock spruce), Rhododendron (including azalea), Lyonia, Menziesia, (Mock Azalea), Pernettya, Hugeria, Pieris, Leucothoe and Oxycoccus.

II. **Fruit of Vaccinium spp** must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown and packed stating that the crop:

(a) has been inspected within 14 days of harvest and no blueberry rust detected; **or**

(b) has been sprayed within 14 days of harvest with a pre-harvest application of a fungicide registered for the treatment of blueberry rust as per the label recommendations.

III. **Plants of Vaccinium spp** must:

(a) be approved for growing in pre- or post-entry quarantine under approved conditions; **or**

(b) have been grown on a property in a State or Territory or in a part of a State or Territory for which there is a current area freedom certificate for Blueberry Rust.

IV. **Host plants other than Vaccinium spp**, must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown stating that those plants have been inspected within 14 days of dispatch and no blueberry rust detected.

V. **Vectors, including agricultural equipment and used packages or containers,** that have been in contact with or have been used in any process involving any host plant or plant product must be accompanied by a certificate signed by an approved person of the State or Territory in which they were last used stating that they have been cleaned free of soil and organic matter **and**:

(a) Steam cleaned; **or**

(b) Treated with a solution containing not less than 100 ppm available Chlorine as a spray rinse or dump treatment; **or**

(c) Treated in a manner approved by the Secretary.

VI. Conditions **II, IV** and **V** do not apply if:

(a) there is an accompanying certificate signed by an approved person stating that the host plants or plant products were grown, or the agricultural equipment, used packages or containers were last used on a property that is located more than 200 kilometres from any detection of blueberry rust that occurred at any time; **or**

(b) the host plants or plant products were grown, or the agricultural equipment, used packages or containers were last used on a property that is in a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Quarantine Officer or equivalent person certifying that the whole of the State or Territory or that part of it is free of Blueberry Rust.

IMPORT REQUIREMENT 29 *(See also import Requirement Nos. 14, 16, 17, 18, 19, 20, 22, 23, 24, 26, 27)*

POTATO CYST NEMATODE INFESTATION (*Globodera rostochiensis* and *Globodera pallida)* (VICTORIA)

Plants and plant products (bulbs) from the Potato Cyst Nematode (PCN)-restricted area in Monbulk, Victoria must be accompanied by a certificate signed by an approved person stating that they comply in full with the PCN Protocol agreed between Tasmania and Victoria for the movement of such plants and plant products into Tasmania.

NOTE: The Protocol is incorporated into this manual as Appendix 2.

IMPORT REQUIREMENT 30

[1]**DECLARED WEEDS, PESTS AND DISEASES IN FEED GRAIN** *(See also Import Requirement Nos. 12, 22 and 27)*

Grain intended for use as animal feed may be imported only under the following conditions:

I. The grain must have been sampled, according to ISTA principles so as to obtain a representative sample of the [2]lot, by or under the supervision of an [3]approved person.

II. **(a)** The sample or a representative sub-sample of it must be submitted to an ISTA accredited laboratory for a seed analysis. The submitted sample must weigh at least 2 kilograms for lots up to 100 tonnes and 5 kilograms for lots greater than 100 tonnes.

(b) The working sample obtained by the laboratory from the submitted sample must be at least 1 kilogram and the sample must be analysed according to ISTA rules.

III. The working sample must be searched for seeds of the following:

- Weeds declared under the Plant Quarantine Act 1997; and
- Ryegrass (Lolium spp), [4]Lupin (Lupinus spp), Chick Pea (Cicer sp) and Pea (Pisum spp).
- All ryegrass seeds (Lolium spp) present in the working sample must be inspected for ryegrass nematode *(Anguina spp)* and the number of nematode galls counted.
- The remainder of the submitted sample is to be searched also for Declared seeds and seeds of Lupin, Chick Pea and Pea.

IV. The certificate or statement of analysis issued by the ISTA accredited laboratory is to adequately describe the lot from which the sample was taken and must list or state the following:

- the identity and number per kg of all Declared seeds;
- the number of seeds of Lupin, Chick Pea and Pea as number per submitted sample weight.
- the number of nematode galls as number per kg.

- If no seeds of Declared weeds are found: *"the whole submitted sample contained no seeds of weeds declared under the Plant Quarantine Act 1997"*- using these or similar words.

- If no seeds of lupin, chick pea or pea species are found: *"the whole submitted sample contained no seeds of lupin, chick pea or pea"*- using these or similar words.

- If no galls of Anguina sp are found this must be stated.

V. The grain must be loaded into containers or ships holds that have been inspected by an approved person and found clean.

VI. The following documentation attesting to the fulfilment of the import conditions must be presented to the Quarantine office at the port of entry with a "Notice of Intention to Import Grain/Seed" prior to landing the lot or consignment of grain:

- Seed Analysis Certificate or Statement for each lot of grain
- Empty Container or Ships Hold Cleanliness Certificate or Declaration
- Sampling Certificate or Declaration
- Plant Health Certificate as required for peas, lupins and chick peas.

VII. Grain must be transferred from the place of landing in Tasmania to the receival premises in containers or vehicles that provide security against spillage in transit.

VIII. Grain that is not free of declared weeds and/or does not fulfil all other conditions of entry will be subject to quarantine and shall be directed for return, destruction or deep burial, or for processing only at [5]premises approved to handle such grain.

NOTES:

[1] Declared weeds are published in the Government Gazette and an annual list of all pests and diseases is published in the Gazette incorporating any changes that have been made within the past year. A pest and disease list for grain is available on request from any Quarantine Tasmania office.

[2] A "lot" is a quantity of a single type of grain, physically identifiable by reference to a line of sacks, storage bin or silo number(s), container number(s) or hold number(s) of a ship, and for which a Seed Analysis Certificate/Statement can be issued.

[3] An Approved Person is:

(a) an officer of the Department of Agriculture or equivalent organisation or an officer of the Australian Quarantine and Inspection Service (AQIS) in the exporting State or Territory; or

(b) a person employed or contracted by the Exporter who has been trained in Empty Container and/or Hold Inspection and grain Sampling and has been accredited by the Department of Agriculture (or equivalent organisation) or by AQIS in the exporting State or Territory to carry out the inspection and sampling.

[4] See Import Requirement Numbers 12, 22 or 27 as necessary.

[5] The importation of feed grain is covered by three Acts and their accompanying regulations, namely:

Weed Management Act 1999 and Weed Management Regulations 2000;

Seeds Act 1985 and *Seeds Regulations 1986*;

Plant Quarantine Act 1997 and *Plant Quarantine Regulations 1998*.

Plants that are declared under the Weed Management Act 1999 are also declared as pests under the Plant Quarantine Act 1997 and as such they are prohibited imports. Feed grain containing any seeds of declared weeds may only be imported and used under stringent conditions to prevent the escape of any declared weed seeds into the environment.

The conditions for the use of imported feed grain are given in the *Code of Practice for Registration of Premises.* This allows premises that meet certain conditions to be registered to receive, store and process grain that may contain or that does contain declared weed seeds, pests or diseases.

The Code is obtainable from any Regional Quarantine Centre.

Import Requirement 31 *(See also Import Requirement Nos. 1, 2, 4A, 5, 15, 19, 23, 24, 25, 26, 29)*

HOSTS AND VECTORS OF CITRUS CANKER (*Xanthomonas axonopodis pv. citri*)

I. *Citrus spp*. and other [1]hosts of citrus canker from any State or Territory of Australia in which the disease Citrus Canker is known to occur must be accompanied by a certificate signed by an approved person stating the plant or plant product has been grown and packed on a property that is covered by a current Area Freedom Certificate.

II. Agricultural machinery and equipment and any other prescribed matter, intended for use with citrus spp. or with other hosts, imported from any State or Territory of Australia in which the disease Citrus Canker is known to occur (currently Queensland) must be accompanied by a certificate signed by an approved person stating that:

(a) the machinery, equipment or other prescribed matter has not been used within 10 km of the location of any outbreak that occurred at any time of the disease Citrus Canker (*Xanthomonas axonopodis pv. citri*); **or**

(b) the machinery, equipment or other prescribed matter has been cleaned and disinfected in such a manner as to remove and/or destroy all viable cells of the citrus canker bacterium.

[1] Hosts of Citrus Canker are: all *Citrus spp.,(Orange, lemon, lime, citron, mandarin ,grapefruit ,kumquat, Satsuma etc.), Ageratum conyzoides (goat weed), Atalantia spp., Clausena lansium (wampee), Feroniella lucida, Foronia spp., Hesperethusa crenulata, Limonia acidissima (elephant apple), Paramignya monophylla, Swiglea spp., Zanthoxylum spp. (wild lime, lime pricklyash)*.

Import Requirement 32 *(See also Import Requirement No 30)*

CANOLA SEED AND GRAIN – FREEDOM FROM GENETICALLY MODIFIED (GM) BRASSICACEAE SEED

I. Canola seed and grain must be accompanied by a certificate or statement of analysis from an approved laboratory that adequately identifies the [1]lot from which the tested sample was drawn and states that the lot has been sampled and tested such that a level of contamination by GM material of 0.01% would be detected with a probability of 95% and the test has returned a negative result for all GM events known to have been inserted into Canola.

NOTES: [1] A "lot" is a quantity of a single type of grain, physically identifiable by reference to a line of sacks, storage bin or silo number(s), container number(s) or hold number(s) of a ship, and for which a Seed Analysis Certificate/Statement can be issued.

3.3 Import Protocols

A business may elect to import plants and plant products into Tasmania under an individual certification arrangement between Quarantine Tasmania and that business, or as an accredited business under an interstate certification assurance arrangement or protocol made between the DPIWE Tasmania and any other State or Territory. This applies to Tasmanian or to interstate businesses.

To qualify for any such arrangement, a business must have in place an approved, documented quality system that ensures all the requirements of the *Plant Quarantine Act 1997* are met for the plants and plant products in question.

To obtain more information on these arrangements a business should contact the nearest Regional Quarantine Centre in the first instance.

A list of currently available interstate certification assurance arrangements is provided in Appendix 1.

4. CONDITIONS OF ENTRY FOR OTHER PRESCRIBED MATTER AND VECTORS

4.1 Sheep and Goats

4.1.1 Import Requirements

As well as having to meet the requirements of the *Animal Health Act 1995*, sheep and goats for import must satisfy the requirements of the *Plant Quarantine Act 1997* for freedom from soil and seeds of declared plants and the requirements of the *Weed Management Regulations 2000, Section 5* for freedom from declared weeds. Sheep in wool and fibre-breed goats that are in fibre, constitute the highest risk for carrying soil and declared weed seeds into the State.

4.1.2 Exemptions

Exemptions from the full requirements of the *Plant Quarantine Act 1997* and the *Weed Management Act 2000* may be obtained by submitting an Exemption Application (Importation of Sheep and Goats) Form. Copies of this form are available from the regional Quarantine Centre when required.

4.2 Agricultural Machinery and Vehicles *(See also Import Requirement Numbers 11, 22, 27)*

The requirements for importing farm machinery and vehicles are covered by the *Plant Quarantine Act 1997* and the *Weed Management Act 2000*.

The requirements are freedom from soil, plant trash, and plants, declared weed seeds and declared diseases or organisms.

Machinery and vehicles that have been used in certain areas will require an approved treatment before being allowed entry into Tasmania (for example a harvester used on a property within 50 kilometres of an occurrence of chick pea blight).

4.3 Cargo Containers

The requirements are the same as for agricultural machinery.

5. PLANT AND PLANT PRODUCT EXPORTS

5.1 Interstate Exports

5.1.1 General

The produce to be exported must comply with the conditions of entry of the importing State or Territory. Tasmanian quarantine authorities are provided with information from the other State organisations on their requirements. In general, produce must be accompanied by a valid Tasmanian Plant Health Certificate stating that the conditions of entry for that produce have been met (see Appendix 2, Forms).

5.1.2 Inspection and Certification

The requirements for inspection vary depending on the nature of the produce and the requirements of the importing State or Territory. Once the produce has passed inspection a Plant Health Certificate is issued and a fee is raised.

5.2 Export Protocols and Certification Assurance Arrangements

A Tasmanian business may elect to export prescribed matter from Tasmania under an individual certification arrangement between Quarantine Tasmania and that business, or as an accredited business under an interstate certification assurance arrangement or protocol made between the DPIWE Tasmania and any other State or Territory.

To qualify for such an arrangement a business must have in place an approved, documented quality system that ensures all the requirements of the *Plant Quarantine Act 1997* are met for the prescribed matter in question.

Businesses that are accredited under a protocol or certification assurance arrangement with Quarantine Tasmania are able to sign their own declaration or certificate. Accredited businesses are audited at least annually by Quarantine Tasmania. They must demonstrate compliance with all the requirements of the protocol or arrangement to maintain their accreditation.

A list of currently available interstate certification assurance arrangements and protocols is provided in Appendix 1 of this Manual.

5.3 International Exports

Inspections are undertaken and Tasmanian Plant Health Certificates or Certificates of Condition/Origin are issued for certain plants and plant products. This occurs where the importing country does not require phytosanitary certification by the Commonwealth Government Agency responsible for plant and plant products exports (AQIS) but certification has been requested by the importer or their agent.

6. APPENDICES

APPENDIX 1 - List of Interstate Certification Assurance Arrangements and Protocols

INTERSTATE IMPORTS

PEST OR DISEASE	PROTOCOL OR ARRANGEMENT	STATE/TERRITORY
WESTERN FLOWER THRIPS (WFT)	WFT-Accredited Property	• Victoria • South Australia • Queensland • NSW (Hay District Growers)
	(Non-certified Cut Flowers) Protocol for the Import of Non-Certified Hosts of WFT	Tasmania (importer and approved fumigator)
	Exporter ICA Arrangement	Victoria (accredited businesses)
POTATO CYST NEMATODE (PCN)	PCN Protocol	Victoria (restricted area in Monbulk)
WFT ETC.	Compliance Agreement MeBr Fumigation	Approved Fumigators
FEED GRAIN	Exporter CA Arrangement for sampling, inspection and testing prior to shipment to Tasmania	Accredited Exporters in other States
VARIOUS PESTS & DISEASES (INCLUDING QUEENSLAND FRUIT FLY & MEDITERRANEAN FRUIT FLY)	ICA Arrangements for various fruits and treatments	ALL STATES & N.T. - Accredited growers/packers

INTERSTATE EXPORTS

PEST OR DISEASE	PROTOCOL OR ARRANGEMENT	STATE/TERRITORY
QFLY AND MEDFLY	BERRY FRUIT EXPORT	SOUTH AUSTRALIA
PCN	WARE POTATOES	WESTERN AUSTRALIA
	SEED POTATOES	WESTERN AUSTRALIA
EUROPEAN RED MITE	ERM ACCREDITATION FOR W A	WESTERN AUSTRALIA
CURRANT LETTUCE APHID	ICA ARRANGEMENT (DRAFT)	ALL

APPENDIX 2

PCN Protocol Developed With Victoria

This protocol refers to additional requirements for movement to Tasmania of plants and bulbs that have been grown in the PCN restricted areas in Victoria.

1. GENERAL CONDITIONS FOR ALL PROPERTIES

I. The property does not share machinery with a potato grower, or with other nurseries within 20 km of an infestation that are not accredited under this protocol.

II. The property is not exposed to the same irrigation source as the infested property or to run-off from PCN-infested properties.

III. Cropping records will be inspected to demonstrate that solanaceous crops have not been grown on the property for a period of 10 years immediately prior to the commencement of accreditation or where solanaceous crops have been grown within the last 5 to 10 years the soil has been fumigated with a registered soil fumigant at the recommended rate since the last Solanaceous crop (Nurseries with potted Plants excepted).

IV. Accreditation may be given following an annual inspection by the Victorian Department of Agriculture to assess the relevant criteria detailed below. An up-to-date list of accredited properties will be provided to Tasmania by the Victorian Department of Agriculture as required.

2. SPECIFIC CONDITIONS FOR PARTICULAR PROPERTY-TYPES

2.1 NURSERIES WITH POTTED PLANTS

I. Plants are grown in containers using a soil-less mix

II. Containers are not in contact with the soil

2.2 TREE NURSERIES

I. Trees are to be bare-rooted and practically free of soil.

2.3 ADVANCED CONTAINERISED FIELD GROWN TREES

I. Consignment approval for movement into Tasmania must be obtained from the Manager, Quarantine Tasmania or their delegate. The end use of the trees will be an important consideration in the granting of approval.

Approval will be considered where:

(i) no potato crop has been grown on the property for at least 10 years.
Or
(ii) If a potato crop has been grown within the past 5 to 10 years the soil has been fumigated as in **1. III** above and soil samples at the rate of one 500 gram sample per consignment (made up of 50 sub-samples of 10 gram) have been tested and found negative for PCN.

II. Containerised trees must be treated with a nematicide at the following rates:

Aldicarb (Temik) 4 g active ingredient per square metre

Fenamiphos (Nemacur) 4 g active ingredient per square metre

2.4 BULB GROWERS

I. The bulbs are to be cleaned and graded prior to sale.

APPENDIX 3 *LIST A and LIST B DECLARED PESTS and DISEASES*

PLANT QUARANTINE ACT 1997

Notice under Section 12

ANNUAL LIST OF LIST A AND LIST B PESTS AND DISEASES

In fulfilment of the requirements of Section 12 of the Plant Quarantine Act 1997 I hereby publish for the year 2005 the list of all organisms that are currently declared under Section 10 to be a List A or List B Pest and under Section 11 to be a List A or List B Disease.

Organisms that have been declared under Section 10 to be List A pests:

ACARINA (mites & ticks)

Oligonychus pratensis (Banks)	(Banks grass mite)

INSECTA (insects)

COLEOPTERA (beetles)

Bruchus pisorum (Linnaeus)	(Pea weevil)
Heteronychus arator (Fabricius)	(African black beetle)
Hyperodes bonariensis (Kuschel)	(Argentine stem weevil)
Listronotus bonariensis (Kuschel)	(Argentine stem weevil)
Pyrrhalta luteola (Müller)	(Elm leaf beetle)
Scolytus multistriatus (Marsham)	(Elm bark beetle)
Trogoderma variabile (Ballion)	(Warehouse beetle)

DIPTERA (flies)

Bactrocera papayae (Drew & Hancock)	(Papaya fruit fly)
Bactrocera philippinensis (Drew & Hancock)	(Philippine fly)
Bactrocera tryoni (Froggatt)	(Queensland fruit fly)
Ceratitis capitata (Wiedemann)	(Mediterranean fruit fly)

HEMIPTERA (bugs, aphids, mealybugs & scale insects)

Aleurodicus dispersus	(Spiralling whitefly)
Bemisia tabaci (Gennadius)	(Poinsettia whitefly, Silverleaf whitefly)
Comstockaspis perniciosus (Comstock)	(San José scale)
Daktulosphaira vitifolii (Fitch)	(Grape phylloxera)
Siphoninus phillyreae	(Ash whitefly)

HYMENOPTERA (ants, bees & wasps)

Linepithema humile (Mayr)	(Argentine ant)
Monomorium spp. (Linnaeus)	(Pharaoh's ant; Hospital ant)
Polistes spp.	(Paper wasps)
Solenopsis invicta (Buren)	(Red Imported Fire Ant)

THYSANOPTERA (thrips)

Frankliniella occidentalis (Pergande)	(Western flower thrips)
Thrips palmi (Karny)	(Melon thrips)

MOLLUSCS (snails & slugs)

Austropeplea viridis	
Helix aperta (Born)	(Green snail)
Pseudosuccinea columella	(American ribbed fluke snail)

NEMATODES

Anguina agrostis	(Ryegrass nematode)
Anguina lolii	(Ryegrass nematode)
Aphelenchus spp.	
Criconemoides spp.	(Ring nematode)
Cryphodera spp.	
Ditylenchus destructor	
Fergusobia spp.	
Globodera pallida	(Potato cyst nematode)
Globodera rostochiensis	(Potato cyst nematode)
Globodera spp.	(Cyst nematodes)
Gracilacus spp.	
Heterodera spp.	(Cyst nematodes, excluding *H. avenae* & *H. humuli)*
Longidorus spp.	(Needle nematode)
Paralongidorus spp.	
Rotylenchus spp.	(Spiral nematode, excluding *R. robustus)*
Scutellonema spp.	
Tylenchulus spp.	(Citrus nematode, of *Vitus* & *Olea*)
Tylenchus spp.	(excluding *T. davainet)*
Xiphinema spp.	(Dagger nematode)

TURBELLARIA (flatworms)

Australoplana sanguinea alba

Bipalium kewense

Caenoplana sp.

Dolichoplana spp.

Kontikia orana

Pelmatoplana sp.

Platydemus manokwari

PLANTS

Achnatherum caudatum	(espartillo)
Allium vineale	(crow garlic)
Alternanthera philoxeroides	(alligator weed)
Asparagus asparagoides	(bridal creeper)
Asphodelus fistulosus	(onion weed)
Bassia scoparia	(kochia)
Berkheya rigida	(African thistle)
Bifora testiculata	(bifora)
Cabomba caroliniana	(cabomba)
Carduus nutans	(nodding thistle)
Carex buchananii	(leather leaf sedge)
Carex comans	(New Zealand sedge)
Carex flagellifera	(New Zealand sedge)
Carex testacea	(New Zealand sedge)
Caulerpa taxifolia	
Cenchrus incertus	(spiny burr-grass)
Cenchrus longispinus	(spiny burr-grass)
Ceratophyllum demersum	(hornwort)
Chondrilla juncea	(skeleton weed)
Cortaderia species	(pampas grasses)
Cuscuta species	(dodder)
Cynara cardunculus	(artichoke thistle)
Datura species	(datura)
Echium vulgare	(viper's bugloss)
Egeria densa	(egeria)
Eichhornia crassipes	(water hyacinth)
Emex australis	(spiny emex)
Equisetum species	(horsetail)
Eragrostis curvula	(African lovegrass)
Galium spurium	(false cleavers)
Galium tricornutum	(three-horn bedstraw)
Gymnocoronis spilanthoides	(Senegal tea plant)
Heliotropium europaeum	(common heliotrope)
Hieracium species	(hawkweeds)
Homeria species	(cape tulip)
Hydrilla verticillata	(hydrilla)
Hypericum perforatum	(St John's wort)
Lagarosiphon major	(lagarosiphon)
Lantana camara	(lantana)
Myriophyllum aquaticum	(parrot's feather)
Nassella neesiana	(Chilean needle grass)
Onopordum species	(Onopordum thistles)
Orobanche spp. (except *O. minor and O. cernua var. australiana*)	(broomrape)
Pennisetum macrourum	(African feather grass)
Pennisetum villosum	(feathertop)

Rorippa sylvestris	(creeping yellow cress)
Sagittaria graminea	(sagittaria)
Sagittaria montevidensis	(arrowhead)
Salpichroa origanifolia	(pampas-lily-of-the-valley)
Salvinia molesta	(salvinia)
Solanum elaeagnifolium	(silverleaf nightshade)
Solanum marginatum	(white-edged nightshade)
Solanum sodomaeum	(apple of Sodom)
Striga spp. (all non-indigenous species)	(witchweed)
Tamarix aphylla	(athel pine)
Trapa spp.	(water chestnut)
Tribulis terrestris	(caltrop)
Xanthium species	(burrs)

Organisms that have been declared under Section 10 to be List B pests:

ARANEIDA (SPIDERS)

Latrodectus hasselti (Thorell)	(Redback spider)

COLEOPTERA (beetles)

Asynonychus cervinus (Boheman)	(Fullers rose weevil)
Graphognathus leucoloma (Boheman)	(Whitefringed weevil)
Otiorhynchus rugosostriatus (Goeze)	(Rough strawberry weevil)
Otiorhynchus sulcatus (Fabricius)	(Black vine weevil)
Perperus spp.	(‘Apple root weevils’ weevil)
Phlyctinus callosus (Boheman)	(Garden weevil)

DIPLOPODA (MILLIPEDES)

Cylindroiulus latestriatus group

HEMIPTERA (bugs, aphids, mealybugs & scale insects)

Chorizococcus arecae (Maskell)	(‘Golden root mealybug’)

LEPIDOPTERA (butterflies & moths)

Cydia pomonella (Linnaeus)	(Codling moth)

MOLLUSCS (SNAILS & SLUGS)

Cochlicella spp.	(Conical snails)
Theba pisana (Müller)	(Sand dune snail; White Italian snail)

NEMATODES

Ditylenchus dipsaci	(Stem & bulb nematode)
Heterodera humuli	(Hop cyst nematode)
Paratrichodorus spp.	
Paratylenchus spp.	(Pin nematode)

Radopholus spp.	(Burrowing nematode)

PLANTS

Anthemis cotula	(stinking mayweed)
Cardaria draba	(white weed)
Carduus pycnocephalus	(slender thistle)
Carduus tenuiflorus	(slender thistle)
Carthamus lanatus	(saffron thistle)
Chrysanthemoides monilifera	(boneseed)
Cirsium arvense	(Californian thistle)
Cytisus scoparius	(English broom)
Echium plantagineum	(Paterson’s curse)
Elodea canadensis	(Canadian pondweed)
Erica lusitanica	(Spanish heath)
Foeniculum vulgare	(fennel)
Genista monspessulana	(Montpellier broom)
Lycium ferocissimum	(boxthorn)
Marrubium vulgare	(horehound)
Nassella trichotoma	(serrated tussock)
Rubus fruticosus	(blackberry)
Salix species except *S. babylonica, S. x. calodendron, S. x. reichardtii*	(Willow)
Senecio jacobaea	(ragwort)
Ulex europaeus	(gorse)

Organisms that have been declared under Section 11 to be List A diseases:

BACTERIA

Curtobacterium flaccumfaciens - pv. flaccumfaciens	(Bacterial blight of legumes)
Erwinia amylovora	(Fire blight)
Pseudomonas solanacearum	(Bacterial wilt of potato)
Pseudomonas pisi	(Pea leaf blight)
Pseudomonas phaseolicola	(Bean halo blight)
Xanthomonas cucurbitae	(of cucurbita spp.)
Pseudomonas striafaciens	(Bacterial stripe of barley)

FUNGI

Alternaria mali	(Apple spot)
Aphanomyces raphani	(of radish)
Ascochyta oleae	(of olive)
Ascochyta rabiei	(Chickpea blight)
Botrytis squamosa	(Botrytis leaf blight of onions)
Ceratocystis fimbriata	(of ornamentals)
Colletotrichum acutatum	(*Pinus* shoot blight, Strawberry fruit rot)

Colletotrichum gloeosporioides	(as Lupin anthracnose, Olive anthracnose & Asparagus anthracnose)
Diplodia oleae	(of olive)
Embellisia allii	(Garlic bulb rot)
Fomes spp.	(of *Eucalyptus* & other spp.)
Fusarium oxysporum f. spp.	(Fusarium wilts)
Ganoderma applanaium	(of *Pinus* & other spp.)
Gnomonia fructicola	(Strawberry leaf blotch)
Gnomonia leptostyla	(Walnut leaf/fruit spot)
Isariopsis griseola	(Angular leaf spot of *Phaseolus vulgaris*)
Macrophoina oleae	(of olive)
Mycosphaerella personaia	(Vitis vinifera)
Oidiopsis sicula	(Powdery mildew of capsicum)
Oidium spp.	(of *Phaseolus vulgaris*)
Ophiostoma spp.	(Dutch elm disease)
Peronosclerospora spp.	(Downy mildew of *Zea mays*)
Peronospora hyoscyami	(Tobacco blue mould)
Phacidopycnis tuberivora	(Potato rot)
Phoma lycopersica	(Stem rot of tomato)
Phomopsis / Fusicoccum sp.	(of walnut)
Phytophthora gonapodyides	(*Phytophthora* 'Pine Lake')
Phytophthora megasperma	(of apple, stone fruit, *Pinus* sp.)
Pseudoperonospora sparsa	(Rose downy mildew)
Puccinia tiruemenii	(Celery rust)
Pucciniastrum vaccinii	(Blueberry rust)
Pyrenochaeta terrestris	(Allium)
Sclerotium rolfsii	(Root rot)
Sclerotium tuliparum	(Bulb rot of tulip)
Septoria olivae	(of olive)
Spilocaea oleaginea	(of olive)
Stromatinia gladioli	(of bulbs)
Typhula spp.	(Buck shot rot of carrot)
Urocystis cepulae	(Onion smut)
Uromyces appendiculatus	(French bean rust)
Ustilago maydis	(Boil smut)

VIRUS & VIRUS-LIKE ORGANISMS

Garlic mosaic virus
Grapevine yellows MLO
Pea seedborne mosaic virus
Potato aucuba mosaic virus
Potato Spindle tuber viroid

Potato virus M
Purple top wilt (of Potato)
Tobacco necrosis virus
Tomato leaf curl geminivirus

Organisms that have been declared under Section 11 to be List B diseases:

BACTERIA

Corynebacterium michiganense	(Bacterial canker of tomato)

FUNGI

Olpidium brassicae	(Manifesting as lettuce big vein)
Phytophthora cinnamomi	(Root rot)
Plasmodiophora brassicae	(Clubroot of brassica)
Puccinia horiana	(Chrysanthemum white rust)
Sclerotium cepivorum	(Onion white rot)
Spongospora subterranea	(Powdery scab of potato)
Verticillium spp.	(Wilt)
Puccinia allii	(Onion rust)

VIRUS & VIRUS-LIKE ORGANISMS
Barley stripe mosaic virus
Tobacco rattle virus

Dated this day of April 2005

KIM EVANS
SECRETARY
DEPARTMENT OF PRIMARY INDUSTRIES, WATER AND ENVIRONMENT

APPENDIX 4 PUBLIC NOTICES – PLANTS and PLANT PRODUCTS

PLANT QUARANTINE ACT 1997

Notice under Sections 66 and 67

PROHIBITED AND RESTRICTED PLANTS AND PLANT PRODUCTS

1. Any plant or plant product grown or packed anywhere outside Tasmania is declared to be a restricted plant or restricted plant product unless it is declared to be a prohibited plant or prohibited plant product.

2. The fruit of any host* of the disease Fire Blight caused by the organism *Erwinia amylovora* is declared to be a prohibited plant product where the fruit is grown or packed outside Tasmania in an area in which the disease is known to exist.

*The following are hosts of the disease Fire Blight:

Botanical Name	Common Names
Amelanchier spp+	Serviceberry, Juneberry
Cotoneaster spp	Cotoneaster
Crataegus spp	Hawthorn
Cydonia spp	Quince
Eriobotrya spp	Loquat
Malus spp	Apple
Mespilus spp	Medlar
Prunus salicina	Japanese Plum
Pyracantha spp	Firethorn
Pyrus spp	Pear
Rubus ideus	Raspberry
Rubus	Thornless Blackberry (derived from crosses among a range of Rubus cultivars)
Sorbus spp	Mountain Ash
Stranvaesia spp	

+ *'spp'* means all species of plants in the genus

Dated this twentieth day of December 2000

KIM EVANS
SECRETARY
DEPARTMENT OF PRIMARY INDUSTRIES, WATER AND ENVIRONMENT

PLANT QUARANTINE ACT 1997

NOTICE UNDER SECTION 68

CONDITIONS AND RESTRICTIONS RELATING TO PRESCRIBED MATTER

The conditions and restrictions imposed in relation to the importation of any prescribed matter which is not declared prohibited under Section 66 of the Act are the requirements and procedures as documented in the *****Plant Quarantine Manual (Tasmania).

***** The Plant Quarantine Manual (Tasmania) is available from all Quarantine Tasmania offices and is also on the Department of Primary Industries, Water and Environment web site at www.dpiwe.tas.gov.au under "Food and Agriculture".

Dated this twentieth day of December 2000

KIM EVANS
SECRETARY
DEPARTMENT OF PRIMARY INDUSTRIES, WATER AND ENVIRONMENT

APPENDIX 5 **Quarantine Forms**

INDEX

DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT
Tasmania

Plant Quarantine Act 1997

(Serial Number)

QUARANTINE NOTICE

Date:......../......./........

To: ....

Prescribed Matter Ex: ....

From: ....

To: ....

Of: ....

I hereby direct you to remove into quarantine the prescribed matter, particulars of which appear below and of which you are the importer.

Description	Number	Supplier/Producer

Under Section 72 of the Plant Quarantine Act 1997, you are instructed to move the prescribed matter listed above to the approved quarantine place known as...

located at ....

Inspector: ....

DEPARTMENT *of*
PRIMARY INDUSTRIES,
WATER *and* ENVIRONMENT
Tasmania

Plant Quarantine Act 1997

(Serial Number)

CERTIFICATE OF RELEASE

To:.. Date:......../.........../............

Port of...

The...

imported by:..

which arrived per..from..

particulars of which appear below:

(tick applicable statement)

Have been inspected and may be released ☐

Have been treated in quarantine and may be released ☐

Description	Number	Supplier/Producer

Start AM/PM	**Finish** AM/PM	**Attendance Time** Hours Minutes

FEES
ORDINARY TIME ....
SUPERVISION ....
WEEKLY OVERTIME ....
WEEKEND OVERTIME ....
TOTAL FEE ....

INSPECTOR: ....

DEPARTMENT of PRIMARY INDUSTRIES, WATER and ENVIRONMENT
Tasmania

Plant Quarantine Act 1997

(Serial Number)

CERTIFICATE OF CONDEMNATION OF IMPORTED PRESCRIBED MATTER

Date:......../........./.........

To: ....

The Prescribed Matter imported by you, which arrived per ....
from .... , particulars of which appear below, has been condemned for the reason(s) indicated below:-- (Tick appropriate box)

1. Breakdown ☐

2. Pests and/or diseases of quarantine concern ☐

3. Contaminated with prohibited matter ☐

4. Other ☐

Description	Number (Ctns / Kg)	Supplier/Producer

Action taken:
....
....
....
....
....
....

INSPECTOR: ....

BAGGAGE STICKER

Date: .... / .... / .... Voyage / Flight No.: ....

Inspection Officer: ....

"Q" Items Seized: ....

Residual: ....

Other "Q" Items Present: ....

"Q" Items Declared YES NO

Plant Quarantine Act 1997

NOTICE OF INTENTION TO IMPORT PLANTS OR PLANT PRODUCTS INTO TASMANIA

DEPARTMENT of PRIMARY INDUSTRIES, WATER and ENVIRONMENT
Tasmania
QUARANTINE SERVICES

Macquarie Wharf No.1, Hunter St, Hobart, Tas, 7000
Tel: 03 6233 3352
Fax: Hobart (03) 62346785; Launceston (03) 63918847; Devonport (03) 64270057; Wynyard Airport (03) 64424671
E-mail: quarantinetasmania@dpiwe.tas.gov.au

ARRIVAL PORT.. FROM................................
DATE............................

VESSEL or AIRLINE.. UNIT NO........................

	PKGS	ORIG		PKGS	ORIG		PKGS	ORIG
ABALONE M'ROOMS			FENNEL			PARSNIPS		
ALFALFA			FEIJOAS			PASSIONFRUIT		
ANISEED			FIGS			PAWPAW		
APPLE CUCUMBER			FLOWERS			PEACHES		
APPLE						PEARS		
APPLE (TOFFEE)			GARLIC			PEAS		
APRICOTS			GINGERS			PEPINOS		
ARTICHOKES			GOLD NUGGETS			PEPPERS		
ASPARAGUS			GOOSEBERRIES			PERSIMMONS		
AVOCADOS			GOURDS			PINEAPPLES		
			GRAIN (See Notice of Intention to Import Grain/Seed)			PLANTS		
						PLUMS		
BABACO						POMEGRANATES		
BANANAS			GUAVA			POTATOES		
BEAN SHOOTS						PRICKLY PEAR		
BEAN			HERBS			PUMPKINS		
BEETROOT			HONEYDEWS					
BLACKBERRIES						QUINCES		
BLUEBERRIES			KIWANO					
BROCCOLI			KIWI FRUIT			RADISHES		
BRUSSEL SPROUTS			KOHL RABBI			RASPBERRIES		
BUTTERNUT PUMPKIN			KUMQUATS			RHUBARB		
BUTTER SQUASH						ROCKMELON		
BUCK CHOI			LEEKS					
			LEMONS			SALAD MIX		
CABBAGE			LETTUCES			SEED		
CANTALOUPES			LIMES			SILVERBEET		
CAPSICUMS			LOQUATS			SPINACH		
CARROTS			LYCHEES			SPRING ONIONS		
CASSAVA						SQUASH		
CAULIFLOWERS			MANDARINS			STRAWBERRIES		
CELERY			MANGOES			SWEDES		
CHERRIES			MARROWS			SWEET CORN		
CHERRY TOMATOES			MELONS			SWEET POTATO		
CHICORY			MINT					
CHILLIES			MIXED VEGIES			TAMARILLO		
CHIVES			MUSHROOMS			TANGERINES		
CHOKOS						TANGELOS		
COCONUTS			NECTARINES			TARO		
CUCUMBERS			NUTS			TOMATOES		
CUSTARD APPLES						TURNIPS		
CHOI SUM			OKRA					
			OLIVES			WATERMELONS		
			ONIONS			WITLOF		
DATES			ORANGES			WOMBOC		
EGG FRUIT			PAPAYA			ZUCCHINIS		
ENDIVES			PARSLEY					
TOTAL PKGS			**TOTAL PKGS**			**TOTAL PKGS**		

TOTAL NUMBER of PACKAGES...

DECLARATION BY IMPORTER OR AGENT

I declare the information provided on this form to be true and correct in every respect to the best of my knowledge.

SIGNATURE OF IMPORTER OR AGENT...

FOR.. ADDRESS
....

SIGNATURE OF INSPECTOR
....

CERTIFICATE OF RELEASE NUMBER
....

PRIVACY STATEMENT: Personal information on this form is collected from you for the purpose of importing / exporting produce into Tasmania under the Plant Quarantine Act 1997. This information may be disclosed to other public sector bodies also involved with the enforcement of requirements under this legislation, or where necessary, for the efficient use and storage of the information. Personal information is managed in accordance with the provisions of the *Personal Information Protection Act 2004* and may be accessed by the individual to whom it relates on request to DPIWE. You may be charged a fee for this service.

DATE OF INSPECTION .... QUARANTINE NOTICE NUMBER ....

NOTICE OF INTENTION TO IMPORT GRAIN/SEED

DEPARTMENT of PRIMARY INDUSTRIES, WATER and ENVIRONMENT
Tasmania
QUARANTINE BRANCH
Macquarie Wharf No.1, Hunter St, Hobart, Tas, 7000
Tel: 03 6233 3352
E-mail: quarantinetasmania@dpiwe.tas.gov.au

To the Operations Coordinator

(PORT)

YOUR REFERENCE No.______________

I the undersigned hereby give notice that I will be importing grain /seed as detailed below and hereby acknowledge liability to pay fees as prescribed.

Name of Importer/Agent (PRINT)
Telephone

Address of Importer/Agent

Postcode

Signature of Importer/Agent **Date**

------/-------/------

Shipping Details

Name of Vessel

Voyage Number **Expected Arrival Date**

Port(s) of Discharge

Burnie ☐ **Devonport** ☐ **Hobart** ☐ **Launceston** ☐

Quarantine Fax:
(03) **64424671** **(03) 64270057** **(03) 62346785** **(03) 6391 8847**

Details of Consignment(s)					**Office Use Only**
Type of grain	Container No./ Hold No.	*Weight (tonnes)	Origin	End-User(s) or Consignee(s)/(If not same as Importer) PLEASE PRINT	Level of Premises

DOCS SUBMITTED:

FINAL INSPECTION OR SAMPLING RECORD ☐ EMPTY CONTAINER DECLARATION ☐ SEED ANALYSIS CERTIFICATE ☐

For Office Use Only

The above consignment(s) is (are) released from quarantine under the conditions listed below

----

START AM / PM	FINISH AM / PM	ATTENDANCE TIME Hours Minutes	FEES TOTAL

Quarantine Officer Signature **Date / /**

* Weight for BULK shipments only

PRIVACY STATEMENT: Personal information on this form is collected from you for the purpose of importing / exporting produce into Tasmania under the *Plant Quarantine Act 1997*. This information may be disclosed to other public sector bodies also involved with the enforcement of requirements under this legislation, or where necessary, for the efficient use and storage of the information. Personal information is managed in accordance with the provisions of the *Personal Information Protection Act 2004* and may be accessed by the individual to whom it relates on request to DPIWE. You may be charged a fee for this service.

DEPARTMENT of
PRIMARY INDUSTRIES,
WATER and ENVIRONMENT
QUARANTINE BRANCH
Tasmania

Macquarie Wharf No.1, Hunter St, Hobart, Tas, 7000
Tel: 03 6233 3352
Fax: Hobart (03) 62346785; Launceston (03) 63918847;
Devonport (03) 64270057
E-mail: quarantinetasmania@dpiwe.tas.gov.au

PLANT HEALTH CERTIFICATE

MOVEMENT OF PLANT MATERIAL FROM TASMANIA

THIS IS TO CERTIFY THAT the plant material described below has been inspected by an authorised officer of the Department and is considered to be free from pests and diseases.

Description of Consignment:

Name and Address of Exporter:	
Name and Address of Consignee:	
Name and Address of Grower / Packer:	
Means of Conveyance:	
Name of Plant Material / Produce and Quantity	

Disinfestation and/or Disinfection Treatment:

Date:	**Treatment:**	**Chemical:**
Concentration:	**Duration:**	**Temperature:**

Additional Declaration:

Official Stamp

Date Inspected		**Name of Inspector**	
Place Inspected		**Signature**	

VALID ONLY WHEN STAMPED WITH THE DEPARTMENTAL SEAL AND SIGNED BY AN INSPECTOR

PRIVACY STATEMENT: Personal information on this form is collected from you for the purpose of exporting produce from Tasmania under the *Plant Quarantine Act 1997*. This information may be disclosed to other public sector bodies also involved with the enforcement of requirements under this legislation, or where necessary, for the efficient use and storage of the information. Personal information is managed in accordance with the provisions of the *Personal Information Protection Act 2004* and may be accessed by the individual to whom it relates on request to DPIWE. You may be charged a fee for this service.

Appendix D

From: Cindy.Hanson@dpiw.tas.gov.au
Sent: Friday, 1 August 2008 2:01 PM
To: brocklands@activ8.net.au
Cc: Adrian.Hatten@dpiw.tas.gov.au; rory.dow@costaexchange.com.au
Subject: BLUEBERRY PLANT IMPORTS

Dear Karen and Rory

Please find attached the approval to import blueberry plants, starting 6 August.

Rory the approval was finalised in consultation with Dean Meltcalf after his visit to Sulphur Creek yesterday. i will send the signed copy to Peter McPherson

Adrian, Karen is on her way to the mainland and will endeavour to have a copy of the approval with her on reentry to Tasmania but in the event she cant manage that, pls note it has been issued.

any questions, please call.

Cindy Hanson
Principal Scientific Adviser (Biosecurity)
Biosecurity and Product Integrity
Department of Primary Industries and Water
Mt Pleasant Laboratories
PO Box 46
Kings Meadows TAS 7249

e-mail : Cindy.Hanson@dpiw.tas.gov.au
Ph : 03 6336 5414
Fax : 03 6336 5374

Appendix E

Karen Brock <brocklands@bigpond.com>
to Rosalie

Hi Rose

Could you please clarify something for me?

In the conversation last week you indicated that you had spoken to Peter Cross and seemed surprised that when we were informed that the presentation at the FGT conference indicated that eradicatio

I understood that with management such as removing the leaves was enough to knock back the spore loading. This was proposed only in a more sever format in August last year to prune the evergre

Were you actually requested to assist Biosecurity or questioned whether a possibility of eradication could be actioned?

Phil and I subsequent phone conversation indicated that you were trialing techniques up in NSW and we were wondering if possible to include this property in the trial? Or can you only operate in a

Your clarification would be much appreciated

Regards

Karen

Nuffield Scholar 2014

- 61 3 63944807
- 0439972793

Linked in profile

Extract from Hansard Thursday 8th of June.

Mr ROCKLIFF - I have not seen that report.
Mr KLUMPP - I assume you are talking about the Rose Daniel report?

Dr BROAD - Yes.

Mr KLUMPP - We have been speaking to Rose Daniel. That work Rose is doing in New South Wales, as you mentioned before - the infected state - about control measures on infe

---

Rosalie Daniel <rosalie.daniel@dpi.nsw.gov.au>
to brocklands

Images are not displayed. Display images below - Always display images from rosalie.daniel@dpi.nsw.gov.au

Hi Karen,

I spoke with Peter Cross on 8 June. I just checked my emails and he is from Biosecurity, not DPI - my mistake.

I am not sure about which paper they are referring to in the Hansard?

My opinion (which I also talked to Peter about) is that, given that there have been three rust incursions over several years, there is no guarantee that eradication would be successful. There are many v

I suspect that defoliation would at least reduce inoculum levels (based on the evergreen system, where retained leaves are likely to be the main way in which the fungus is carried over), but we don't k

We have previously received a small number (~15) of young plants (maybe 30 cm high in tubes) which we defoliated and which then grew new leaves on which rust symptoms did not develop. This

The project we have is BB13002 - funded by HIA and ABGA. It will finish in December this year. We are finishing up some biological/epidemiological work. We have completed a number of fung

I hope that helps.

Rose

--
Rosalie Daniel
Plant Pathologist
Department of Primary Industries
Central Coast Primary Industries Center, University of Newcastle Ourimbah Campus
North Loop Road, Ourimbah NSW 2258
Locked Bag 26 | Gosford NSW 2250
T: 02 4348 1932
E: Rosalie.Daniel@dpi.nsw.gov.au
W: www.dpi.nsw.gov.au

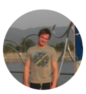
Appendix F

Thekopsora minima causes blueberry rust in south-eastern Queensland and northern New South Wales

Article *in* Australasian Plant Disease Notes · December 2013

DOI: 10.1007/s13314-013-0101-2

3 authors, including:



Alistair McTaggart
University of Pretoria

Andrew D W Geering
University of Queensland

Australasian Plant Dis. Notes
DOI 10.1007/s13314-013-0101-2

Thekopsora minima causes blueberry rust in south-eastern Queensland and northern New South Wales

A. R. McTaggart · A. D. W. Geering · R. G. Shivas

Received: 12 March 2013 / Accepted: 28 April 2013

Abstract The cause of blueberry rust in eastern Australia was determined by molecular and morphological analysis as *Thekopsora minima.*

Keywords Large Subunit region · *Naohidemyces* · Pucciniales · *Vaccinium*

Vaccinium (Ericaceae) is host to three rust fungi, *Naohidemyces vaccinii*, *N. fujisanensis* and *Thekopsora minima*, which are morphologically distinguished by aecial and telial characteristics (Sato et al. 1993). The uredinial stage of blueberry rust was first recorded from Australia in 2003.

In September 2012, a specimen of rust on blueberry (*Vaccinium corymbosum*) from Bundaberg, Queensland, was forwarded to Biosecurity Queensland and lodged as BRIP 57654 with the DAFF Plant Pathology Herbarium. The specimen was examined microscopically. Uredinia were present on lower leaf surfaces in groups up to 5 mm diameter, confluent, vein limited, on necrotic spots with the corresponding upper leaf surface dark brown with a bright red diffuse border, subepidermal, erumpent, round, 100–200 μm diameter, yellow (Fig. 1a). A peridium was present with a central pore. Urediniospores were subglobose, ellipsoidal to obovoid, yellow, 15–27×13–19 μm, with a wall that was 1–2 μm thick and echinulate (Fig. 1b).

DNA was extracted from this specimen according to the protocol outlined by Aime (2006) using the UltraClean Plant DNA Isolation Kit (MoBio Laboratories, Solana Beach, CA, USA). The ITS2-LSU region was amplified with Rust2INV (Aime 2006)/LR7 (Vilgalys and Hester 1990) and nested with LROR/LR6 (Vilgalys and Hester 1990). The 28S sequence of blueberry rust (GenBank KC763340) had high identity to *Thekopsora minima* (HM439777 and GU355675; 99 % identical over 100 % query coverage) in a BLAST search. A match to *Naohidemyces vaccinii* was also returned with a lower sequence identity (DQ354561; 95 % identical over 99 % query coverage). Based on a phylogenetic reconstruction of closely related taxa from GenBank (Fig. 2), the pathogen was identified as *T. minima*.

The blueberry rusts in *Thekopsora* and *Naohidemyces* are heteroecious. The aecial stage of each occurs on the conifer *Tsuga* in the northern hemisphere. Aecial morphology is a reliable character to distinguish the two genera. *Naohidemyces* has aecia that are *Uredo*-type, with aeciospores borne singly on pedicels (Sato et al. 1993). *Thekopsora* differs by having aecia that are *Peridermium*-type, with aeciospores in chains (Sato et al. 1993). Telial morphology also differentiates the genera. The germ pores of *Naohidemyces* occur in the centre of the teliospores, whereas germ pores of *Thekopsora* are situated in the corner of each cell (Sato et al. 1993). Uredinial differentiation of *Thekopsora* and *Naohidemyces* is more subtle. Uredinia of *Naohidemyces* are enclosed by a peridium with conspicuous ostiolar cells, which are not present in *Thekopsora* (Sato et al. 1993). The size of urediniospores of species of *Thekopsora* and *Naohidemyces* on *Vaccinium* is not a useful taxonomic character.

Thekopsora minima was recently reported from South Africa (Mostert et al. 2010) and Mexico (Rebollar-Alviter et al. 2011) based on inoculation studies and molecular data. Australian specimens of blueberry rust held in BRIP were identified as *T. minima* by morphology, and in some cases by LSU sequence data, which is indicated by GenBank numbers as follows. Specimens examined: on *Vaccinium corymbosum* L., Brooklet, Byron Bay, New South Wales,

A. R. McTaggart (✉) · A. D. W. Geering
Queensland Alliance for Agriculture and Food Innovation,
The University of Queensland, Ecosciences Precinct,
GPO Box 267, Brisbane, Queensland 4001, Australia
e-mail: alistair.mctaggart@gmail.com

R. G. Shivas
Plant Pathology Herbarium, Biosecurity Queensland,
Department of Agriculture, Fisheries and Forestry,
GPO Box 267, Brisbane, Queensland 4001, Australia

Published online: 21 June 2013

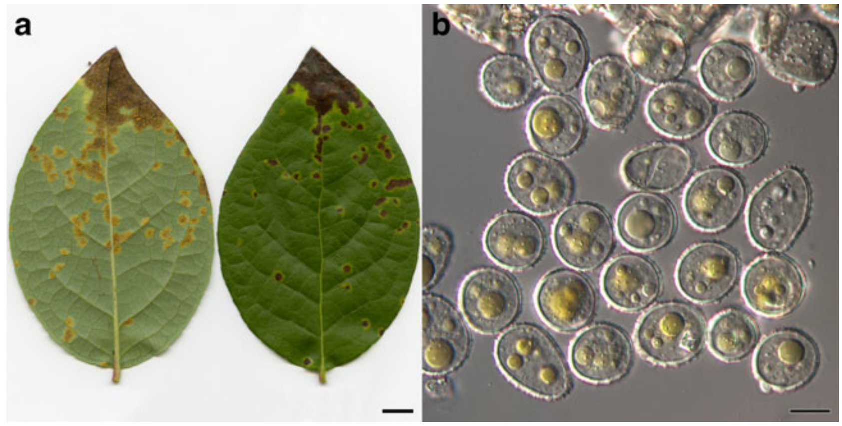


Fig. 1 *Thekopsora minima* on *Vaccinium corymbosum*. **a** Abaxial and adaxial leaf symptoms; **b** Urediniospores. Scale A=1 cm; B=10 μm

Australia, 19 February 2003, J.M. Anderson, BRIP 39896; Redlands Research Station, Cleveland, Queensland, Australia, 22 August 2008, J. Moisander, BRIP 52162, GenBank# KC763341; Nambour, Queensland, Australia, 15 September 2009, J. Nagle, BRIP 52832, GenBank# KC763342.

Naohidemyces vaccinii and *N. fujisanensis* were not regarded as pathogens of blueberry by Sato et al. (1993),

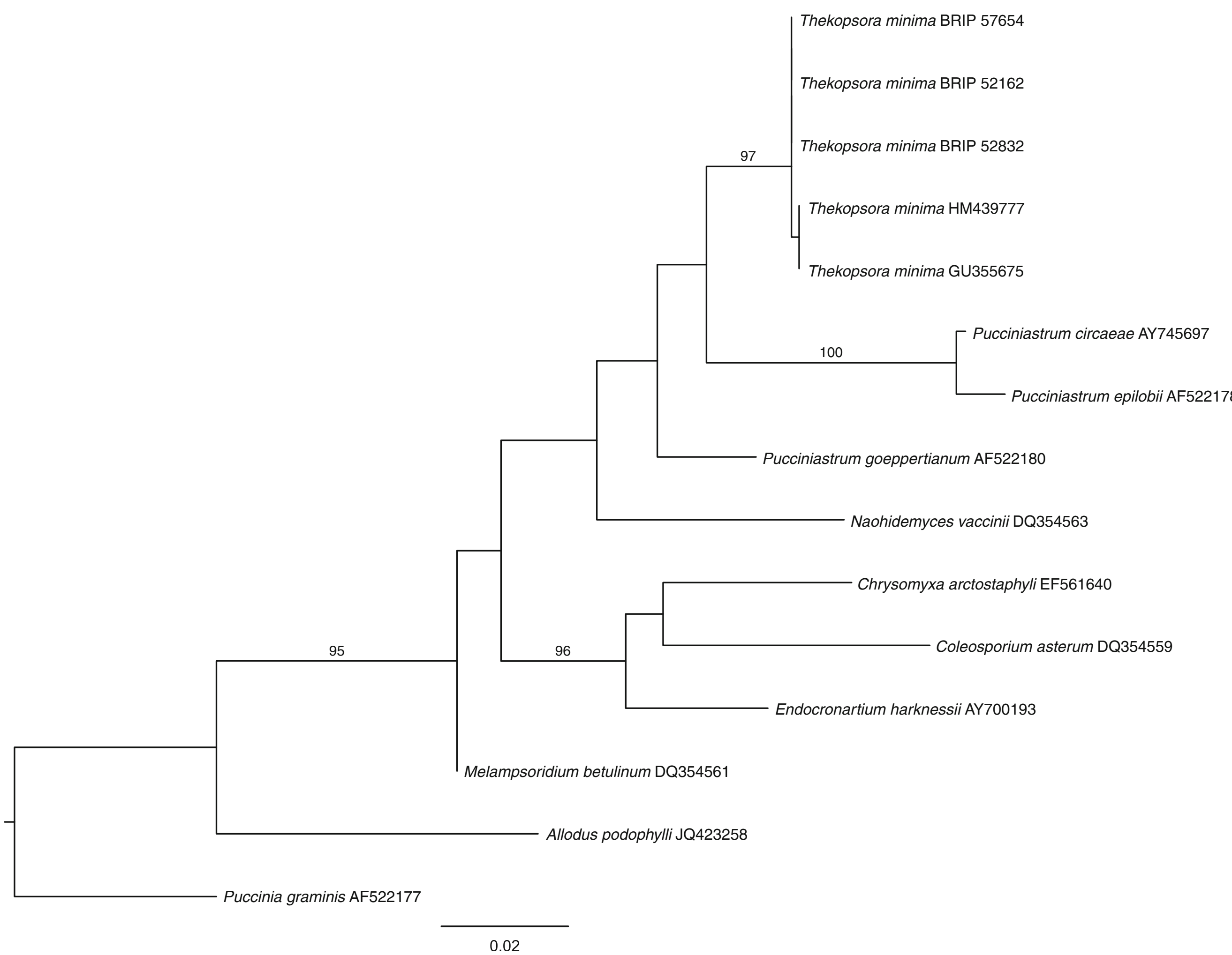


Fig. 2 Phylogram recovered from a maximum likelihood search and SPR tree improvement in PhyML with an alignment of the LSU region. aRLT values >90 % shown above nodes

although they infected other *Vaccinium* species. *Naohidemyces* is not recorded in Australia.

Acknowledgments This work was partly funded by the Australian Biological Resources Study, grant number RFL212-33.

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Aime MC (2006) Toward resolving family-level relationships in rust fungi (Uredinales). Mycoscience 47:112–122

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Rebollar-Alviter A, Minnis AM, Dixon LJ, Castlebury LA, Ramírez-Mendoza MR, Silva-Rojas HV, Valdovinos-Ponce G (2011) First report of leaf rust of blueberry caused by *Thekopsora minima* in Mexico. Plant Dis 95:772–772

Sato S, Katsuya K, Hiratsuka Y (1993) Morphology, taxonomy and nomenclature of *Tsuga*-Ericaceae rusts. Trans Mycol Soc Jpn 34:47–62

Vilgalys R, Hester M (1990) Rapid genetic identification and mapping of enzymatically amplified ribosomal DNA from several *Cryptococcus* species. J Bacteriol 172:4238–4246

Appendix F1

Blueberry rust

January 2016 Primefact 1432 First edition
Plant Biosecurity & Product Integrity Orange

Blueberry rust

Blueberry rust (*Thekopsora minima*) is a fungal disease which infects the leaves and fruit of blueberries and related plants in the Ericaceae plant family.

Blueberry rust is present in NSW and is not reportable. However, it is regulated in other states. Import regulations for hosts of blueberry rust should be checked with the relevant state authority and should be followed at all times.

Description

The initial symptoms of blueberry rust usually appear midseason on the leaves of host plants.

Small yellow spots develop on the upper surface of leaves. As the infection progresses the spots grow and darken to a rust brown colour (Figure 1), often surrounded by a yellow halo.

On the underside of leaves, yellow pustules of powdery fungal spores develop (Figure 1). These pustules turn rusty red with age.

Infected leaves may curl and in severe cases the entire leaf will eventually die as the spots merge and become necrotic.

Later in the season similar disease pustules may also appear on developing fruit (Figure 2).

Damage

Severe cases of blueberry rust can lead to premature leaf drop. The loss of leaves reduces plant vigour, leading to a decline in yield and a reduction in flowers the following season.

Severe blueberry rust infection may lead to the death of susceptible plants.

The majority of Australian states are free of blueberry rust and some regulate against host products. Occurrence of blueberry rust can therefore restrict market access to some states.

Figure 1 Blueberry rust lesions on topside (left) and underside (right) of blueberry leaves

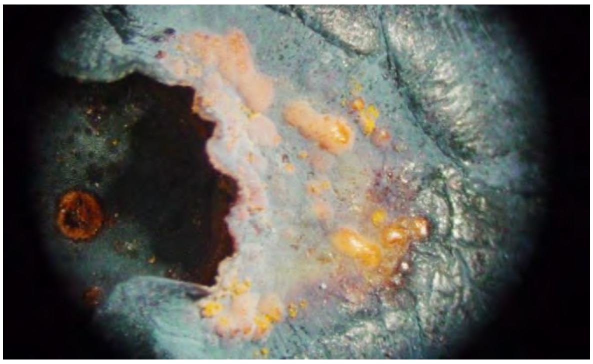


Figure 2 Magnified rust pustules on blueberry fruit

Lifecycle

In spring, airborne spores of blueberry rust infect new leaves. Rust pustules on the underside of infected leaves can be seen roughly 10 days after initial spore contact.

Spores released from the pustules further infect blueberry leaves in a repetitive cycle. New pustules are generally produced every 10–14 days, though this can occur more rapidly under favourable conditions.

In mild climates such as Australia's, blueberry rust survives over winter by persisting on host leaves that remain evergreen. It does not require an alternative host as it would in colder climates overseas.

Hosts

The following plants are considered hosts of blueberry rust in Australia and have associated movement restrictions in some states:

- *Vaccinium* species (blueberry and cranberry)
- *Gaylussacia* species (huckleberry)
- *Rhododendron* species (including azalea)
- *Tsuga* species
- *Lyonia* species
- *Menziesia* species
- *Pernettya* species
- *Hugeria* species
- *Pieris* species
- *Leucothoe* species
- *Oxycoccus* species

Spread

Blueberry rust spores are very easily and quickly spread to nearby plants by wind and rain.

Blueberry rust can be spread over longer distances by people transporting infected plants, fruit, packaging, equipment and clothing.

Distribution

Blueberry rust has been reported in Europe, Argentina, Asia, Mexico, Canada, the United States and Australia.

Australian distribution

Blueberry rust has been present in parts of NSW and Queensland for many years. Blueberry rust is known to exist within the red zones of Figure 3.

Blueberry rust was detected in the Melbourne metropolitan area towards the end of 2014. This was the first instance of the disease occurring in Victoria. Spread of the disease has currently been contained, though the Victorian government is remaining vigilant for any further detection.

Blueberry rust was also detected in Tasmania towards the end of 2014, with all infected plants subsequently destroyed under Tasmania's biosecurity protocols.

Blueberry rust quarantine

Blueberry rust has been present in NSW for many years and there are currently no import conditions or restrictions applied to the movement of host plants in NSW.

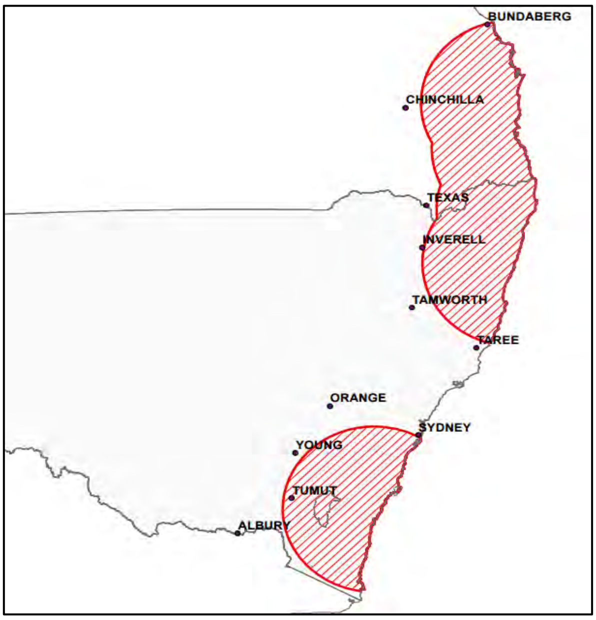


Figure 3 Blueberry rust restricted areas in NSW and QLD

Blueberry rust is not reportable in NSW, however, quarantine boundaries and procedures have been established to prevent the spread of blueberry rust from known infested areas to other states currently free of the disease.

Interstate import requirements should be considered prior to any movement of blueberry rust host material. Further information is available by contacting the relevant state authority.

Management

Blueberry rust can be managed with fungicides or by planting tolerant varieties.

The removal of alternative or volunteer hosts that may harbour the disease can be beneficial in reducing sources of blueberry rust spores.

Limiting overhead irrigation can reduce leaf wetness to minimise the spread of rust spores in water runoff.

Actions to minimise risks

Put in place biosecurity best practice actions to prevent entry, establishment and spread of blueberry rust onto your property:

- practice "Come clean, Go clean"
- ensure all staff and visitors are instructed in and adhere to your business management hygiene requirements
- monitor your plants regularly
- source plant material of a known high health status from reputable suppliers
- keep records

A plant pest is a disease causing organism or an invertebrate which threatens agricultural production, forestry or native and amenity plants.

Acknowledgments

Figures 1 and 2 courtesy of Department of Primary Industries, Parks, Water and Environment, Tasmania

Figure 3 courtesy of NSW Department of Primary Industries

Published by the NSW Department of Primary Industries.

PUB15/522

FACTSHEET

BIOSECURITY SA
PIRSA

Monday, 13 February 2017

Call the Exotic Plant Pest Hotline 1800 084 881

Blueberry Rust

Thekopsora minima

What is blueberry rust?

Blueberry rust is a plant disease caused by the fungus *Thekopsora minima*, which affects a range of plants in the Ericaceae family, including blueberries, cranberries and rhododendrons.

Blueberry Rust is not known to occur in South Australia and early detection and reporting of blueberry rust will help protect the South Australian blueberry industry. Entry of all host material into South Australia is prohibited unless it complies with Condition 1 of the Plant Quarantine Standard.

What do I look for?

The initial symptoms of blueberry rust are reddish spots on the upper surfaces of young leaves. These lesions darken with age, often surrounded by a yellow halo, and may merge as the disease progresses. Infected leaves may curl.

On the undersides of the leaves, yellow pustules develop to release spores capable of infecting other leaves and spreading the disease.

In severe cases, leaves can turn brown and drop prematurely. Rust spores may be found on other parts of the plant (such as fruit and stems) if they become dislodged from the pustules.

How does it spread?

Blueberry rust produces spores during five life stages. The disease can overwinter on evergreen blueberry leaves in milder climates, but is more prevalent in warm, wet conditions.

New pustules can be produced and release spores every 10-14 days, with more rapid spore production occurring under favourable climatic conditions. The optimum temperature for spore production is around 21°C, but new infections are unlikely when the temperature is over 30°C.

The millions of spores released from the pustules are very easily and quickly transported by wind (up to several hundred metres), but can also be spread via infected plants and fruit, packaging, equipment, clothing and hands.

The spores are able to re-infect the original host plant as well as other blueberry plants and other host species.

Hosts

The following plants are considered hosts of blueberry rust in Australia:

- Vaccinium species (blueberry and cranberry)
- Gaylussacia species (huckleberry)
- Rhododendron species (including azalea)
- Tsuga species
- Lyonia species
- Menziesia species
- Pernettya species
- Hugeria species
- Pieris species
- Leucothoe species
- Oxycoccus species

Distribution

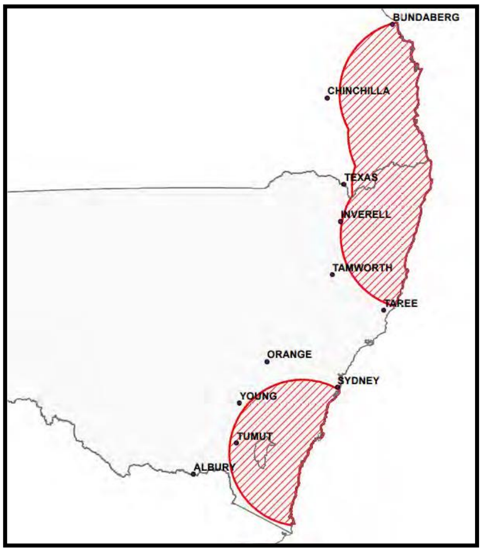
Blueberry rust has been reported in Europe, Argentina, Asia, Mexico, Canada, the United States and Australia.

Australian distribution

Blueberry rust has been present in parts of NSW and Queensland for many years.

Blueberry rust was detected in the Melbourne metropolitan area towards the end of 2014. This was the first instance of the disease occurring in Victoria. Spread of the disease has currently been contained, though the Victorian government is remaining vigilant for any further detection.

Blueberry rust has also been detected on a property in the North- West of Tasmania in August 2016 and is under control by Biosecurity Tasmania.



Blueberry rust restricted areas in NSW and QLD

What do I do if I find it?

If you find plants that you suspect might be infected with blueberry rust it is very important that you not disturb or move the plant.

Care should also be taken to ensure that any clothes or equipment has not become contaminated.

You should, as soon as possible, phone the plant disease hotline on 1800 084 881 and report the infection.

EXOTIC PLANT PEST HOTLINE
1800 084 881

Images courtesy of Biosecurity Tasmania, Department of Primary Industries, Parks, Water and Environment. (©2014)

Disclaimer: The material in this publication was prepared from the most up-to-date information available at the time of publication. It is intended as a guide only and the publisher accepts no responsibility

Appendix F3

Blueberry rust: declared pest

Page last updated: Wednesday, 22 July 2015 - 12:54pm

Blueberry rust is a plant disease caused by the fungus *Thekopsora minima*, which affects a range of plants in the Ericaceae family, including blueberries, cranberries and rhododendrons.

This pest has been reported in Europe, Argentina, Asia, Mexico, Canada and the United States of America. In Australia, it has been present in parts of New South Wales and Queensland for many years.

Blueberry rust is not known to occur in Western Australia. Early detection and reporting of blueberry rust will help protect the Western Australian blueberry industry.

WA growers and members of the public who suspect the presence of Blueberry rust should contact the Department of Agriculture and Food, Western Australia on 1800 084 881.

What plants are affected?

Blueberry rust is a fungal disease of a range of plants in the Ericaceae family, including the genera:

Vaccinium spp. (blueberries and cranberries)

Gaylussacia spp. (huckleberries)

Rhododendron spp. (azalea)

Lyonia spp.

Conifer hemlocks (*Tsuga spp.*) are the alternative hosts which the rust requires to complete its lifecycle in colder climates. These species are believed to be uncommon in Australia, but in mild climates such as Australia's the rust can survive without completing its life cycle.

To date, blueberry rust has only been reported on blueberries (Vaccinium spp.) in Australia. Southern Highbush varieties and their cultivars are more susceptible to the disease than other varieties.

What do I look for?

The initial symptoms of blueberry rust are reddish spots on the upper surfaces of young leaves. These lesions darken with age, often surrounded by a yellow halo, and may merge as the disease progresses. Infected leaves may curl.

On the undersides of the leaves, yellow pustules develop to release spores capable of infecting other leaves and spreading the disease.

In severe cases, leaves can turn brown and drop prematurely. Rust spores may be found on other parts of the plant (such as fruit and stems) if they become dislodged from the pustules.

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The millions of spores released from the pustules are very easily and quickly transported by wind (up to several hundred metres), but can also be spread via infected plants and fruit, packaging, equipment, clothing and hands.

The spores are able to re-infect the original host plant as well as other blueberry plants and other host species.

What damage can this disease cause?

Defoliation of affected plants reduces vigour and, in the following year, crop yield. Serious defoliation may lead to the death of susceptible cultivars.

What do I do if I find it?

WA growers and members of the public who suspect the presence of blueberry rust should contact the Department of Agriculture and Food, Western Australia’s Pest and Disease Information Service (PaDIS) on 1800 084 881. They can also send plant samples to AGWEST Plant Laboratories.

When sending samples, package the leaves between sheets of absorbent paper, such as newspaper, to prevent them getting crushed in transit and enter the locality where collected, date and collector’s contact details. It is important not to post specimens on a Thursday or Friday. This avoids deterioration while in transit over the weekend.

Farm biosecurity measures

DAFWA advises growers to follow farm biosecurity measures, which include restricting farm visitor access, using footbaths, and cleaning and disinfecting tools and machinery.

Refer to **Farm Biosecurity** for more information on farm biosecurity measures.

More information

For information on the management of blueberry rust, refer to the **Victorian Department of Environment and Primary Industries** website.

Blueberry Rust (*Thekopsora minima* P.Syd & Syd)

What is blueberry rust?

Blueberry rust (*Thekopsora minima*) is a serious disease of blueberries that causes extensive defoliation on plants with severe infections. It is a threat to the Tasmanian blueberry industry and is currently subject to Tasmanian biosecurity regulation as a notifiable plant pest. This means that anyone who sees what they think might be blueberry rust must report it.

Blueberry rust affects blueberries, cranberries, huckleberries as well as a few other host plants. Blueberry rust poses no threat to human health.

What to look for:

- Initial small yellow, chlorotic leaf spots on upper surface of young leaves
- Lesions turn rust/brown coloured and enlarge as the infection progresses (*Fig 1. And 2.*)
- Yellow-orange powdery pustules develop on the underside of leaves (*Fig 3.)*
- Similar pustules may also appear on blueberry fruit (*see page* 2.)
- Premature leaf drop and defoliation

When do symptoms first appear?

In the field, the symptoms appear on leaves by mid-season at any growth stage of plants and on fruits by late season.

How does Blueberry rust spread?

The disease spreads by airborne spores mainly via wind. In glasshouse environments, spores can be carried by people, on clothing for example, when walking past and contacting plants.

Fig 1.

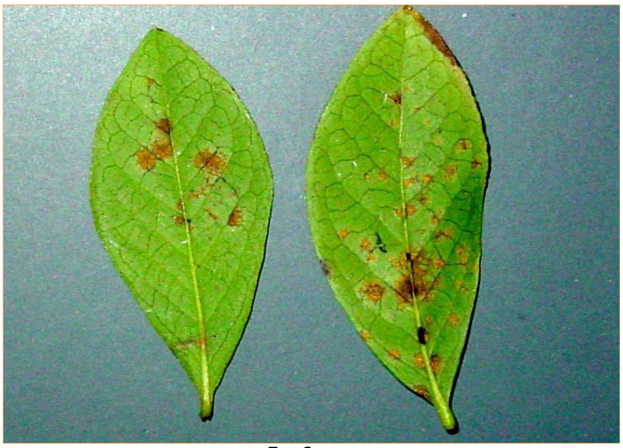

Fig 2.

Fig 3.

Close-up of the rust pustules on the blueberry fruit.
(All images DPIPWE)

Distribution of Blueberry rust

The disease has been recorded in Europe, Argentina, Asia, Mexico, Canada and USA. In Australia it is present in New South Wales, Queensland and more recently Victoria.

What to do if you suspect you have blueberry rust

If you find plants on your property that you suspect might be infected with blueberry rust it is very important that you not disturb or move the plant.

Care should also be taken to ensure that any clothes or equipment has not become contaminated.

You should, as soon as possible, phone the plant disease hotline on **1800 084 881** and report the infection.

Ways you can protect your blueberry crop

Adopt a range of farm biosecurity measures that will assist in protecting your property from the entry and spread of pests and diseases. Farm biosecurity is a shared responsibility, and that of every person visiting or working on your property.

- Ensure you and your staff are aware of the disease, and are familiar with plant symptoms
- Disease identification information should be on-site and be easily accessible
- Limit the access of people (visitors and staff) onto your property
- Disinfect all equipment/vehicles that move off-site and return to operate on the property
- Implement a hygiene protocol for essential visitors (contractors, suppliers, etc.)
- Restrict all non-business vehicles from entry onto the property
- Minimise or allocate specific staff who might come in contact with host material
- Source blueberry host plant material from reputable professional growers that are known to be free from the disease
- Inspect imported blueberry host material prior to introduction to your property.

For detailed information, together with a range of farm biosecurity resources that will assist in protecting your property – and livelihood – visit the Farm Biosecurity Program.

Keep informed on biosecurity issues affecting Tasmania - subscribe to the Tasmanian Biosecurity Advisories

biosecurityadvisory.dpipwe.tas.gov.au

Biosecurity Tasmania
Plant Biosecurity and Diagnostics
Web: www.dpipwe.tas.gov.au
Email: Blueberryrust.info@dpipwe.tas.gov.au
Phone: 1300 368 550

Website

Facebook

Mini data sheet on *Thekopsora minima*

Thekopsora minima was added to the EPPO A2 List in 2017. A full datasheet will be prepared, in the meantime you can view here the data which was previously available from the EPPO Alert List (added to the EPPO Alert List in 2016 – deleted in 2017).

Thekopsora minima (blueberry leaf rust)

Why: *Thekopsora minima* is an heteroecious rust which lives on needles of *Tsuga* spp. (aecial stage) and leaves of ericaceous plants (telial stage). On blueberries (*Vaccinium* spp.), it can cause a serious rust disease leading to extensive defoliation. In the EPPO region, the presence of *T. minima* was detected for the first time in Germany in 2015 and an express-PRA has concluded that this pathogen might present a high risk for Germany and other parts of the EPPO region. The NPPO of Germany has therefore suggested that *T. minima* should be added to the EPPO Alert List.

Where: initially recorded in the eastern part of North America and Japan, *T. minima*. has been introduced on *Vaccinium corymbosum* in other parts of the world (e.g. South Africa, Mexico, Australia, Colombia) during the last decades. In the EPPO region, it was found in Germany in 2015 and in Belgium in 2016. Considering some taxonomic confusion in the past and morphological similarities with other rust fungus attacking *Vaccinium* spp., the world geographical distribution of *T. minima* is rather uncertain. In the German PRA, it is argued that some records attributed to *Pucciniastrum vaccinii* in Argentina, Hawaii (US), and Spain may need to be reconsidered as they might be misidentifications of *T. minima*.
EPPO region: Belgium (first found in 2016; transient), Germany (first found in 2015; transient), Netherlands (first reported in 2017), Portugal (first reported in 2017).
North America: Canada (New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Québec), Mexico, USA (Connecticut, Delaware, Georgia, Maine, Massachusetts, Michigan, New Hampshire, New York, Oregon, Vermont, Virginia, West Virginia, Wisconsin).
South America: Colombia.
Asia: China (Sichuan), Japan (Hokkaido, Kyushu, Shikoku).
Oceania: Australia (New South Wales, Queensland, Tasmania).

On which plants: the main host plants are *Vaccinium* spp. (*V. angustifolium, V. corymbosum*, *V. erythrocarpum*). The susceptibility of *Vaccinium* species that are growing in the wild in the EPPO region (e.g., *V. myrtillus*, *V. vitis-idaea*) is not known. The host range also includes Ericaceae species from the following genera: *Azalea, Gaylussacia, Hugeria, Leucothoe, Lyonia, Menziesia, Pernettya, Pieris,* and *Rhododendron*. The alternate host is hemlock (*Tsuga canadensis, T. diversifolia*).

Damage: symptoms appear on the upper surface of blueberry leaves as small, yellow spots that later become necrotic as they enlarge and coalesce, eventually covering large areas of individual leaves. On the undersides of leaves, small flecks surrounded by water-soaked halos appear, turning into yellow-orange pustules. Later in the season, similar pustules can develop on fruits. In case of severe infection, premature leaf drop and plant defoliation is observed. Loss of leaves reduces plant vigour which may lead to a decline in fruit yield and flower production during the following season. The presence of pustules on fruit also leads to crop losses.
The life cycle of the rust has been described as follows. Teliospores of *T. minima* hibernate on blueberry leaves on the ground and after germination in late spring they infest their alternating host, *Tsuga* spp., via basidiospores. The produced aeciospores infest *Vaccinium* and other Ericaceae host plants. The urediniospores which are then produced ensure disease spread within the crop during the whole growing season. However, in closely related rusts

attacking blueberries in Europe, it has been shown that these rusts could hibernate as mycelium in the plant buds and directly produce urediniospores in spring, which means that the alternate host is no longer needed. It is not known whether this could happen for *T. minima* in the EPPO region but in such a case, this would add to the risk.

Dissemination: blueberry rust spores are spread to nearby plants by wind and rain. Over longer distances, trade of infected plants can ensure disease spread. It is also suspected that humans can transport fungal spores on equipment, packaging and clothing.

Pathway: Plants for planting, fruits? of host plants from countries where *T. minima* occurs.

Possible risks: cultivation of *Vaccinium corymbosum* in the EPPO region has started in the 1930s, and takes place in several countries (e.g. Poland, Germany, the Netherlands, Sweden, Baltic countries, Russia, Romania, France). Other Ericaceae hosts, in particular azaleas and rhododendrons, are also widely grown in the EPPO region, mainly for ornamental purposes. *Tsuga canadensis* (alternate host) can also be found in the EPPO region, however the necessity of the alternate host to complete the life cycle remains to be studied under European conditions. Although further studies are needed, the climatic conditions prevailing in the EPPO region appear to be favourable to the establishment of *T. minima.* In countries where *T. minima* has been introduced (e.g. Australia and Mexico), the disease is considered to be economically damaging. In Mexico, it is stated that *T. minima* has become one of the most significant diseases of blueberry in Jalisco and Michoacan states. In Australia, following the successful eradication of *T. mimina* in Tasmania, phytosanitary measures are in place to protect the island from another introduction. Recently published reports from the USA suggest that damage from blueberry leaf rust has been increasing in the last few years. Although some control methods are available (fungicide treatments, use of tolerant varieties, appropriate irrigation, removal of volunteer hosts), these constitute additional constraints to the growers. Considering the high risk that *T. minima* could present for cultivated *Vaccinium* in the EPPO region, and the potential damage that it might cause to wild *Vaccinium* (e.g. *V. myrtillus*), it seems desirable to prevent any further spread within the EPPO region.

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EPPO RS 2016/058, 2016/171, 2017/059, 2017/060, 2017/122
Panel review date 2017-03 Entry date 2016-03

Appendix G

Annemiek Schilder
to brocklands

Dear Karen,

Thanks for your message and for sharing information on the blueberry rust outbreak in Tasmania. I am not aware of any study which has shown that imposed defoliation of plants helps in controlling the disease, at least not in the US. Here plants defoliate naturally in winter but we have the alternate host, hemlock, to carry over the disease to the following season.

I believe, however, that if there is a period of at least 2 months without leaves (this would have to be in at least a 1-km radius), the disease can be halted in its tracks as the spores cannot survive such a long gap without having living host tissue. In addition, fungicide sprays (such as sterol inhibitors or strobilurins) can be used as well, assuming the property is not organic. When plants are defoliated prematurely, they may have lower yield the following year.

I hope that helps somewhat. Best wishes,

Annemiek

From: brocklandsnursery@gmail.com [mailto:brocklandsnursery@gmail.com] **On Behalf Of** Karen Brock
Sent: Friday, June 09, 2017 8:52 AM
To: schilder@msu.edu
Subject: Blueberry Rust

Hi Annemiek

I have been forwarded your email by Carlos Garcia Salazar, who was kind enough to send me information via ResearchGate on Organic production of blueberries. Firstly we are propagators using tissue culture of blueberries and are part of 58 growers within the state of Tasmania. This state represents 6% and is the second largest production state of Australia's total blueberries.

A few things happening down here in Tasmania and one of them is a single property is infected with blueberry rust. The property is predominantly deciduous northern high bush with some evergreen varieties every fourth row. It is the evergreen ones which have the infection and the local folks are baying to have these dug out. The size of the property is large and the owners are

We had an extraordinary wet pre spring season last year and assumption can be made that this did not asssist the situation but enhanced the spore spread correlated with warmer than normal temperatures

There is an alternative if my reading of your work along with Timothy Miles is correct, and that is to prematurely defoliate the plants and allow time to decay the spores so to speak. This was replicated in work carried out in Oregon and also preview work carried out by Rose Daniels Dept Primary Industry New South Wales (not yet published - only presented).

The Citation in Amercian Phytopathological Society Journal June 2011, gave a view which encourages me to ask if you could forward to the appropriate person or put your hands on a more detailed report by yourself. Basically to see if we are chasing shadows or whether the troops have grounds to demand this from the government agents.

This is a passionate issue as 30% of the state is Certified Organic and chemical treatments do not allow for the higher premium markets to continue, should their farms get infected.

So any assistance with reference material would be most helpful Annemiek

Regards

Karen

Nuffield Scholar 2014

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Appendix H

Biosecurity New Zealand

Tiakitanga Pūtaiao Aotearoa

Assessment of the risks of transmission of myrtle rust (*Austropuccinia psidii*) spores by honey bees (*Apis mellifera*)

Prepared for Biosecurity New Zealand
By New Zealand Plant & Food Research
Pattemore D, Bateson M, Buxton M, Pegg G, Hauxwell C

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July 2018

New Zealand Government

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Manatū Ahu Matua

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Pattemore D, Bateson M, Buxton M, Pegg G, Hauxwell C. May 2018. Assessment of the risks of transmission of myrtle rust (*Austropuccinia psidii*) spores by honey bees (*Apis mellifera*). A Plant & Food Research report prepared for: Ministry for Primary Industries. Milestone No. 74580. Contract No. 18638. Job code: P/414069/01. SPTS No. 16355.

Report approved by:

David Pattemore
Science Team Leader, Pollination & Apiculture
May 2018

Warwick Nelson
Science Group Leader, Operations Manager – Sustainable Production
May 2018

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Executive summary

Assessment of the risks of transmission of myrtle rust (*Austropuccinia psidii*) spores by honey bees (*Apis mellifera*)

Pattemore D[1], Bateson M[2], Buxton M[1], Pegg G[3], Hauxwell C[2]
[1]Plant & Food Research Ruakura; [2]School of Earth, Environmental and Biological Sciences, Queensland University of Technology; [3]Queensland Department of Agriculture and Fisheries

May 2018

Honey bees (*Apis mellifera*) have been observed foraging on and collecting myrtle rust (*Austropuccinia psidii*, “MR”) spores, which would result in spores being brought back to their hives. If these spores remain viable within the hive, the long-distance movement of hives could be a means of spreading this plant pathogen. To help quantify this risk, we sought to determine the rates of spores being brought into hives by foraging bees, and to assess the survival of spores inside the hive environment.

We detected MR spores on returning forager bees and in pollen stores inside hives. We found that MR spores remain viable (able to germinate) within beehives and on worker bees for at least 9 days (limit of this test).

The greatest risk for New Zealand is that many bee hives are now being transported great distances into remote locations to produce honey, specifically mānuka honey, and this may lead to the transfer of spores to areas that would not have been exposed to the spores through wind movement. Mānuka plants are susceptible to myrtle rust and therefore this commercial activity could inadvertently spread myrtle rust into otherwise unaffected regions.

For further information please contact:

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1 Introduction

Austropuccinia psidii, (commonly known as myrtle rust; MR), is a fungal pathogen of plants in the family Myrtaceae with a broad host range. The pathogen was first recorded in North Island, New Zealand in May 2017, and has since been detected at locations through North Island and at the top of South Island.

Plant species in the Myrtaceae family in New Zealand have considerable cultural, ecological and economic importance, and the pathogen has the potential to have severe negative impacts to these values through the loss of populations of these plant species. As a primarily wind-dispersed pathogen, eradication or management of the pathogen is complex. An understanding of the potential transmission pathways and their relative risks is important for making decisions about how to avoid or mitigate the spread of the pathogen to new areas.

Western honey bees (*Apis mellifera*) are managed in New Zealand for honey production and crop pollination. The most economically valuable honey crop comes from the myrtaceous mānuka (*Leptospermum scoparium*), but beekeepers also seek honey crops from pōhutukawa (*Metrosideros excelsa*) and rātā species (*Metrosideros spp*), both in the Myrtaceae family. In addition, honey bees will visit most other native and exotic members of the family.

Honey bees have been observed actively collecting MR spores (Shaw 1999; Carnegie et al. 2010), and this behaviour could lead to the build-up of spores within a hive that could then be transferred to new susceptible hosts or new outbreak-free locations. Of principal concern is the long-distance movement of hives from MR outbreak areas into remote back-country sites for mānuka honey harvest; a movement that could potentially transmit the pathogen in a direction contrary to prevailing winds.

To determine the relative risk of honey bees as vectors of MR, it is necessary to first determine whether spores can survive within a hive environment and whether spores are actively brought into hives by bees. The environment within a hive near the brood is kept at a constant 36°C at relatively high humidity, and bees are highly effective at grooming themselves which could reduce the probability of spores remaining and surviving on bees and in the hive.

The aim of this project was to assess the relative risk of MR spore transmission via the movement of honey bees (*A. mellifera*) or beehives by assessing the movement of spores into hives by bees and assessing the survival of spores once in the hive.

Due to legal constraints around the handling and research of MR in New Zealand, the field work was conducted in Brisbane, Queensland (QLD), Australia with our partners at the Queensland University of Technology (QUT) and the Queensland Department of Agriculture and Fisheries (QDAF).

2 Methods and results

2.1 TRIAL DESIGN AND SAMPLING PROTOCOL

The overall design of the study was to place honey bee hives at locations in and around Brisbane, QLD, Australia, in proximity to active MR outbreaks for a period of 2 weeks to allow the bees opportunity to forage on the spores. At the end of this 2–week exposure, samples of returning foragers and pollen stores were taken from the hives. The hives were then moved to containment screen houses for 2 weeks for further research on spore persistence and viability without further exposure to natural sources of spores. Experiments were conducted to test and develop methods to assess:

- The presence of MR spores on foraging bees in the field
- The presence of MR spores in pollen stores in hives from the field
- The viability of spores over time in hives
- The persistence and viability of spores on bees in hives.

The first trial was conducted primarily to test feasibility of the methodology, particularly to see if hives would survive in screen houses. In December 2017, single hives were placed at three locations in close proximity to sporulating MR outbreaks; Moggill (Brisbane), The Channon (New South Wales; NSW) and the Tallebudgera Valley (SE Queensland). The foraging behaviour of bees was observed in the field. After 2 weeks, samples were taken of up to 25 pollen-foraging bees returning to each hive and 50 bees from within each hive, along with samples of pollen cell contents, before the hives were moved into containment.

The containment cages were 7 x 7 x 3 m insect-mesh screen houses located at QUT environmental research facility at Samford (SERF). Each hive was kept in a separate screen house and fed sugar syrup, water and a pollen substitute. While in containment, hive worker bees (50 per day) were collected daily or at 2–day intervals over a 2 week period. In the first trial we were able to demonstrate the viability of keeping colonies alive for up to 3 weeks with this methodology.

In the second trial, six hives were placed for 2 weeks at sites of known MR outbreak at four sites in Brisbane in January 2018 (Moggill, Kenmore, Samford and three subsites within the Brisbane Botanic Gardens at Toowong). After 2 weeks, forager bees and pollen cell contents were collected from the hives. Hives were then moved into containment at SERF for two rounds of further research.

The presence of spores on bees and pollen was initially examined by washing of bees, precipitation by centrifugation and light microscopy. Published quantitative PCR (qPCR) methods were then modified, optimised and used to detect and quantify the spores (from DNA copy number).

Little active foraging on rust by bees was observed in the field and bees in screen houses were found to carry no or very little distinguishable residual spores. Methods were therefore developed to assess viability of MR spores over time in hives using both pure spores and pure spores on live bees placed inside the hives during containment in the SERF screen houses.

In trial one (December 2017), MR spores suspended in 0.05% Tween®80 were dried onto small, concave wax blocks that were secured inside plastic queen bee cages to prevent direct contact with bees inside the hive, and then placed on brood frames within the hive. Four samples per hive were prepared in this manner. Wax blocks were removed on days 0 (control), 1, 4 and 7. Wax contamination of samples in the first trial led to a modified protocol in which pure dry spores were placed inside a lidless 0.5 ml Eppendorf tube with a paper plug, placed within plastic queen bee cages and sampled in the same manner as in trial 1. This was used and repeated in two rounds in trial two (January/February 2018), with the addition of a fifth sample taken on day 9 in round two.

In this second trial, an additional method was developed to test persistence of spores on live bees. MR spores provided by QDAF were used to coat bees collected from the hives, which were then placed in batches of five bees in plastic queen bee cages with a sugar cube. This method ensured that the bees would remain alive over the period of the trial (as bees can be fed by other bees through the cage), while minimising contact with other bees and ensuring that the inoculated bees could be recovered and sampled on subsequent days. Bees remained alive in the cages and were free to groom and consume the spores. Four cages of bees were prepared for each hive in the first round of trial two, and then were sampled on days 0 (control), 1, 4 and 7. This was repeated in in the second round with the addition of a fifth sample taken on day 9.

A second control involved two samples of the spores provided by QDAF that were immediately run through the germination protocol to assess for germination without being placed on wax, in tubes or on bees. These controls are hereafter called “controls”, while the day 0 controls which were placed on bees or in tubes are referred to as “day 0” samples.

2.2 SPORE VIABILITY

Methods were developed to assess the viability of MR spores over time in hives using both pure spores and pure spores on live bees placed inside the hives during containment in the SERF screen houses. The viability of spores using germination assessment was tested using pure spore samples and live bees coated in spores in trial two, from methods developed in trial one. Spore viability and visual presence of spores in pellets were assessed using a germination test on water agar adapted from published methods (Salustiano et al. 2008).

Viability of pure spores in hives

In trial one (December 2017), MR spores suspended in 0.05% Tween80 were placed onto 1 cm concave wax blocks and dried before placement in queen cages in hives as described in Section 2.1 or in a controlled environment 26°C in the dark. After collection from the hive, spores were removed from the wax by gentle agitation in 0.05% Tween80, then pelleted by centrifugation and re-suspended in 100 µL of either paraffin or 0.05%Tween80 in water. The suspension was pipetted onto an agar plate and incubated at 22°C in the dark. Samples suspended in water/Tween80 were covered in paraffin wax on the agar plate before incubation. In both rounds of trial two, dry spores that had been placed in hives in 0.5 ml Eppendorf tube were placed directly onto water agar, covered in paraffin wax, and incubated as with the samples in trial one.

After incubation for 24 to 48 h, germinated and un-germinated spores in each of ‘three fields of view’ on each plate were counted using an inverted microscope. All spores in one or several fields of view were counted and the numbers germinated and not germinated were recorded. Up to 50 spores were counted for each sample, leading to a maximum possible spore count of 300 for any given sample point (i.e. samples from bees and tubes from six hives).

Spore viability on bees

We initially assessed the feasibility of visual identification of spores and spore viability (germination) in material washed from bees collected in either individual forager bees, or groups of forager bees, or bees from within the hives. Bees were washed by mechanical agitation for 15 min in 1 mL (individual) or 40 mL (groups of 5 up to 25 bees) of either 0.05% Tween80 in water or 0.05% Tween80 in paraffin, and the material recovered (which included pollen collected by the bees) was pelleted by centrifugation.

Viability of spores on bees was assessed in trial two. Bees were collected from each hive into 50 ml falcon tubes and chilled briefly on ice, then tipped gently to coat with dry spores provided by QDAF. Coated bees were then placed in batches of five bees in plastic queen bee cages with a sugar cube. Bees remained alive in the cages and were free to groom and consume the spores and be fed by nest mates. Four cages of bees were prepared for each hive in round one of trial two, and sampled on days 0, 1, 4 and 7. This was repeated in the second round with the addition of a fifth sample taken on day 9. Bees were then washed to remove spores in 0.05% Tween80 and spore viability assessed as above.

Washing with Tween80 in water recovered a far greater quantity of material than washing in paraffin with Tween80, and significantly more material was recovered from forager bees from the field than from bees within the hive. Almost no material (including pollen) could be recovered from any bees collected during containment in screen houses in trial one.

We found that spores could be identified visually via microscope but that no spores were detected by visual inspection in our initial inspection of pellets (the majority of which was pollen) from foraging or hive workers.

Spores placed on wax substrates inside hives could be recovered 2 weeks later, confirming that this method was viable as a test of spore recovery in hives. However, a greater concentration of spores was recovered from the wax in the controlled environment than in the hive, and bees were observed harvesting the wax and possibly spores in the hive. In addition, wax contamination resulting from washing the spores from the tablet was found to interfere with microscopic examination of spore germination. The protocol was therefore modified to use spores placed in 0.5 mL Eppendorf tubes with paper plugs, and this method was used in two rounds in trial two.

Spore germination using the modified protocol (wash in 0.05% Tween80 in water to recover spores, then cover with paraffin) gave better results compared with germination in 0.05% Tween80 in water without paraffin.

Spore germination after 2 weeks of storage on wax in the controlled environment (incubator) and in hives was not significantly different: 22% and 28%, respectively.

Forty-eight samples recovered from Eppendorf tubes or from bees coated with spores (39% of 122 samples taken in trial two) were found to contain spores, of which only eight samples had fewer than 50 spores detected. Spore recovery rates remained relatively constant for samples of bees, with spores recovered from more than a third of samples on day 9 (Figure 1). In contrast, no spores were recovered from day 0 samples from tubes and remained low on day 1, but by day 9 spores were recovered in all six tube samples (Figure 1).

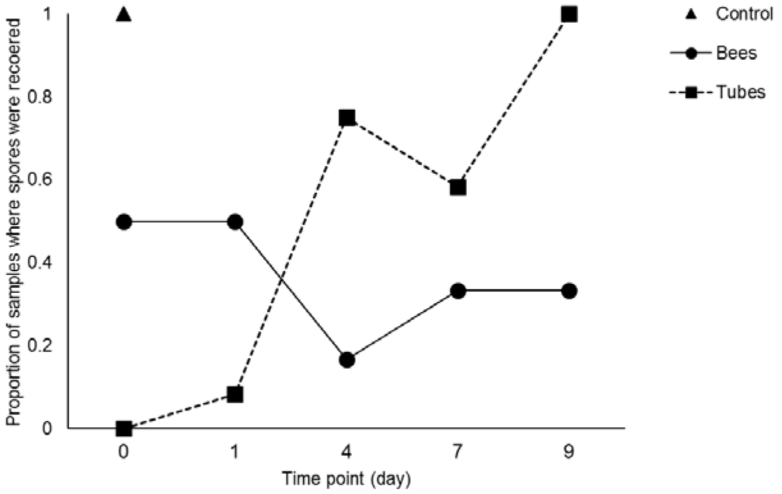

Figure 1. Proportion of samples where myrtle rust (*Austropuccinia psidii*) spores were recovered, from control samples in the laboratory (“control”), live bees coated in spores (“bees”), and spores placed in Eppendorf tubes (“tubes”), on days 0 (the day the hives were moved into containment), 1, 4 and 7 in both rounds of trial two, and also on day 9 in the second round.

Mean germination rates of positive control samples kept in the lab were 20%. Germination rates on samples taken from hives varied between 3% (tubes on day 1) and 16.2% (bees on day 1). Germination was recorded in all samples apart from discs/tubes on day 0, and germination rates on day 9 in round two of trial two were 8.2% for bee samples and 14% for samples in tubes.

The lack of recovery of MR spores in the majority of samples would artificially reduce mean germination rates, so the zero recovery data points were removed for further analysis. To assess whether spore germination rates on bees and tubes declined over the seven or nine days of the rounds in trial two, a Hierarchical Generalised Linear Model (HGLM) was used, where the response variate was the number of germinated spores out of the binomial totals. The fixed effect was Sample*Time*Site and the random effect was Round, modelled by beta distribution. The analysis was performed by GenStat 17.

There is no evidence to suggest difference between samples or sites (p-value > 0.1). There is limited evidence to suggest a difference over time (p-value = 0.07; Figure 2), but there is moderate evidence of a difference between rounds (p-value = 0.013).

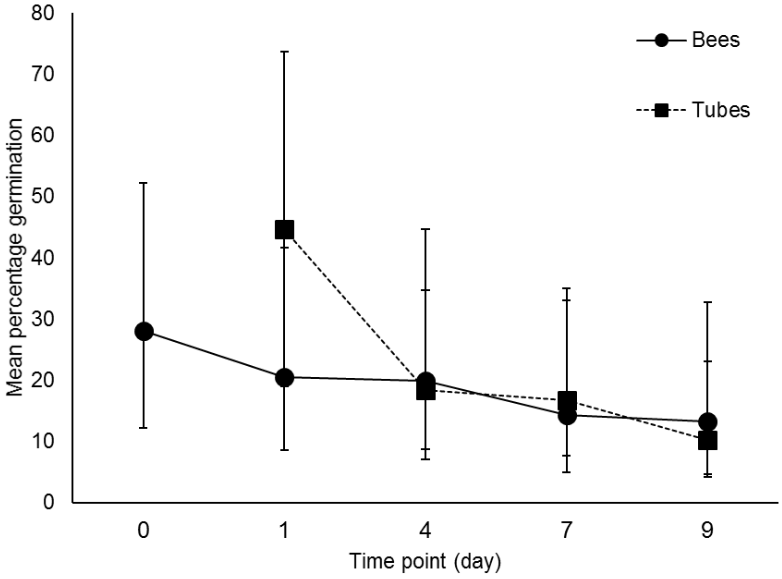

Figure 2. Predicted mean germination rates (from Hierarchical Generalised Linear Model (HGLM) of myrtle rust (*Austropuccinia psidii*) spores from live bees coated in spores ("bees"), and spores placed in Eppendorf tubes ("tubes"), on days 0 (the day the hives were moved into containment), 1, 4 and 7 in both rounds of trial two, and also on

2.3 QPCR ASSESSMENT

The method of Baskarathevan et al. (2016) was adapted using the qPCR primers PpsiITS1F/R/P to detect MR uredospores from samples taken from hives in the field and in screen houses.

Bees and pollen cell contents were collected from nine hives at the end of a 2-week placement at sites of known MR outbreaks in south east Queensland and northern NSW: at three sites in December 2017 (Moggill, The Channon (NSW) and the Tallebudgera Valley) and at four sites in Brisbane in January 2018 (Moggill, Chapel Hill and Samford, and three places within the Brisbane Botanic Gardens at Toowong). Bees were washed individually or in batches of 5 or 25 to remove spores by agitation for 20 min in 0.05% Tween80. The bees were removed from the wash, which was then centrifuged, the supernatant removed and the pellet dried. The pellet was frozen in liquid nitrogen and ground with a micropestle, re-suspended in extraction buffer (SDS, Tris, EDTA, and RNase) and incubated at 50°C for 30 min. Protein contaminants were removed by precipitation with potassium acetate and DNA was precipitated with isopropanol, washed twice with 70% ethanol, dried and re-suspended in 200 µL of Tris/EDTA buffer and stored at -20°C. All samples, including dilutions of purified spores, were extracted in the same way.

For qPCR, 3µl of extract was used in a reaction which included PpsiITS1F/R primers and PpsiITS1P Taqman probe, SensiFAST Probe (no Rox) reaction buffer and water. Samples were amplified in a Rotor gene 6000 Real Time Thermocycler (72 well carousel) using a 2 step PCR profile: one initial cycle at 95°C for 5 min followed by 40 cycles at 95°C for 15 sec and 60°C for 45 sec. Fluorescence was detected using the Green channel and Auto-Gain optimisation was used before first acquisition. During analysis, dynamic tube and slope correct options were used.

A serial dilution of spores was prepared from a stock solution (~440,000 spores/mL estimated by counting; D0). Dilutions of 10^{-1} (D1), 10^{-2}(D2), 10^{-3} (D3), 10^{-4} (D4), 10^{-5} (D5) were prepared and 0.8 mL of each extracted and amplified in qPCR as described above to generate a standard curve for quantification. The D1–D3 dilutions generated the linear phase of the standard curve, while very high (D0) and low (D4 and D5) concentrations were detected but could not be quantified consistently (Table 1). DNA extracted from dilutions D1–D3 was used to prepare standard curves for all qPCR runs incorporating field and screen house samples. D4 and another sample were also included in all runs to check for consistencies between runs. The standard curve was generated using the auto-threshold function based on D–D3. Reactions were run in triplicate. No template controls (NTC) were included in each qPCR run.

Table 1. The number of spores extracted as estimated from standard curves generated from D1–D3 in seven separate quantitative PCR runs. Red numbers indicate values used for standard curves.

	Estimated number of spores extracted [average of three samples]						
D1 - 44,000 spores/mL [35,000 spores extracted]	34,880	36,988	35,747	35,352	34,784	34,952	34,903
D2 - 4400 spores/mL [3500 spores extracted]	3,524	3,134	3,355	3,431	3,544	3,510	3,519
D3 - 440 spores/mL [350 spores extracted]	349	370	357	354	347	350	349
D4 - 44 spores/mL [35 spores extracted]	121	n/a	150	139	158	152	147
positive sample	n/a	30	21	26	26	35	36

The total DNA obtained from each sample extraction varied. The detection of MR did not correlate with the total DNA extracted; very dilute total DNA samples gave positive results while some high concentrations of total DNA were negative. The qPCR output for all runs included cycle threshold (Ct) for each sample replicate, the corresponding calculated concentration (spores extracted) for each replicate estimated from the standard curve, Rep. Ct which was the average Ct for the three replicates of each sample and the corresponding concentration (Rep. Calc. Conc.) determined from the standard curve.

Tables 2, 3 and 4 give the Rep. Ct and Rep. Calc. Conc. (i.e. the estimated total number of spores in the original extract) for each sample. Very low levels of myrtle rust spores were only detected in later cycles making quantitation unreliable. No amplification was detected in the NTC.

MR was positively identified using this qPCR in samples from all sites in all trials, apart from samples from the hive located at Samford in trial two (Table 4; Figure 4). The highest estimated spore count per extract was 71, in a sample taken from pollen in a cell in a hive in trial one

Table 2. Estimated myrtle rust (*Austropuccinia psidii*) spore counts from samples taken from hives immediately after a 2-week period at sites of known myrtle rust outbreak in south east Queensland (QLD) and northern New South Wales (NSW) in December 2017. Blanks indicate no detection (below detection threshold), while * indicates cycle threshold (Ct) value (>35) was observed in only one replicate. Rep. Ct. is the average Ct for three replicates, and Rep. Calc. Conc. is the corresponding concentration determined from the standard curve.

	qPCR Sample ID	Rep. Ct (std dev)	Rep. Calc. Conc.	Source of samples
Trial 1: Field 6 December 2017	22/1-1	35.31 (2.33)	11	pollen from single cell in hive, Moggill
	22/1 -2	34.8 (0.15)	71	pollen from single cell in hive, Moggill
	22/1 -3	*		pollen from single cell in hive, Moggill
	22/1 -4			pollen from single cell in hive, Moggill
	22/1 -5	37.97 (0.77)	10	single forager bee, Moggill
	22/1 -6			single forager bee, Moggill
	22/1 -11	*		single leg from forager bee, Moggill
	22/1 -7	35.47 (0.88)	47	wash from 25 bees from within hive at The Channon
	22/1 -8	34.88 (0.4)	67	wash from 25 bees from within hive at The Channon
	22/1 -9	35.14 (3.82)	57	wash from 25 bees from within hive at Tallebudgera
	22/1 -10	36.21 (0.22)	29	wash from 25 bees from within hive at Tallebudgera

Table 3. Estimated myrtle rust (*Austropuccinia psidii*) spore counts (Rep. Calc. Conc.) from samples of stored pollen taken from hives immediately after a 2-week period at sites of known myrtle rust outbreak in SE Queensland in January 2017. Blanks indicate no detection (below detection threshold), while * indicates Ct value (>35) was observed in only one replicate. Rep. Ct. is the average Ct for three replicates, and Rep. Calc. Conc. is the corresponding concentration determined from the standard curve.

	qPCR Sample ID	Rep. Ct (std dev)	Rep. Calc. Conc.	Source of samples
Moggill Jan 2018	aM 30 1	37.87 (0.24)	10	pollen from single cell in hive
	M 30 2	38.77 (0.36)	6	pollen from single cell in hive
	M 30 3	*		pollen from single cell in hive
	M 30 4	36.47 (0.07)	25	pollen from single cell in hive
	M 30 5	*		pollen from single cell in hive
Kenmore Jan 2018	K 30 1			pollen from single cell in hive
	K 30 2	35.64 (0.58)	42	pollen from single cell in hive
	K 30 3	*		pollen from single cell in hive
	K 30 4			pollen from single cell in hive
	K 30 5	38.52 (0.43)	13	pollen from single cell in hive
Hive 1 Botanical Gardens Jan 2018	B1 30 1			pollen from single cell in hive
	B1 30 2			pollen from single cell in hive
	B1 30 3	*		pollen from single cell in hive
	B1 30 4	39.4 (0.32)	8	pollen from single cell in hive
	B1 30 5	*		pollen from single cell in hive
Hive 2 Botanical Gardens Jan 2018	B2 30 1	*		pollen from single cell in hive
	B2 30 2	38.29 (0.74)	15	pollen from single cell in hive
	B2 30 3	37.91 (1.03)	19	pollen from single cell in hive
	B2 30 4	39.34 (0.76)	8	pollen from single cell in hive
	B2 30 5			pollen from single cell in hive
Hive 3 Botanical Gardens Jan 2018	B3 30 1	*		pollen from single cell in hive
	B3 30 2	36.66 (0.23)	42	pollen from single cell in hive
	B3 30 3	39.62 (0.09)	7	pollen from single cell in hive
	B3 30 4	*		pollen from single cell in hive
	B3 30 5			pollen from single cell in hive

Table 4. Estimated myrtle rust (*Austropuccinia psidii*) spore counts (Rep. Calc. Conc.) from samples of foraging bees taken from hives immediately after a 2-week period at sites of known myrtle rust outbreak in SE Queensland in January 2017. Blanks indicate no detection (below detection threshold), while * indicates Ct value (>35) was observed in only one replicate. Rep. Ct. is the average Ct for three replicates, and Rep. Calc. Conc. is the corresponding concentration determined from the standard curve.

	qPCR Sample ID	Rep. Ct (std dev)	Rep. Calc. Conc.	Source of samples
Samford Jan 2018	S1 30/1 1.1	*		1 forager bee
	S1 30/1 1.2			1 forager bee
	S1 30/1 1.3	*		1 forager bee
	S1 30/1 1.4			1 forager bee
	S1 30/1 1.5			1 forager bee
	S1 30/1 5.1			5 forager bees
	S1 30/1 5.3			5 forager bees
	S1 30/1 5.4			5 forager bees
	S1 30/1 5.5	*		5 forager bees
Moggill Jan 2018	MF1 29.1 1.1			1 Forager bee
	MF1 29.1 1.2			1 Forager bee
	MF1 29.1 1.3			1 Forager bee
	MF1 29.1 1.4	*		1 Forager bee
	MF1 29.1 1.5			1 Forager bee
	MF1 29.1 5.1			5 Forager bees
	MF1 29.1 5.2			5 Forager bees
	MF1 29.1 5.3	37.78 (1.48)	9	5 Forager bees
	MF1 29.1 5.4			5 Forager bees
	MF1 29.1 5.5			5 Forager bees
Kenmore Jan 2018	K1 29/1 1.1	36.88 (0.63)	12	1 Forager bee
	K1 29/1 1.2			1 Forager bee
	K1 29/1 1.3	37.5 (1.04)	8	1 Forager bee
	K1 29/1 1.4	*		1 Forager bee
	K1 29/1 1.5			1 Forager bee
	K1 29/1 5.1	36.14 (0.64)	20	5 Forager bees
	K1 29/1 5.2	34.73 (0.5)	48	5 Forager bees
	K1 29/1 5.3	36.29 (0.72)	18	5 Forager bees
	K1 29/1 5.4	36.33 (0.03)	17	5 Forager bees
	K1 29/1 5.5	*		5 Forager bees
Hive 1 Botanical Gardens Jan 2018	Bg1.1 29/9 1.1	*		1 Forager bee
	BG1.1 29/1 1.2			1 Forager bee
	BG1.1 29/1 1.3	35.19 (0.22)	5.2	1 Forager bee
	BG1.1 29/1 1.4	*		1 Forager bee
	BG1.1 29/1 1.5			1 Forager bee
	BG1.1 29/1 5.1	36.23 (0.79)	6	5 Forager bees
	BG1.1 29/1 5.2	*		5 Forager bees
	BG1.1 29/1 5.3	*		5 Forager bees
	BG1.1 29/1 5.4	33.17 (0.19)	42	5 Forager bees
	BG1.1 29/1 5.5	36.8 (0.51)	5	5 Forager bees
Hive 2 Botanical Gardens Jan 2018	BG2-1 29/1 1.1			1 Forager bee
	BG2-1 29/1 1.2			1 Forager bee
	BG2-1 29/1 1.3			1 Forager bee
	BG2-1 29/1 1.4	36.43 (0.91)	21	1 Forager bee
	BG2-1 29/1 1.5			1 Forager bee
	5.1?			
	BG2-1 29/1 5.2			5 Forager bees
	BG2-1 29/1 5.3	*		5 Forager bees
	BG2.1 29/1 5.4	34.47 (0.91)	19	5 Forager bees
	BG2.1 29/1 5.5	36.78 (1.14)	5	5 Forager bees
Hive 3 Botanical Gardens Jan 2018	B3 29 1.1	*		1 Forager bee
	B3 29 1.2	38.04 (0.66)	2	1 Forager bee
	B3 29 1.3	37.55 (0.4)	3	1 Forager bee
	B3 29 1.4			1 Forager bee
	B3 29 1.5			1 Forager bee
	B3 29 5.1	34.36 (0.77)	20	5 Forager bees
	B3 29 5.2	33.1 (0.65)	44	5 Forager bees
	B3 29 5.3	35.43 (0.82)	10	5 Forager bees
	B3 29 5.4			5 Forager bees
	B3 29 5.5	33.51 (0.3)	34	5 Forager bees

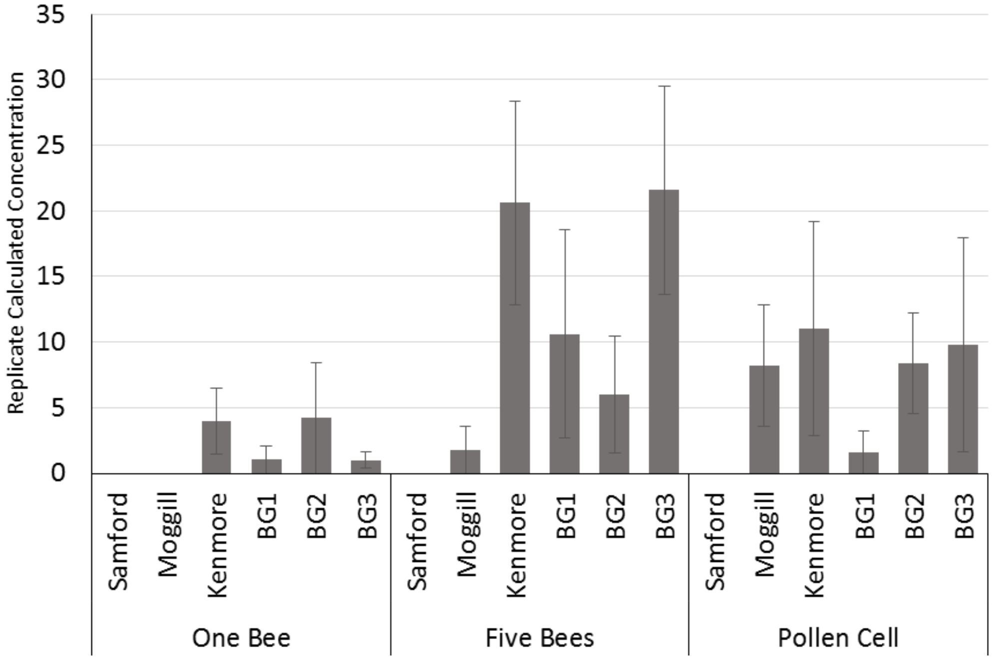

Figure 4. Mean replicated calculated concentrations of myrtle rust (*Austropuccinia psidii*) spores from one bee, five bee and pollen cell content samples taken from hives immediately following a two week period of foraging at myrtle rust outbreak locations around SE Queensland.

3 Discussion

Myrtle rust spores were recovered from hives after 9 days in isolation from any new source of spores, and showed 15% germination rates at this time point. This was true both for spores placed inside an Eppendorf tube with a paper plug and for spores that were used to coat live worker bees.

This result is important as it demonstrates that neither the internal environment of the hive nor the grooming behaviour of bees are sufficient to remove or kill all MR spores over a 9-day period. There is limited evidence for a decline in spore germination rates over the 9-day period, suggesting that spores may remain viable inside a hive considerably longer than 9 days.

The methods used to obtain these spore viability results were designed to maximise the chance of spore recovery, with bees coated in copious spores before being placed in queen cages and considerable quantities of spores placed on wax discs and in plastic tubes. The degree to which these results are comparable to the natural survival rate of spores within hives will depend on the loading of spores on foragers returning to the hive. However, observations of honey bees actively collecting spores showed that bees foraging on MR spores become coated with spores in a similar manner to the method used in this trial (G. Pegg, personal communication 2018).

The apparent lack of recovery of any spores at the day 0 time point for the tube samples may be due to over dispersion on the plates, and the increase in recovery rates for these samples may indicate an improvement in the method. However, the existence of this pattern in both rounds of trial two suggests that there may be more to understand about this phenomenon.

To determine whether bees were bringing MR spores back to their hives in these trials, we used qPCR analysis (following initial calibration trials) to estimate the number of spores in samples of pollen foraging bees returning to hives, bees sampled from within hives and the contents of pollen storage cells. Positive results were obtained from all hives on all sample dates, apart from the Samford hive in the first round of trial two. Without positive controls of bees directly caught while foraging on MR it is unclear how these figures relate to background amounts due to environmental contamination or amounts to be expected from bees foraging on spores. We aimed to collect these data, but were unable to find sufficient numbers of bees foraging on MR spores to allow for a sample collection. Determining the relative amounts of spores to be expected from spore-foraging bees should be a priority for future research, and will allow greater interpretation of these qPCR results.

Surveys of infected plants with active eruptions of spores at the field sites while hives were present showed little evidence of bees actively collecting spores. However, observations have been made by the authors and their collaborators of honey bees and native stingless bees collecting rust spores on occasion. It is likely that this behaviour depends on the relative availability of pollen, and so the phenomenon of bees actively collecting rust spores is relatively rare. Understanding the cues and triggers that drive this behaviour should be a priority for future research.

Bees have been implicated in the spread of other plant pathogens, including the fire blight pathogen *Erwinia amylovora* (Alexandrova et al. 2002), and the kiwifruit pathogen *Pseudomonas syringae* pv. *actinidae* (Pattemore et al. 2014). This study provides further evidence that honey bees may play a role in the transmission of plant pathogens, in this case MR, *A. psidii*.

Honey bees, and other insects, can spread plant pathogens such as MR locally as they forage and move from an infected plant to a susceptible plant. At this scale, the risk of transmission by honey bees is likely to be low compared with many other potential vectors including wind and human activity. However, there are several aspects of honey bee behaviour that may result in the spread of MR spores in a manner that would not have happened otherwise. Individual honey bees can forage 5 km from their hive, and thus spread the spores over this distance. This is especially significant if the direction of long-distance foraging bouts is across relatively un-modified habitat or in the opposing direction of prevailing winds. Furthermore, spores are likely to be transferred between individual foragers within a hive, similar to that seen with pollen and other plant pathogens (e.g. Pattemore et al. 2014), which could result in a 10 km diameter spread of spores from a hive.

In the case of MR, where spores are predominantly wind-dispersed, local spread of spores by honey bees is likely to be of low concern and limited by the flight distance of the bees. Other vectors or environmental movement (wind) could spread the spores over similar or greater distances.

However, managed honey bee colonies can be transported by vehicle over much greater distances, and this long distance movement could be counter to prevailing winds or could result in hives being moved into remote locations where other human activity is unlikely to have facilitated the spread of the spores. This is especially of concern in New Zealand where the most valuable honey crop is from mānuka (*L. scoparium*), a member of the susceptible Myrtaceae family. Hives being moved from locations with active MR outbreaks into remote mānuka sites risk moving spores into locations that might otherwise have been at relatively low risk due to prevailing wind directions. This would only be a risk if a) bees bring MR spores back into the hive, and b) if the spores can survive in the hive long enough to remain viable after these long distance moves.

This study has shown that a) MR spores are being brought into hives even when there is no observed evidence of active foraging on the spores by bees, and b) that these spores can remain on bees and remain viable in the hive for at least 9 days. These results suggest that the long-distance movement of hives needs to be considered as a potential risk for the transmission of MR spores, especially to remote locations.

As this study did not provide clear evidence of decline in either spore recovery or spore viability, future research should aim to extend the length of the trial to determine the decay curve for recovery and viability. In addition, the phenomenon of honey bees foraging on rust spores is not well understood, and future research should seek to understand the cues and triggers for this behaviour so that the role of honey bees in the spread of pathogens like MR can be better quantified.

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NSW Department of Industry

Blueberry rust (in NSW)

BB13002: MANAGEMENT OF BLUEBERRY RUST

Rosalie Daniel
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Australian Blueberry Growers' Association

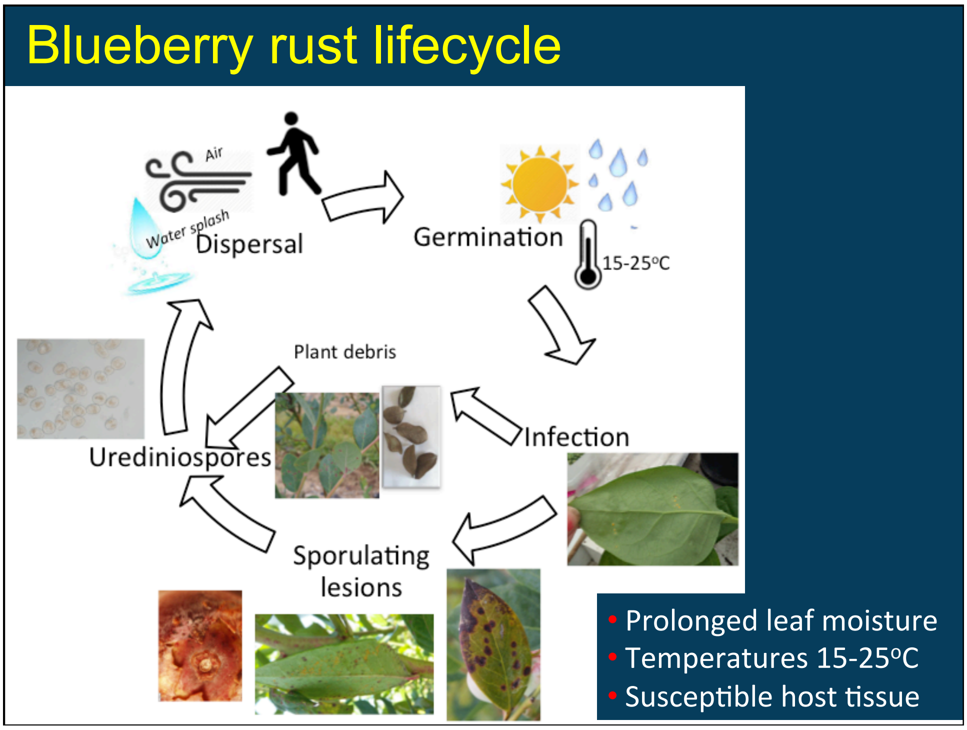
Horticulture Innovation Australia

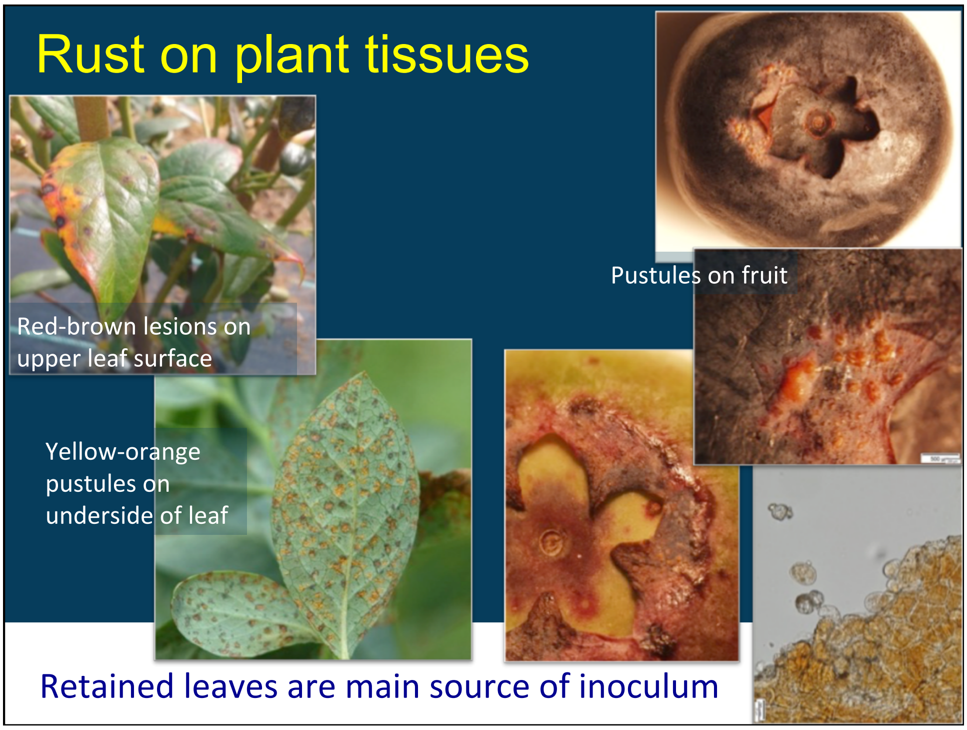
Blueberry rust: know your enemy

- What is blueberry rust?
- Where does it come from?
- Where does it survive?
- Using this information to manage rust
- Hygiene and cultural management
- Fungicides and bio-pesticides

NSW Department of Industry

Understanding how and when a disease occurs is central to management


Blueberry rust lifecycle
Air
Water splash
Dispersal
Germination
15-25°C
Plant debris
Infection
Urediniospores
Sporulating lesions
Prolonged leaf moisture
Temperatures 15-25°C
Susceptible host tissue

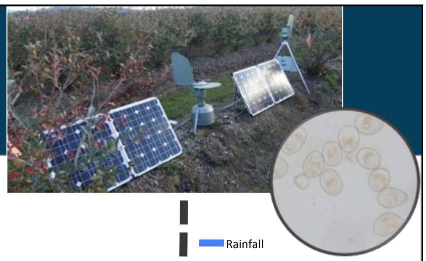

Rust on plant tissues
Red-brown lesions on upper leaf surface
Pustules on fruit
Yellow-orange pustules on underside of leaf
Retained leaves are main source of inoculum

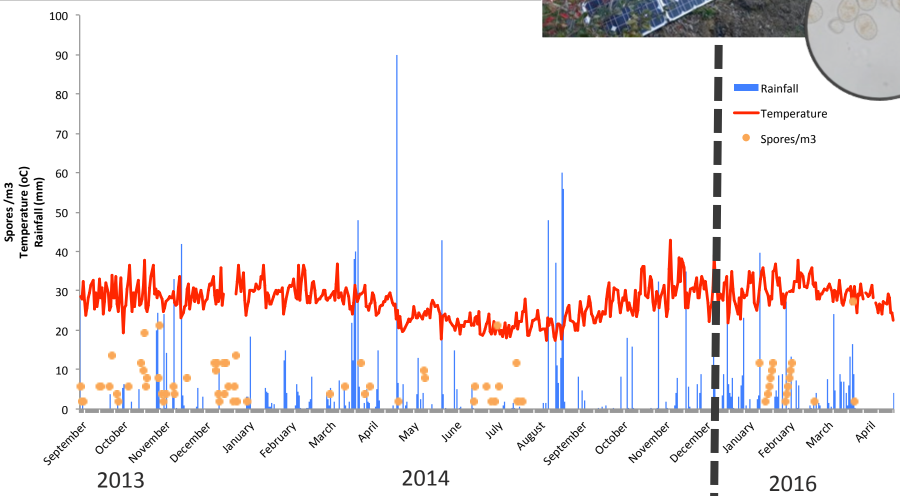
Rust is present in plant tissues

- Specific DNA probe to detect *Thekopsora minima*

Rust fungus can be quiescent in asymptomatic plant tissues

Rust is in the air





Spores are dispersed through air (and water splash/rain)

Survival

- 25% spores remain viable in leaves after 2 weeks on orchard floor
- Retained leaves are main means of survival in evergreen system

NSW Government | Department of Industry

Cultural practices and hygiene

Management	Reason
Site selection and preparation - good drainage, mounding, ventilation - weed management	Reduce leaf wetness time
Clean planting material	Avoid introducing pathogens and disease
Tolerant/resistant varieties	Reduce disease levels, less need for chemical control
Good orchard hygiene and sanitation - remove diseased material - disinfect tools and clothing	Reduce inoculum dissemination and carry over between seasons
Pruning	Removed diseased material Open canopy to improve ventilation
Monitor for disease and conducive weather conditions	Treat early if needed

Disease monitoring: early symptoms




Fungicides

- Monitor for disease symptoms and conducive weather conditions
  - Assume rust is present
- Protect new shoots
- Select and use fungicides appropriately
- Rotate chemicals

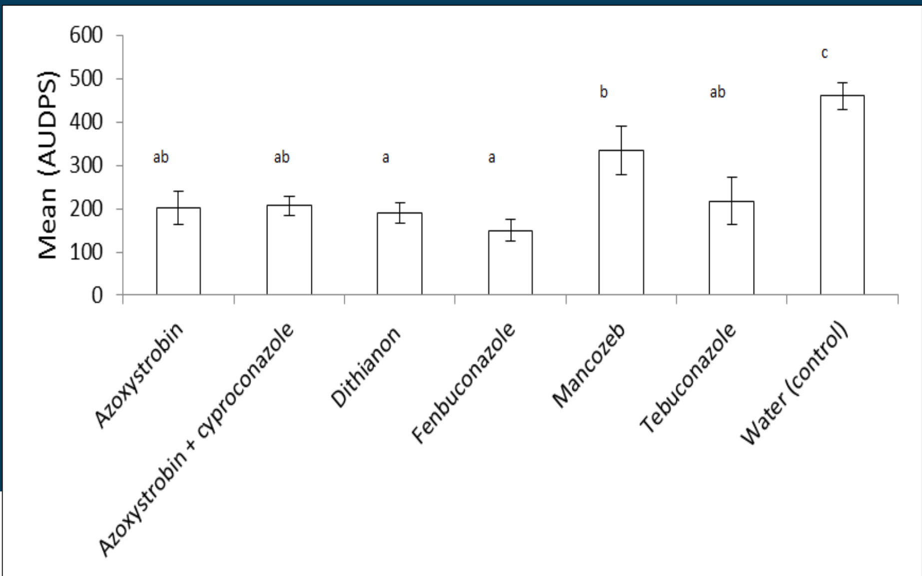
NSW Department of Industry

Chemicals (current APVMA permits)

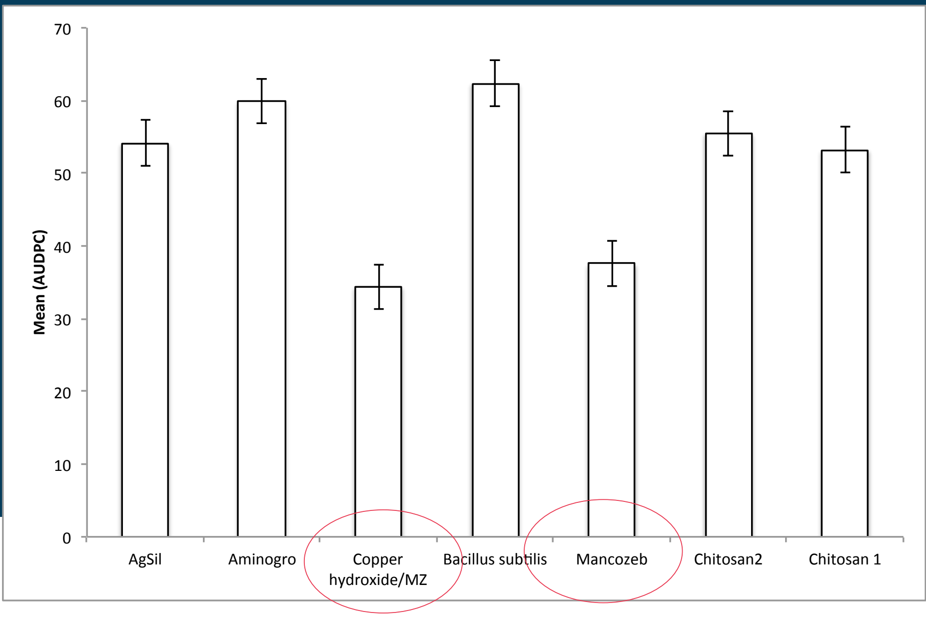
Mode of action	Mode of action	Chemical
Multisite, protectant (FRAC M)	Prevent infection	Mancozeb Chlorothalonil Dithianon* Copper (Permit in Queensland)*
QoI (FRAC 11)	Protectant, translaminar, kill germinating spores	Pyraclostrobin (Pristine)
DMI triazoles (FRAC 3)	Translocated upward in plant; may limit pustule development	Propiconazole (Tilt) Tebuconazole*
SDHI (FRAC 7)	Locally systemic; translaminar; Inhibit spore germination, mycelial growth and sporulation	Boscalid (Pristine)

Apply as soon as possible when expecting moist conditions
ROTATE CHEMICAL GROUPS

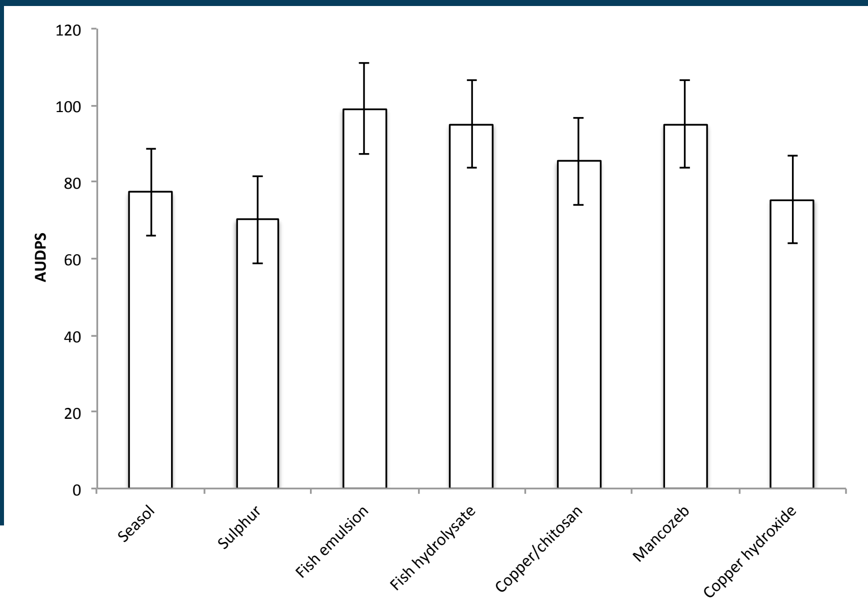
Fungicide efficacy – new permits



Rotate your chemicals



Mixing chemicals and activators



Summary and recommendations

- Rust is anywhere, any time
- Use clean planting material
- Remove infected plant material
- Promote good ventilation
- Monitor to detect symptoms early
- Protect young shoots
- Treat early, when wet
- Select chemical(s) appropriately and rotate
- Breed/select for tolerant or resistant plants
- Nursery certification scheme

Acknowledgements

- Fruit Growers Tasmania
- Australian Blueberry Growers Association
- Horticulture Innovation Australia
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- Damian Collins, Anna Englezou, Lucas Shuttleworth, Kelly Scarlett, EMAI, DPI
- Carly Murray, Anchal Sabharwal CCPIC, DPI
- Maurizio Rocchetti, Costa Group - Berry Category
- Mountain Blue Orchards, Blueberry Fields

NSW Department of Industry

Appendix K1

Karen Brock <brocklands@bigpond.com>
to putnamm

Hi Melodie

I was kindly forwarded your contact details by Dr Bill Cline after Chad Finn received my initial request for assistance.

We have an issue within our state of Tasmania where blueberry rust has infected one commercial property which is a large scale operation. A management program using chemica

Blueberry rust is a notifiable disease in this state (plus other states). The recent issue has now limited plant an fruit movement into three other states which do not have blueberry r

One of the proposals put forward to the Biosecurity agents last August was to remove the infected evergreen cultivars, back to the stump to remove the innoculum. Followed up wi

Now that market access has changed resulting from two other properties are infected, the growers are concerned and lobbying for an eradication program to occur - or at least a s

In reading your paper and also Ammeike's work from Michigan, it would appear that we may have some hope as the bulk of the property are deciduous cultivars and we do not hav

Are there any processes you would recommend such as defoliation, pruning, etc that may assist in eradicating this pathogen?

Any ideas would be much appreciated.

Regards

Karen

Nuffield Scholar 2014

- 61 3 63944807
- 0439972793

Melodie Putnam <putnamm@science.oregonstate.edu>
to brocklands

Images are not displayed. Display images below - Always display images from putnamm@science.oregonstate.edu

Hi Karen,

Yes, this is a problematic situation. One thing that I am curious about is what is the fungus overwintering on - what is the alternate host in your situation? The confusion of whether

I had previously asked the grower who had had problems with the rust about how it was being managed, and this is what I received back:

Fungicides (in advance to prevent in the first place), then if anything [shows up], typically azoxystrobin and quat (KleenGrow). Then sometimes, defoliation if needed. This has actually been quite successful in most cases, if the protocols are followed.

Part of the protocols include regular scouting, removal of fallen leaves on a frequent basis, and pruning and burning or discarded affected material. I don't believe this rust affects th
I hope this helps. Best of luck,
Melodie

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Appendix L1

EPPO Global Database

EPPO Reporting Service no. 09 - 2016 **Num. article:** 2016/171

First report of Thekopsora minima in Belgium

The NPPO of Belgium recently informed the EPPO Secretariat of the first finding of *Thekopsora minima* (EPPO Alert List) on its territory. At the end of March 2016, the German NPPO notified Belgium that *Vaccinium* plants originating from an infected production site in Germany had been delivered to a Belgian nursery. This specialized nursery, located in the province of East-Flanders, produces berry plants and sells other soft fruit plants to final consumers mainly. The nursery was inspected in 2016-04-20 and, although symptoms resembling those of *T. minima* were observed in the *Vaccinium* variety concerned by the German notification, the presence of the fungus could not be confirmed. However, at the same nursery 2 other *Vaccinium* varieties delivered by another German and a Dutch company also showed symptoms (62 plants for planting of *Vaccinium corymbosum* cvs. 'Cipria' and 'Sunshine blue'). All 3 lots had been delivered in autumn 2015, so cross-contamination might have taken place. Symptomatic plants were sampled in 2016-04-20 and tested by the NRL (Institute for Agricultural and Fisheries Research). In 2016-05-24, laboratory analysis (morphology, nested-PCR, sequencing) confirmed the identity of the fungus. A short Pest Risk Analysis was conducted and concluded that considering the very high risk of introduction, spread and establishment of the fungus, as well as its host range (Ericaceae), eradication measures were necessary. All infected *Vaccinium* plants in the nursery have already been destroyed. Tracing-back and forward studies are ongoing. As two deliveries to other EU countries had taken place, NPPOs concerned have been notified. Surveys to detect symptoms of *T. minima* will continue.
The pest status of *Thekopsora minima* in Belgium is officially declared as: **Transient: actionable, under eradication.**

Sources

NPPO of Belgium (2016-07).

European Union funding: For a one-year period (2017-12-16 to 2018-12-15), EPPO has been awarded an EU grant for the further development of the EPPO code system

Appendix L2

EPPO Global Database

EPPO Reporting Service no. 03 - 2016 Num. article: 2016/057

First report of Thekopsora minima in Germany

The NPPO of Germany recently informed the EPPO Secretariat of the first record of the blueberry leaf rust, *Thekopsora minima*, on its territory. In June 2015, the rust was first observed by a plant protection advisor on young potted plants of *Vaccinium corymbosum* cv. 'Pink Icing' growing in the greenhouse of a nursery located in Lower-Saxony. The fungus was identified morphologically and with DNA sequencing. In autumn 2015, *T. minima* was also found in *V. corymbosum* cv. 'Blue Crop' in a garden centre in Hamburg. The person had brought the infected plants to the plant protection service of Lower-Saxony for diagnosis. The fungus was also found in *V. corybosum* cv. 'Goldtraube' potted plants which had been bought in a garden centre in Lower-Saxony. Rust symptoms could be found in plants that had remained at this garden centre. The plants concerned originated from the nursery in Lower-Saxony where the disease had been detected on the cv. 'Goldraube'. Investigations showed that the plants from the latter nursery originated from another one in Lower-Saxony where the disease was also detected on cvs. 'Goldraube', 'Cipria' and 'WE-97-1'. Tracing-back and forward investigations are on-going. It is suspected that *T. minima* might have been introduced with young plants imported from the USA (country where the disease occurs). Official control measures have been taken to prevent the spread of the disease. Some plants have been destroyed and quarantine has been imposed. Further inspections are planned to better understand the situation of this disease in Germany and finally decide on the objective of official measures.

The pest status of *Thekopsora minima* in Germany is officially declared as: **Transient, actionable, under eradication.**

Sources

NPPO of Germany (2016-03).

JKI Express-PRA on *Thekopsora minima*:

http://pflanzengesundheit.jki.bund.de/dokumente/upload/fee0d_thekopsora-minima_express-pra.pdf

EPPO Global Database

EPPO Reporting Service no. 03 - 2017 **Num. article:** 2017/060

First report of Thekopsora minima in Portugal

The NPPO of Portugal recently informed the EPPO Secretariat of the first finding of *Thekopsora minima* (EPPO Alert List) on its territory. The rust was detected in mother plants of *Vaccinium corymbosum* in a nursery (outdoors) in the region of Alto Minho. On a total number of 35 066 plants, 266 were found to be infected (*V. corymbosum* 'Legacy' and 'Ivanhoé'). *T. minima* was only detected in mother plants and not in seedlings. This finding was made during tracing-back studies triggered by information sent in December 2016 by Spain about the detection of an infected lot of *V. corymbosum* var. 'Berkeley' sent by a Portuguese nursery but which had previously been received from France two months before. Although no plants of that lot were present in the nursery in Alto Minho, all *Vaccinium* plant present in the premises were subject to inspection and sampling. The identity of the fungus was confirmed by laboratory tests (isolation, morphology, sequencing). The source of this outbreak is being investigated, and it is noted that the *V. corymbosum* mother plants had been imported from France in May 2011 and May 2012. Eradication measures were taken, all *Vaccinium* plants present in the nursery (mother plants and seedlings) were incinerated.

The pest status of *Thekopsora minima* in Portugal is officially declared as: **Present, under eradication.**

Sources

NPPO of Portugal (2017-02).

European Union funding: For a one-year period (2017-12-16 to 2018-12-15), EPPO has been awarded an EU grant for the further development of the EPPO code system (agreement nb: SANTE/2017/GS/EPPO/S12.768842). The EU Commission is not responsible for any use that may be made of the information from this project subsequently included in the EPPO Global Database.

EPPO Reporting Service no. 03 - 2017 **Num. article:** 2017/059

First report of Thekopsora minima in the Netherlands

The NPPO of the Netherlands recently informed the EPPO Secretariat of the first finding of *Thekopsora minima* (EPPO Alert List) on its territory. During an official survey, the rust was found on *Vaccinium corymbosum* (wild and invasive plants) near Venlo in a natural green area covering approximately 1400 ha. No typical symptoms were observed on *V. corymbosum* plants but rust spores were found on leaves by the laboratory of the National Reference Centre. The identity of the fungus was confirmed in the laboratory (morphology, sequencing). The source of this infestation is unknown. The NPPO considered that the fungus is probably widespread in the area concerned because of the high density of blueberry bushes, and the fact that the leaves which were left on these bushes (*T. minima* causes leaf drop) were heavily infected. As the fungus can spread via airborne spores and is already present in several European countries, eradication measures were not considered feasible.
The pest status of *Thekopsora minima* in the Netherlands is officially declared as: **Present, only in some parts of the Member State concerned.**

Sources

NPPO of the Netherlands (2017-02).

European Union funding: For a one-year period (2017-12-16 to 2018-12-15), EPPO has been awarded an EU grant for the further development of the EPPO code system (agreement nb: SANTE/2017/GS/EPPO/S12.768842). The EU Commission is not responsible for any use that may be made of the information from this project subsequently included in the EPPO Global Database.

Appendix M

Australasian Plant Dis. Notes (2013) 8:81–83
DOI 10.1007/s13314-013-0101-2

Thekopsora minima causes blueberry rust in south-eastern Queensland and northern New South Wales

A. R. McTaggart · A. D. W. Geering · R. G. Shivas

Received: 12 March 2013 / Accepted: 28 April 2013 / Published online: 21 June 2013

Abstract The cause of blueberry rust in eastern Australia was determined by molecular and morphological analysis as *Thekopsora minima.*

Keywords Large Subunit region · *Naohidemyces* · Pucciniales · *Vaccinium*

Vaccinium (Ericaceae) is host to three rust fungi, *Naohidemyces vaccinii*, *N. fujisanensis* and *Thekopsora minima*, which are morphologically distinguished by aecial and telial characteristics (Sato et al. 1993). The uredinial stage of blueberry rust was first recorded from Australia in 2003.

In September 2012, a specimen of rust on blueberry (*Vaccinium corymbosum*) from Bundaberg, Queensland, was forwarded to Biosecurity Queensland and lodged as BRIP 57654 with the DAFF Plant Pathology Herbarium. The specimen was examined microscopically. Uredinia were present on lower leaf surfaces in groups up to 5 mm diameter, confluent, vein limited, on necrotic spots with the corresponding upper leaf surface dark brown with a bright red diffuse border, subepidermal, erumpent, round, 100–200 μm diameter, yellow (Fig. 1a). A peridium was present with a central pore. Urediniospores were subglobose, ellipsoidal to obovoid, yellow, 15–27×13–19 μm, with a wall that was 1–2 μm thick and echinulate (Fig. 1b).

DNA was extracted from this specimen according to the protocol outlined by Aime (2006) using the UltraClean Plant DNA Isolation Kit (MoBio Laboratories, Solana Beach, CA, USA). The ITS2-LSU region was amplified with Rust2INV (Aime 2006)/LR7 (Vilgalys and Hester 1990) and nested with LROR/LR6 (Vilgalys and Hester 1990). The 28S sequence of blueberry rust (GenBank KC763340) had high identity to *Thekopsora minima* (HM439777 and GU355675; 99 % identical over 100 % query coverage) in a BLAST search. A match to *Naohidemyces vaccinii* was also returned with a lower sequence identity (DQ354561; 95 % identical over 99 % query coverage). Based on a phylogenetic reconstruction of closely related taxa from GenBank (Fig. 2), the pathogen was identified as *T. minima*.

The blueberry rusts in *Thekopsora* and *Naohidemyces* are heteroecious. The aecial stage of each occurs on the conifer *Tsuga* in the northern hemisphere. Aecial morphology is a reliable character to distinguish the two genera. *Naohidemyces* has aecia that are *Uredo*-type, with aeciospores borne singly on pedicels (Sato et al. 1993). *Thekopsora* differs by having aecia that are *Peridermium*-type, with aeciospores in chains (Sato et al. 1993). Telial morphology also differentiates the genera. The germ pores of *Naohidemyces* occur in the centre of the teliospores, whereas germ pores of *Thekopsora* are situated in the corner of each cell (Sato et al. 1993). Uredinial differentiation of *Thekopsora* and *Naohidemyces* is more subtle. Uredinia of *Naohidemyces* are enclosed by a peridium with conspicuous ostiolar cells, which are not present in *Thekopsora* (Sato et al. 1993). The size of urediniospores of species of *Thekopsora* and *Naohidemyces* on *Vaccinium* is not a useful taxonomic character.

Thekopsora minima was recently reported from South Africa (Mostert et al. 2010) and Mexico (Rebollar-Alviter et al. 2011) based on inoculation studies and molecular data. Australian specimens of blueberry rust held in BRIP were identified as *T. minima* by morphology, and in some cases by LSU sequence data, which is indicated by GenBank numbers as follows. Specimens examined: on *Vaccinium corymbosum* L., Brooklet, Byron Bay, New South Wales,

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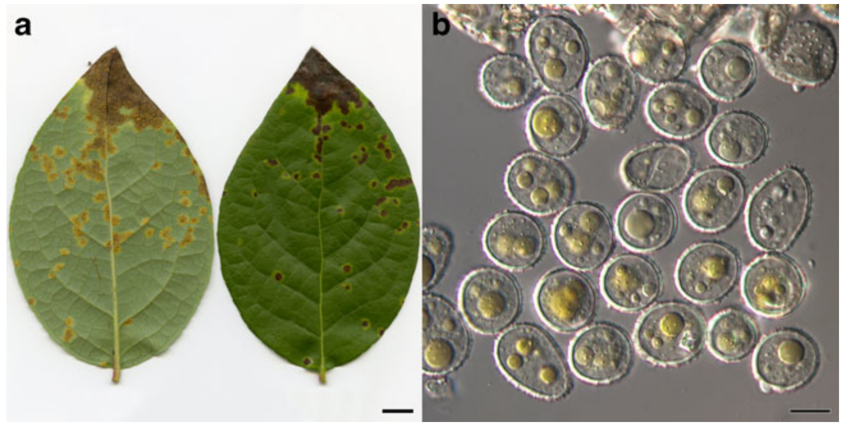

Fig. 1 *Thekopsora minima* on *Vaccinium corymbosum*. **a** Abaxial and adaxial leaf symptoms; **b** Urediniospores. Scale A=1 cm; B=10 µm

Australia, 19 February 2003, J.M. Anderson, BRIP 39896; Redlands Research Station, Cleveland, Queensland, Australia, 22 August 2008, J. Moisander, BRIP 52162, GenBank# KC763341; Nambour, Queensland, Australia, 15 September 2009, J. Nagle, BRIP 52832, GenBank# KC763342.

Naohidemyces vaccinii and *N. fujisanensis* were not regarded as pathogens of blueberry by Sato et al. (1993),

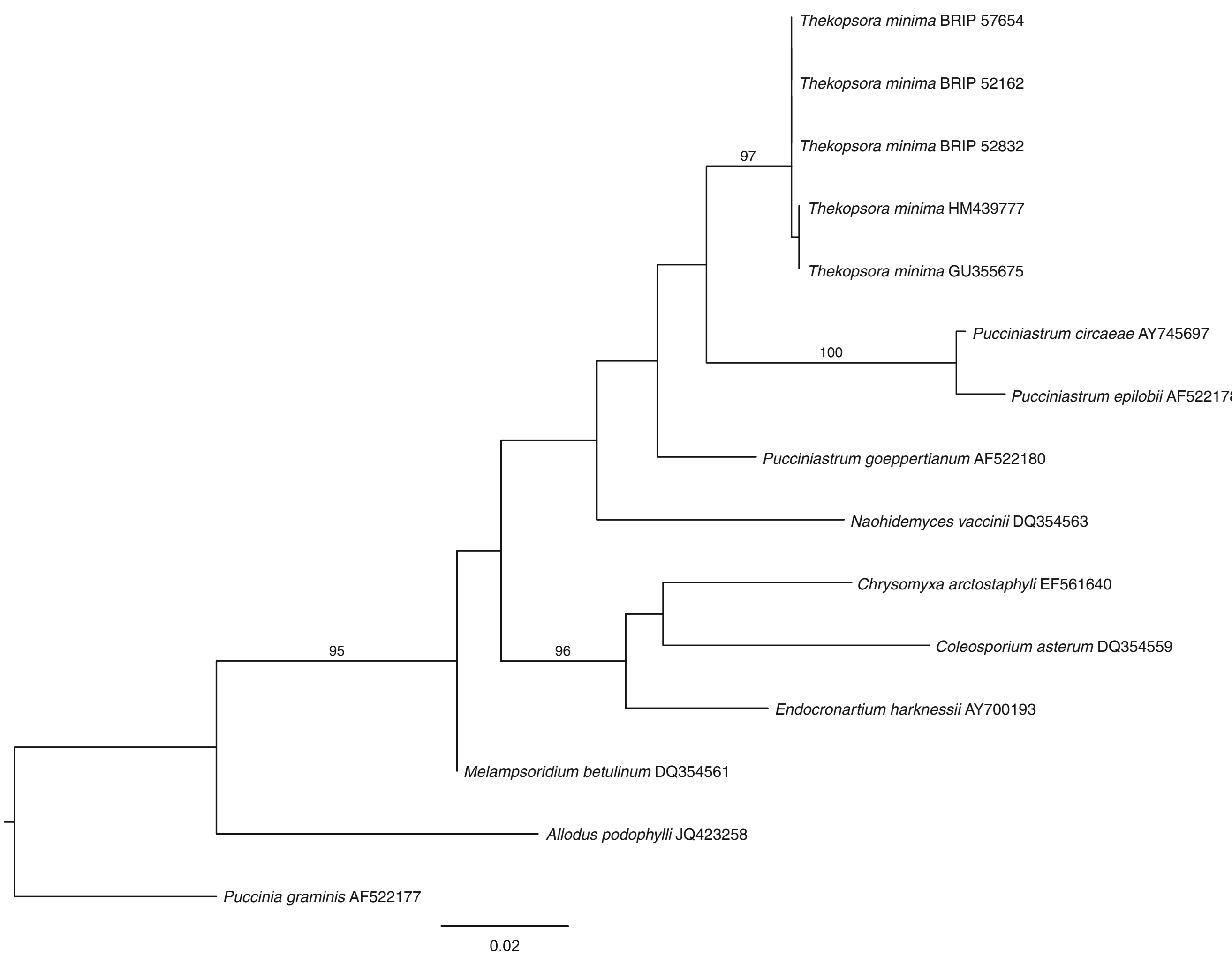

Fig. 2 Phylogram recovered from a maximum likelihood search and SPR tree improvement in PhyML with an alignment of the LSU region. aRLT values >90 % shown above nodes

although they infected other *Vaccinium* species. *Naohidemyces* is not recorded in Australia.

Acknowledgments This work was partly funded by the Australian Biological Resources Study, grant number RFL212-33.

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Appendix N

Final Report

Development of effective and sustainable disease management for blueberry production in Australia

Project leader:

Rosalie Daniel

Delivery partner:

Department of Primary Industries NSW

Project code:

BB13002

Project:

Development of effective and sustainable disease management for blueberry production in Australia BB13002

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Content

Summary

The Australian blueberry industry continues to expand rapidly. Diseases such as Blueberry rust, Botrytis, Anthracnose and Botryosphaeria stem blight have the potential to reduce yields and increase costs associated with production and marketing. Management of these diseases can present significant challenges for the industry. The objective of this project was to improve management options for Blueberry rust by better understanding the biology and epidemiology of the pathogen, and identifying additional effective fungicides (chemical, biological and activators) for disease control.

The outcomes of this project begin to fill the knowledge gaps in the ecology of Blueberry rust (*Thekopsora minima*) by identifying environmental conditions encountered in the evergreen production system that favour spore production, infection and survival. Air sampling in a commercial orchard revealed that spores can be present at any time of the year. Preliminary data analysis indicates that greater spore numbers were observed when temperatures ranged between 20 °C and 30°C. Spore numbers were not correlated to daily or fortnightly rainfall, temperature or relative humidity. Spore numbers were slightly higher between 8 pm and 4 am. Further data exploration, and more observations over a longer period of time are required to draw any conclusions. Plant physiology is also likely to play a role.

Six field trials were conducted to evaluate a range of chemical and non-chemical fungicides, biological agents and plant defence activators that can be added to the previously limited repertoire available for management of Blueberry rust. Based on results from fungicide efficacy trials, applications for Minor Use Permits have been submitted to the Australian Pesticides and Veterinary Medicines Authority (APVMA) by the Industry Development Officer (Blueberries) for use of dithianon, tebuconazole and copper against Blueberry rust. Dithianon (Minor Use Permit PER82601) and copper (PER84176) are now available for use against blueberry rust. Further work is required to determine the time at which application of fungicides will be most effective in relation to weather conditions, plant physiology and the pathogen disease cycle. Additional research should also continue to look at the timing of application of fungicides and plant defence activators during early flowering to reduce the incidence of post-harvest rots caused by Botrytis, Colletotrichum and other fungal species.

Field and laboratory observations, feedback from growers, and submissions to the NSW DPI Plant Health Diagnostic Service suggest an increase in the incidence of Botryosphaeria stem blight in the field. Field sampling has shown that postharvest fruit rots are not limited to *Botrytis* and *Colletotrichum* species, and that other fungi including *Alternaria* sp., *Cladosporium* sp. and *Pestalotiopsis* sp. can also be responsible for post-harvest diseases. Soilborne diseases may also increase, as the industry continues to expand and blueberry orchards are established in areas previously used for other crops.

The project has delivered key-findings and outputs to industry to enrich the existing resources and capacity of growers. Grower meetings were held annually to communicate project updates, and to build diagnostic capacity and awareness. Information has also been disseminated through the industry journal and via direct communication with growers. Disease information sheets have been developed to be made available to growers via the ABGA website. Blueberry rust disease management recommendations continue to be updated as epidemiological and biological data is interpreted.

The project outcomes deliver a better understanding of environmental factors that are conducive to disease enabling more targeted and effective management strategies to be developed and implemented.

Keywords

Blueberry, *Vaccinium*, Blueberry rust, *Thekopsora minima*, Botrytis, Anthracnose, disease management

Introduction

Australia produces more than 7,660 tonnes of berries annually, worth an estimated $150 million at the farm gate (2015/2016; Hort Innovation). More than 90% of production occurs in New South Wales (NSW) and Queensland, supplying the Australian domestic market with fresh (75%) and processed (10%) fruit, and exports expanding into Asia (15%). The subtropical climate supports an extended growing season, and growers can attract premium prices when berries are not available from other regions. However, the warmer temperatures, higher relative humidity and rainfall, along with evergreen cropping practices, are also conducive to fungal diseases that can have a significant effect on plant vigour, yield and berry quality.

Blueberry rust (*Thekopsora minima*), Botrytis blight and grey mould (*Botrytis cinerea; Botrytis* spp.) and Anthracnose (*Colletotrichum simmondsii*; *Colletotrichum* spp.) can result in significant yield losses in the evergreen system, particularly in wet years. *Thekopsora minima*, first reported in Australia in November 2001, now occurs in NSW, Queensland and Tasmania. It was also reported, and subsequently eradicated, in Victoria (Agriculture Victoria 2016). Following infection, red-brown lesions develop on the abaxial side of leaves. Yellow pustules form on the corresponding underside of the leaf. Severe disease can lead to defoliation and reduced production in the following season. Botrytis blossom blight can be severe in cooler, wet seasons. Infection at flowering can lead to the development of grey mould on fruit after harvest. *Colletotrichum* sp. infect twigs, leaves, flowers and fruit resulting in loss of flowers at bloom, and rotting of fruit during ripening, or post-harvest. The continuous presence of foliage on plants in the evergreen system is conducive to the build up of inoculum and persistence of pathogens.

Management of Blueberry rust in Australia relies largely on fungicides. Studies conducted more than a decade ago (HAL Projects FR01024 and RD04002) identified products that effectively control Blueberry rust (Lazar et al. 2006; Stovold et al. 2004). These studies led to the application for Minor Use Permits for mancozeb (FRAC M3), propiconazole (Tilt®; FRAC 3) and chlorothalonil (FRAC M6) from the Australian Pesticide and Veterinary Medicine Authority (APVMA). Other chemicals demonstrated in that study to effectively reduce severity of Blueberry rust included dithianon, Bioacumen (an alternative copper), tebuconazole and cyproconazole (Stovold et al 2004). A Minor Use Permit for Pristine® (boscalid + pyroclostrobin; FRAC 7 and 11) was issued in 2013.

For the last decade, the blueberry industry has relied predominantly on the chemicals available on Minor Use Permits to manage Blueberry rust. Mancozeb, propiconazole and Pristine® are listed in the Interstate Certification Assurance 31 (ICA-31) agreement, an accreditation to meet domestic quarantine requirements for interstate market access. The ICA-31 requires growers to comply with specific treatment schedules and inspection protocols to reduce the risk of Blueberry rust entering Blueberry rust-free states. In addition to increasing costs associated with production, the treatment schedule places pressure on permitted fungicides, amplifying the risk of fungicide insensitivity emerging in pathogen populations.

This project addressed criteria specified in the Blueberry Industry Strategic Plan 2009-2014, contributing to the development of a profitable, environmentally sustainable industry that produces high quality fruit by promoting the adoption of sustainable production systems and implementation of Biosecurity Best Management Practices to improve disease management. Field trials were conducted to identify chemical and alternative fungicides for management of Blueberry rust, Botrytis and Anthracnose. Factors conducive to infection were investigated in the laboratory and greenhouse. Air sampling determined the year-round presence of aerially-dispersed inoculum in the field.

While current fungicide practices generally provide acceptable control of Blueberry rust when disease is moderate, when symptoms are very severe a calendar style spray program does always not guarantee acceptable disease control. When conditions were not conducive, disease did not develop on plants treated with water, or fungicides. There was a need to identify new, alternative and complimentary management measures, while taking into consideration pathogen biology to reduce inoculum levels and disease development, and target fungicide application to the disease cycle.

Methodology

Fungicide trials

Six field trials were conducted in commercial orchards at Corindi, Lindendale and Brooklet, NSW, to evaluate the efficacy of fungicides and biopesticides against blueberry rust. In three of the field trials at Corindi and Brooklet, the efficacy of fungicides against postharvest rots caused by Botrytis and Colletotrichum was also evaluated. Fungicide efficacy was evaluated in complete randomized block designs in small plots in each orchard. Four replicate blocks were established for each treatment. Each treatment block consisted of at least three plants depending on the size of the site. A buffer plant (treated but not assessed) was included at the end of each treatment block. Treatments were applied using a backpack sprayer every 10-14 days, depending on weather conditions. Fungicides were applied according to the label or manufacturer recommendations. The methodology and results for each trial are presented in more detail in Appendix I.

Disease assessment for blueberry rust field-based fungicide efficacy trials

Severity of rust was initially assessed by visually estimating the leaf area affected by rust. A diagrammatic disease severity scale was developed and used to assess severity of blueberry rust in all fungicide trials from mid-2015 onward (Appendix II). To develop the scale, 30 blueberry leaves showing varying levels of disease symptoms were scanned and converted to binary images. The total leaf area and the area affected by blueberry rust, including lesions and chlorosis, were calculated using the Image Analysis function of Image J (Schindelin et al 2015). To ensure uniformity the scale was tested by three users prior to disease assessments being conducted. The same person assessed a trial to ensure consistency.

Disease assessments for blueberry rust were made on 20 randomly selected leaves in the upper, middle and lower part of the canopy on plants between the two buffer plants in each treatment. Disease assessments were made every 14-21 days, alternating with treatment applications.

Statistical analysis

Disease severity data from fungicide trials was converted to Area under the Disease Progress Stairs (AUDPS) (Simko & Piepho 2011). The AUDPS is used to combine multiple observations of disease progress into a single value. A low value indicates less disease. The AUDPS is used to combine multiple observations of disease progress over time into a single value. A low value indicates less disease. Additional details of statistical analyses are presented for each experiment in the Appendices.

Post-harvest fruit rot assessment

To assess the effect of treatments on post-harvest rots, berries were collected at ripening and placed into multi-well trays to avoid cross-contamination between fruit. Berries were incubated at room temperature 20°C for up to 21 days and assessed daily for symptoms. Diseased berries were removed. Fungi affecting berries were identified visually macro- and microscopically as *Botrytis* sp., *Colletotrichum* sp. or 'other', using morphological characteristics. Specific details for trials are presented in Appendix I.

Effect of temperature on urediniospore germination

Urediniospores used in experiments were produced on detached leaves (Twizeyimana and Hartman 2010). Briefly, the first three leaves were detached from actively growing shoots of blueberry plants in the greenhouse and placed on a rack in a plastic container lined with moist blotting paper. Spores from infected leaves were transferred to the underside of the detached leaves using a toothpick. The containers were sealed to maintain humidity and incubated in the dark for 24 hours. After this time, the containers were incubated under natural light for 10-14 days until urediniospores formed. The spores were harvested for immediate use. Alternatively, leaves of plants growing in the greenhouse were inoculated in the same way, covered with a plastic bag for 24 hours, and spores harvested after 10-14 days.

The effect of temperature (10, 15, 20, 25 and 30^{O}C) on spore germination were assessed on detached leaves inoculated by spraying with a 1 x 10^{5}spore/mL suspension and incubating for 6, 24 and 48 hours. Leaves were stained with calcofluor white and viewed using fluorescent microscopy. Between 200 and 300 spores were counted on each leaf section and the experiment was conducted in triplicate.

Spore sampling and assessment

Spore sampling was conducted using a Seven-day recording volumetric spore trap (2013, 2016-2017) (Burkard Manufacturing Co., UK). Spore samplers were placed in a commercial orchard at Corindi. The volumetric spore trap collected air samples onto Melinex tape over seven days. Tape was viewed microscopically to quantify urediniospores of *T. minima*. The number of spores counted on each slide was converted to spores per cubic meter (Lacey and West 2006). Temperature and rainfall data was obtained from the Bureau of Meteorology (bom.gov.au) and from the grower’s onsite data loggers.

Disease reports from blueberry

The occurrence of other blueberry diseases was recorded during field visits, discussion with growers and via samples that were submitted to the Plant Health Diagnostic Service (PHDS) at the Elizabeth Macarthur Agricultural Institute (EMAI), Department of Primary Industries NSW.

Outputs

Conference presentations

Daniel R, Wilk P and Tesoriero L (2013). Understanding blueberry rust in Australia: histology of infection by *Thekopsora minima*. Australasian Plant Pathology Conference 25-27 November, Auckland, New Zealand.

Daniel R (2014) Management of blueberry rust. Australian Blueberry Growers Association Conference, 10-12 November 2014, Coffs Harbour NSW.

Rothwell C, Scarlett K, Shuttleworth LA, Guest DI and Daniel R (2015). Blueberry stem blight: Taxonomy and pathogenicity of Botryosphaeriaceae associated with stem blight in northern NSW. Australasian Plant Pathology Conference, 14 - 16 September 2015, Fremantle, Western Australia.

Simpson M, Daniel R and Wilk P (2016). Managing blueberry rust under an evergreen system. XI International *Vaccinium* Symposium, 10-14 April, 2016, Orlando, Florida USA.

Daniel R (2017). Management of blueberry rust: what we know from NSW. Tasmanian Fruit Growers Conference, 26-27 May 2017, Hobart, Tasmania. The presentation is available on the TAIR website.

Daniel R, Englezou A and Scarlett K (2017). Understanding the biology and epidemiology of blueberry rust (*Thekopsora minima*) to improve control measures. SciPlant2017, 26-28 September 2017, Brisbane, Queensland.

Grower workshops

Presentations were made to update industry on project outcomes, improve diagnostic capacity amongst growers and liaise with stakeholders, as follows:

2013 – 'Key diseases of blueberry'; Grower workshop, 18 June 2013, Woolgoolga Bowling Club.

2015 – 'Management of blueberry rust – trial update'; Grower workshop, 11 May 2015, Woolgoolga Bowling Club.

2016 – 'Management of blueberry rust and other diseases'; Grower workshop, 6 April 2016, Woolgoolga Bowling Club.

– 'Blueberry rust – project update'; Australian Blueberry Growers Association Meeting, Lorne, 18 November 2016.

– 'Know your enemy: rust does not sleep'; NSW DPI Blueberry Roadshow grower meetings, Woolgoolga Bowling Club and Coffs Harbour RSL, 15 and 16 December 2016.

Project updates were also presented annually at ABGA meetings through the Industry Development Officer and in the *Australian Blueberry Grower* journal.

Articles in grower magazines

2013 – 'Disease management for blueberries project' *In*: 'Australian Blueberry Grower', Spring 2013.

2015 – 'Understanding Blueberry rust to improve management' *In*: 'Blueberry Plant Protection Guide 2015-2016' (Eds. Wilk P and Simpson M). NSW Department of Primary Industries 2016.

2017 – 'Botryosphaeria stem blight: something to look out for as summer approaches' *In: '*Blueberry Plant Protection Guide 2017-2018' (Eds. Simpson M and Browne B). NSW Department of Primary Industries 2017.

Disease information sheets

Disease information sheets were developed for four key diseases: Blueberry rust, Botrytis blight and grey mould, Anthracnose and Botryosphaeria stem blight (Appendix IV). The sheets were printed and distributed to growers and made available on the ABGA website.

Outcomes

Chemicals and alternatives for disease management

Based on results from fungicide efficacy trials, applications for Minor Use Permits have been submitted to the Australian Pesticides and Veterinary Medicines Authority (APVMA) by the Industry Development Officer (Blueberries) for use of dithianon, tebuconazole and copper against blueberry rust.

Fungicide trial: Corindi 2014

The efficacy of five fungicides (mancozeb, dithianon, metiram, copper, tebuconazole) and potassium silicate was evaluated from February until July, 2014. Conditions were very dry and blueberry rust symptoms developed only on water and silica treated plants in September, two months after the last spray was applied. Silica is a plant defence activator that requires regular application to be effective. It is not possible to determine from the trial whether plants were no longer protected when application stopped in July, or whether the application of silica was not effective at all.

No recommendations can be made regarding the efficacy of these chemicals because disease pressure was too low. The lack of symptom development on the water-treated plants until September suggests that calendar sprays may not be the most efficient means of controlling blueberry rust, particularly when conditions are dry. Alternatively, the lack of symptom development on treated plants could indicate that the protection afforded by chemical applications extended at least 2 months beyond the period of spraying.

Fungicide trial: Lindendale 2015

This trial was conducted between March and May 2015, under severe disease pressure. Based on the AUDPS (Simko and Piepho 2012) calculated from the per cent leaf area affected, the fortnightly application of the fungicides azoxystrobin + cyproconazole, fenbuconazole and tebuconazole gave the greatest reduction in disease severity (Fig. 1). Minor Use Permits have been issued by the APVMA for copper and dithianon.

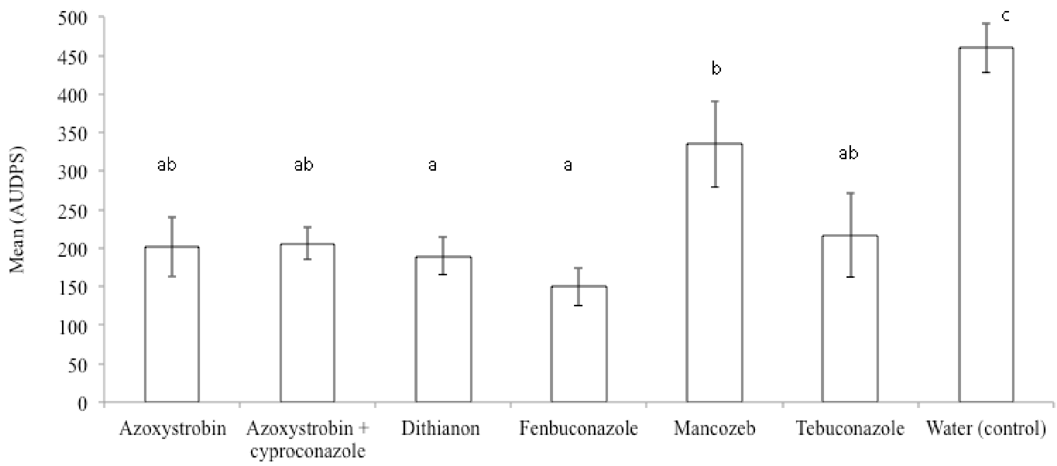


Fig. 1. Disease severity of blueberry rust expressed as the area under the disease progress stairs (AUDPS) following fortnightly application of selected chemicals from March to May 2015. Assessments of per cent leaf area affected by rust were made every 2 weeks. Bars represent standard error of the mean values. Different letters at each column indicate significant differences between treatments ($P < 0.05$).

Fungicide trial: Lindendale 2016

The aim of this trial was to assess whether the time at which application of fungicides commenced affected disease severity. The same treatments were applied, the second treatment commencing 4 weeks after the first treatment (highlighted by the dashed boxes in Table 3). A water control treatment was not included because of the severity of disease experience in a previous trial in which a water treatment was included and the trial was being conducted on a commercial orchard. Because the majority of growers use mancozeb, this fungicide was included as the control treatment.

The trial commenced 2 days after pruning. No significant differences were observed between treatments (Fig. 2). In this trial applying the combination of chemicals, commencing at different times was no more or less effective than applying mancozeb, every 14 days, under the given environmental conditions. The absence of an untreated control makes it difficult to assess treatments any further. The trial design would benefit from the use of a single, effective fungicide and including an untreated control to better determine the role of timing of application in the efficacy of spraying.

Table 3. Fungicides evaluated for their efficacy against blueberry rust at Lindendale in 2015. Fungicides were applied every 14 days.

Treatment #	Weeks 0 & 2	Week 4	Weeks 6 & 8	Weeks 10
1	Chlorothalonil	Pristine	Mancozeb	Mancozeb
2	Chlorothalonil	Fenbuconazole	Mancozeb	Mancozeb
3	Dithianon	Pristine	Mancozeb	Mancozeb
4	Dithianon	Fenbuconazole	Mancozeb	Mancozeb
5	Fenbuconazole	Pristine	Mancozeb	Mancozeb
6	Mancozeb	Chlorothalonil	Pristine	Mancozeb
7	Mancozeb	Chlorothalonil	Fenbuconazole	Mancozeb
8	Mancozeb	Dithianon	Pristine	Mancozeb
9	Mancozeb	Dithianon	Fenbuconazole	Mancozeb
10	Mancozeb	Fenbuconazole	Pristine	Mancozeb
11	Mancozeb	Mancozeb	Mancozeb	Mancozeb

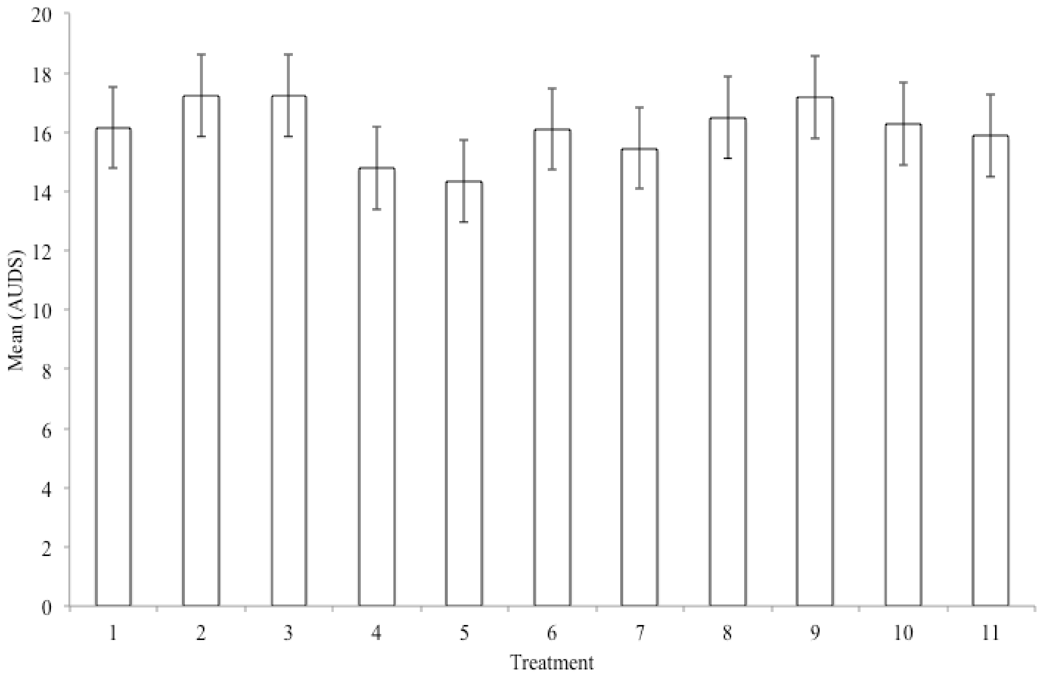


Fig. 2. Disease severity of blueberry rust expressed as the area under the disease progress stairs (AUDPS) following fortnightly application of selected chemicals from December 2015 to February 2016. Treatments are listed in Table 3. Bars represent standard error of the mean values. There was no significant difference between treatments ($p<0.05$).

Fungicide trial: Brooklet 2016 A

This trial was conducted to assess the efficacy of a range of biological and plant defence activating products against blueberry rust (Table 4). Alternating copper hydroxide with mancozeb every 14 days was as effective at reducing severity of blueberry rust as applying mancozeb on its own every 14 days (Fig. 3). Copper hydroxide should be considered as an option for blueberry rust control.

Table 4. Treatments evaluated for their efficacy against blueberry rust at Brooklet in 2016. Treatments were applied every 14 days.

Active ingredient	Commercial name	Rate (/100L)	Efficacy
Bacillus subtilis	DC-122 WP	150 g	+
Copper hydroxide/Mancozeb[ŧ]	Kocide™	105 g	++
Chitosan 1	Taikang™	166 mL	+
Chitosan 2	Taikang™	333 mL	+
Potassium silicate	AgSil	1000 mL	+
Fortified crustacean and fish wastes	Aminogro®		+
Mancozeb	Penncozeb™ 750WP	200 g	++

The spray adjuvant Agral (10 mL/100 L) was used for all treatments, except when conditions were wet, when Designer® (500 mL/100 L) was used.

Ŧ Copper hydroxide application was alternated with mancozeb every 14 days.
Ħ NI – not able to interpret, NA – no significant activity, + = limited activity, ++ = moderate activity, +++ = good activity, ++++ = excellent activity

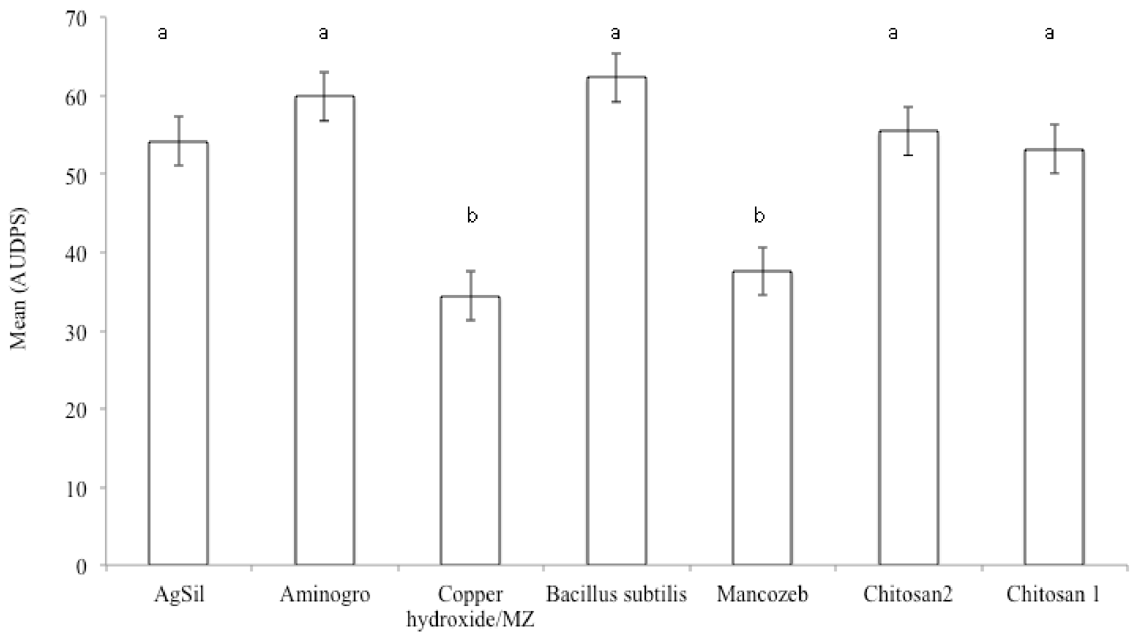


Fig. 3. Disease severity of blueberry rust expressed as the area under the disease progress stairs (AUDPS) following fortnightly application of selected treatments from January to May 2016. Bars represent standard error of the mean values. Different letters at each column indicate significant differences between treatments (P < 0.05).

Fungicide trial: Brooklet 2016 B

This trial was conducted to assess the efficacy of a range of biological and plant defence activating products against blueberry rust, and to determine the efficacy of copper on its own (following from the previous trial where copper was applied alternating with mancozeb) (Table 5). Fish and seaweed products have been shown to reduce blueberry rust symptoms in blueberry (Scherm et al 2011). Based on mean score and ordinal analysis of the data none of the treatments applied were significantly better or worse at reducing rust severity than mancozeb, under the prevailing environmental conditions (Fig. 4). It is possible that the low disease pressure during the time of the trial contributed to the inability to distinguish between treatments. The use of chitosan to dilute copper, and the application of sulphur and seaweed extracts (Seasol™) warrant further investigation.

Table 5. Treatments evaluated for their efficacy against blueberry rust at Brooklet in 2016. Treatments were applied every 14 days.

Active ingredient	Commercial name	Rate (/100L)	Efficacy
Mancozeb	Pencozeb™	200 g	+
Copper	Kocide	105 g	++
Chitosan/copper	Taikang + Kocide	200 mL + 73 g	++
Fish emulsion	Rutec Neptune Fish	7.5 L	NI
Fish hydrolysate	Dickers Plant & Soil Booster	666 L	NI
Seaweed extract	Seasol™	7.5 L	+
Sulphur	Barmac Wettable Sulphur 800 WP	200 g	+++

The spray adjuvant Agral (10 mL/100 L) was used for all treatments, except when conditions were wet, when Designer® (500 mL/100 L) was used.
NI – not able to interpret, NA – no significant activity, + = limited activity, ++ = moderate activity, +++ = good activity, ++++ = excellent activity

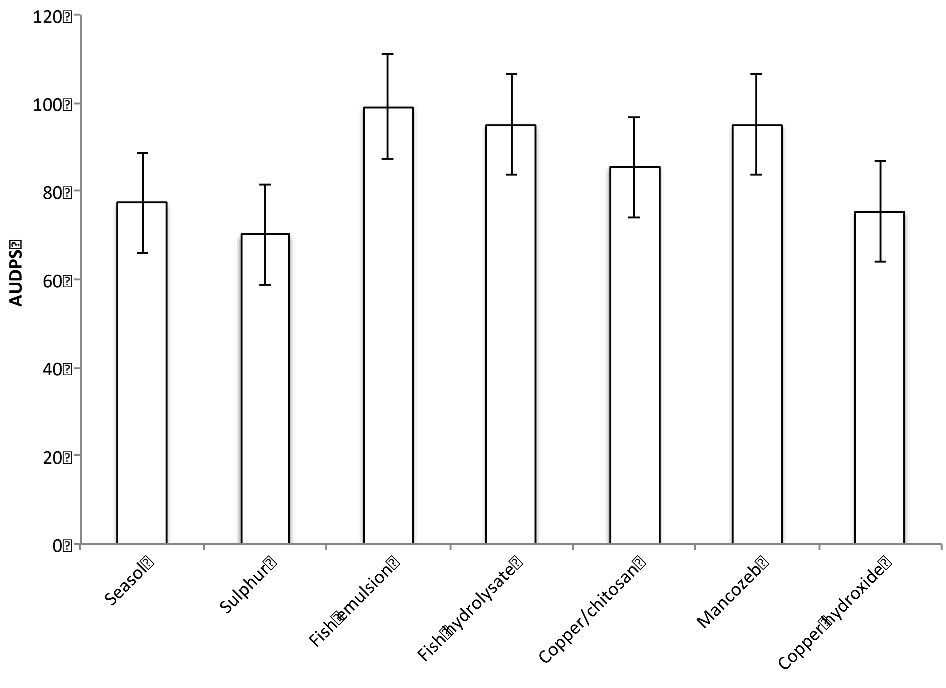
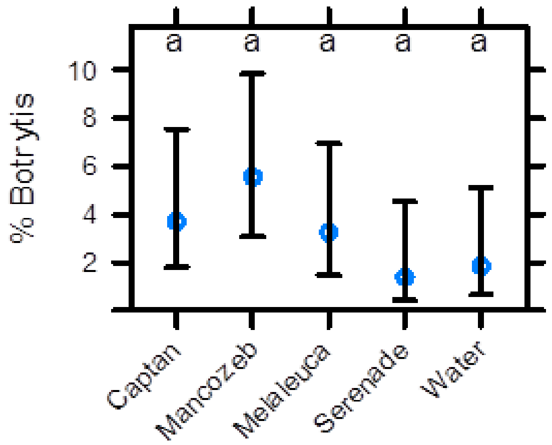


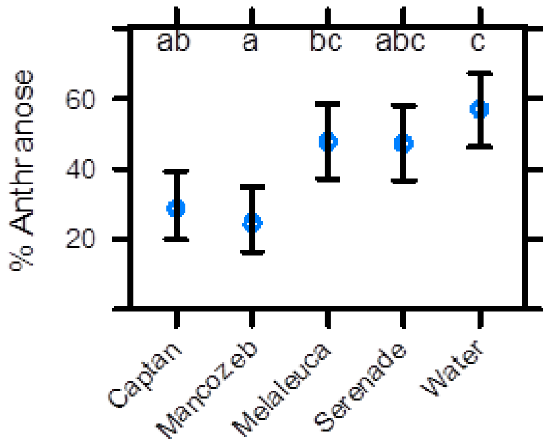
Fig. 4. Disease severity of blueberry rust expressed as the area under the disease progress stairs (AUDPS) following fortnightly application of selected treatments from October to December 2016. Bars represent standard error of the mean values. No significant differences were observed between treatments during the trial (P < 0.05).

Botrytis and Anthracnose

The field trials conducted to assess efficacy of fungicides and plant defence inhibitors against Botrytis and

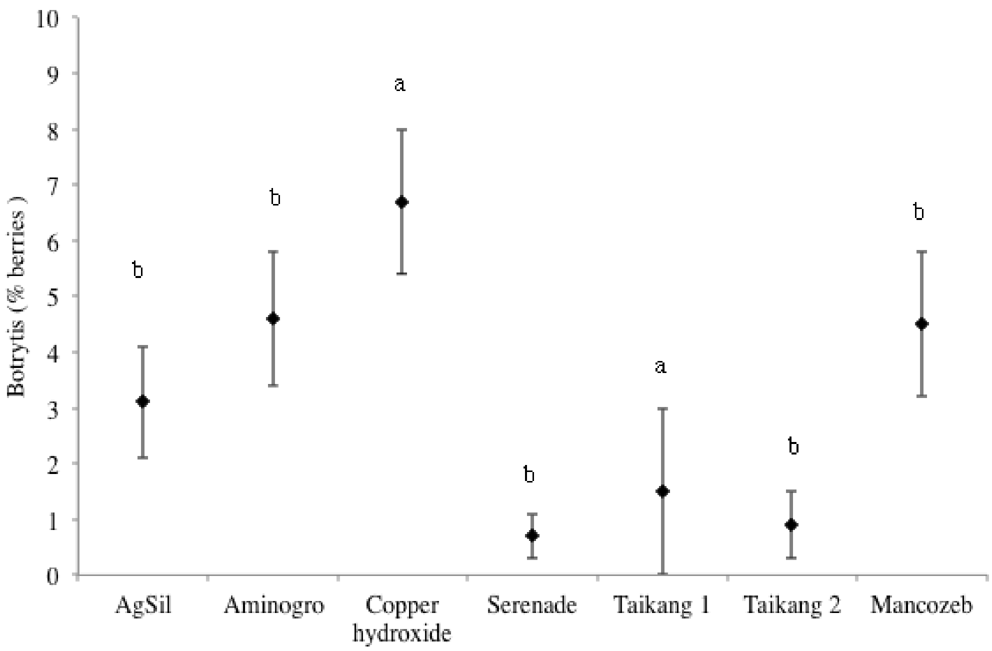
Anthracnose were highly variable. In the first trial conducted in 2015 the level of post-harvest Botrytis or Anthracnose rots was not significantly different between plants treated with Serenade, Ausoil 23 EC, captan or mancozeb (Fig 5a, b). In the second trial conducted in 2016, Serenade® and chitosan (Taikang™) application during flowering significantly reduced the proportion of berries affected with Botrytis compared with other treatments (Fig. 6a). Application of copper and chitosan during and after flowering reduced post-harvest incidence of Anthracnose (Fig 6b). These trials had very low levels of infection with Botrytis, so need to be repeated with larger sample numbers and higher disease levels to confirm efficacy of treatments.





a   b

Fig. 5. Percentage of berries affected by (a) Botrytis grey mould (*Botrytis cinerea*) and (b) Anthracnose (*Colletotrichum simondsii*) after fortnightly treatment with captan, mancozeb, Serenade® and Ausoil 23 EC during flowering through to harvest. Data presented is the back transformed mean of the diseased berries in each plot. Lower and upper error bars are mean ±sqrt(2)*SE. Different letters at each column indicate significant differences between treatments (P < 0.05).



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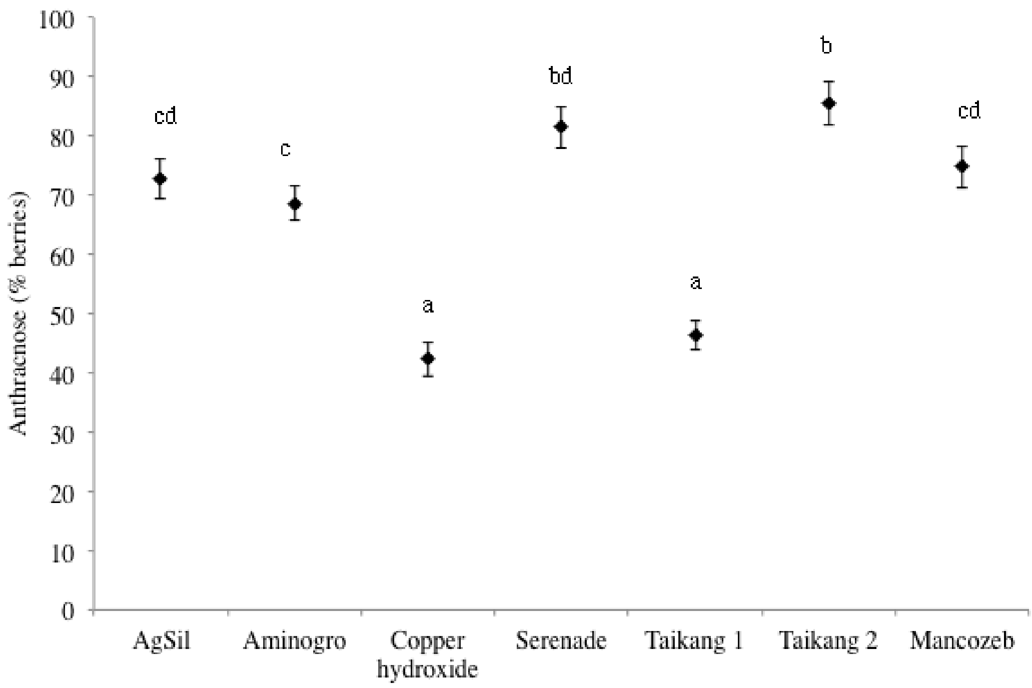

b

Fig. 6. Effect of biopesticides and fungicides on development of postharvest rots. (a) Effect of treatments on development of Botrytis grey mould and (b) Anthracnose. Fruit were assessed for development of disease symptoms up to 21 days after harvest. Data shown is shown as the mean per cent berries affected by the disease. Error bars indicate ± SEM. Different letters indicated significant differences between treatments ($p<0.05$).

Future studies should determine the efficacy application of treatments applied from early flowering on development of post-harvest fruit rots. If there is a positive correlation a bioassay could be developed to test fungicides on harvested fruit, enabling rapid screening of a greater number of fungicides under statistically rigorous conditions. Fungicides shown to be effective in such bioassays could then be tested under field conditions to confirm their efficacy against Botrytis, Anthracnose and other post-harvest diseases.

The chemicals that were found to be effective in reducing rust severity, products that need further testing and products that the industry may like to consider evaluating in the future be evaluated in the future are summarised in Table 6. There is potential to reduce the quantity of fungicides used by mixing or diluting them with plant defence activator products such as chitosan.

In many of the field trials conducted to test the efficacy of fungicides against blueberry rust, the effect of applying treatments was no more, or less, effective than applying mancozeb, the current industry standard. This was particularly apparent when disease pressure was low and suggests that the frequency and timing of application of fungicides could be optimised to improve the effectiveness and economic viability of treatments.

Table 6. Fungicides that were shown to be effective against blueberry rust and that need further evaluation.

Fungicides that were shown to be effective against	**Products that warrant further evaluation**

blueberry rust	
Amistar Xtra® (azoxystrobin + cyproconazole)	Wettable sulphur; liquid lime sulphur
Folicur™ (Tebuconazole)	Mixing chitosan with copper, and other fungicides to reduce the amounts of chemical applied
Indar™ (Fenbuconazole)	Seaweed extracts
Copper hydroxide (Kocide™)	
Delan™ (Dithianon)	

Spore sampling and assessment

Air sampling in a commercial orchard revealed that spores could be present at any time of the year (Appendix III). Data analysis indicates that greater spore numbers were often observed when temperatures ranged between 20 and 30°C. Spore numbers were not correlated to daily or fortnightly rainfall, temperature or relative humidity. There is some indication that spore numbers were greater between 8 pm and 4 am. Laboratory experiments indicated that the optimal temperature for spore germination was 20°C (Fig. 7) and that a minimum period of two hours leaf wetness was required for spore germination on blueberry leaves.

Spore concentrations in the atmosphere are the result of a range of complex and interacting environmental and biological factors. While the air sampling data suggest some correlations, for example the possibility of a greater number of spores released at temperatures between 20 and 30°C, and around April and July, and the release of more spores during the night, sampling over a longer period and/or a greater number of climatic zones is required to establish more definitive correlations between spore concentration in the atmosphere and climatic variables.

The large differences in spore counts between the two periods, where spore counts are relatively low in 2013-14 compared to 2016-17 needs to be investigated further. For example, average daily rain was lower in the 2013-2014 period, compared with the 2016-2017 period. At this stage, it can be assumed that blueberry rust urediniospores can be present all year in the subtropical climate, and that in the evergreen production system susceptible new leaves are produced almost continuously. Spore germination is favoured by temperatures around 20°C, and at least 2 hours of leaf wetness are required for infection. This means, that infection can potentially take place at any time when moisture is available and spores are present on susceptible host tissue.

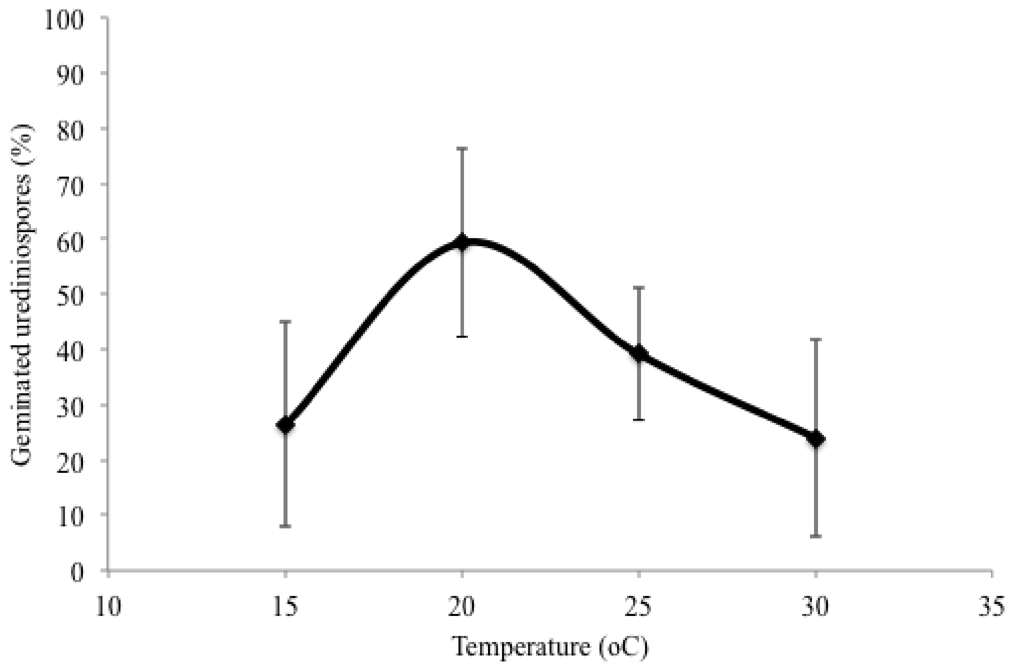

Fig. 7. Effect of temperature on germination of *T. minima* urediniospores. Data presented is the mean of spore counts, and the error bars are ± SEM.

It is clear from other studies that factors affecting the liberation, dispersal and deposition of rust spores vary greatly between rust fungi. Zauza et al. (2015) measured spore concentrations of eucalyptus rust *(P. psidii)* in Eucalypt plantations in Brazil (as well as disease progression) using a Burkhard spore trap, between July 2004 and June 2005. Concentrations of urediniospores were positively correlated with leaf wetness and relative humidity and negatively with rainfall, light intensity, minimum, average and maximum temperatures and wind speed. Spore trapping of urediniospores of *P. psidii* between rose apple (*Syzygium jambos*) trees found the amount of urediniospores in the air and infected young shoots were positively correlated to the number of days with night temperature <20°C or night RH >80%. Monitoring of leaf wetness, and wind speed is something that should be considered in future studies into blueberry rust epidemiology. The number of infected rose apple shoots was positively correlated with the number of days with relative humidity (RH) >80%. These data show that in rose apple and eucalyptus, urediniospores numbers and disease development was favoured by low temperatures (<20°C), high night RH (>80%) and high levels of airborne urediniospores.

Urediniospores of coffee rust (*Hemeleia vastatrix*) rely on water droplets for liberation and dispersal (Nutman et al. 1960). Urediniospores of coffee rust stick to each other and the leaf surface and the water droplets help to dislodge them. Urediniospores of blueberry rust are relatively easily released and can be seen floating in the air when disease pressure is very high. The concentration of urediniospores of *Melampsoridium botulinum*, the cause of birch rust, was not affected by rainfall (Vuroinen and Helander 1995). Wind and water splash are both important for liberation of *Puccinia graminis* urediniospores (Hirst 1961). Smith (1966) subsequently showed that dispersal was positively correlated with light intensity and temperature. Kumar et al (2000) also reported a higher number of urediniospores of *Peridospsora mori*, the cause of mulberry rust, on sunny days. No correlation was found between solar exposure and concentration of *T. minima* urediniospores. Spore trapping of urediniospores of *Puccinia psidii* between rose apple (*Syzygium jambos*) trees found that most spores were released between 10 am and 1 pm, and that spore numbers were positively correlated with the infection of young shoots (Blum and Dianese 2001). Conversely, Zausa et al (2015) reported that 58% of urediniospores of *P. psidii* were trapped at night in a Eucalypt plantation. There is some indication that this may be the case for *T. minima*. Some possible reasons there was little apparent association between spore counts and climatic conditions may relate to other factors outweighing any effect of weather data included in the analysis here, or the mechanism for weather influencing spore count may be more complex, or occur at the microclimate level. The monitoring of disease severity in the crop, and crop growth stage, in addition to spore concentrations and microclimate, would provide valuable additional information about the conditions that are favourable for infection and subsequent development of disease.

Diseases of blueberry

A list of diseases of blueberry that were observed or submitted to the DPI PHDS during the period of the project is presented in Table 7. This type of information is valuable for planning disease management opportunities and for biosecurity.

Table 7. Diseases of blueberry that were submitted to the Plant Health Diagnostic Service, or observed during field visits between 2014 and 2017.

Disease	Pathogen	Organism	Plant host tissue
Botryosphaeria stem blight and canker	*Neofusicoccum* spp., *Lasiodiplodia* spp.	Fungus	Stems, crown
Crown gall	*Agrobacterium* spp.	Bacterium	Crown
Phomopsis	*Phomopsis* sp.	Fungus	Branch
Septoria leaf spot	*Septoria* sp.	Fungus	Leaf
Dieback/decline associated with nematodes	Various nematodes	Nematode	Roots
Dieback	*Phytophthora* sp.	Oomycete	Roots
Botrytis blight and fruit rot	*Botrytis cinerea*	Fungus	Fruit, flowers
Anthracnose	*Colletotrichum simmondsii*	Fungus	Twigs, fruit, flowers
Bacterial wilt	*Ralstonia* sp.	Bacterium	Roots

Evaluation and discussion

The blueberry industry's marketing initiatives have been effective in promoting blueberries as a healthy food to consumers. Growers are aware of the importance of minimizing fungicide use, from marketing, economic and environmental perspectives. Fungicides could be used more efficiently by monitoring conditions that are conducive to disease, by targeting vulnerable periods in the pathogen lifecycle, selecting and rotating fungicides appropriately to target the infection stage if the pathogen, and the physiological stage of the crop (eg. contact and protectant fungicides prior to infection, systemic fungicides when infection has taken place, fungicides with longer withholding requirements in the non-flowering or non-fruiting growth stages) and by adding other agents that may act synergistically with the chemical to improve its efficacy. This project has contributed to improving our understanding of the biology and epidemiology of blueberry rust in the evergreen production system. This will contribute to better targeting fungicide application. Dithianon and copper are available on Minor Use Permits as a result of efficacy trials conducted in this project. By selecting appropriate fungicides, and managing the timing of application, management of blueberry rust can be more targeted.

Epidemiology and biology of *Thekopsora minima*

Urediniospores of *Thekopsora minima* were found to be the principal inoculum that contributes to blueberry rust epidemics in the evergreen system. Urediniospore germination is favoured by at least 2 hours exposure to high relative humidity, and temperatures between 15 and 25^{o}C. Infection requires high humidity. This means that germination and infection are less likely to occur when relative humidity is low, for example when foliage dries quickly, even if temperatures are optimal. Pruning to open the canopy to promote drying of foliage may be something growers consider in the future, particular in areas subject to morning dew. The retention of the fungus in old leaves is likely to be the means by which inoculum is carried between seasons in the evergreen system. Survival in leaves on the orchard floor was significantly reduced after two weeks, and no teliospores have been detected on leaves collected from the field throughout the project. Other spore stages (basidiospores) are unlikely to occur due to the absence of the alternate host, *Tsuga* sp. in the NSW production regions (plantnet.rbgsyd.nsw.gov.au; Sato et al 1993).

Plant disease cycle events are affected by environmental variables that can limit the rate and extent of disease development and therefore, each event is an important quantitative parameter in models of the initiation and progression of disease. Air sampling conducted during this project showed that urediniospores can be present at any time of the year. Analysis of the environmental and spore release data collected have failed to confirm any specific relationships between weather and spore numbers. The area where the spore trap was located experienced close to 100% humidity year round during the sampling periods, and no seasonal rainfall pattern could be detected. Spore counts in the 2016-17 were higher during periods where temperatures ranged between 20 and 30^{o}C. There is some indication from the data that spores may be more numerous at night. There were also significantly more spores counted in the 2016-17 sampling period than in the 2013-14 period. While the 2016-17 period had higher rainfall, data needs to be collected over more years to fully elucidate the environmental variables that accompany and influence the events in the blueberry rust disease cycle. It could be hypothesized that spore release is greater at night, and that infection is favoured by moisture maintained on leaves in the morning. Further sampling, disease assessment and monitoring of microclimate and crop physiology may reveal more details about factors that favour spore release and disease development.

Chemical fungicides

Outcomes from field-based fungicide trials suggest that a range of multisite (FRAC M), Demethylation Inhibitors (DMI; FRAC 7) and Quinone outside Inhibitors (QoI; FRAC 11) fungicides are effective in reducing severity of blueberry rust. A short discussion of fungicide trials conducted between 2014 and 2016 is presented below and details of each trial are presented in Appendix I.

Chemical options for the blueberry industry to consider for use against blueberry rust in the future include tebuconazole, fenbuconazole (Indar™) and azoxystrobin + cyproconazole (Amistar Xtra®) as these were demonstrated to provide effective control of blueberry rust under high disease pressure in the field.

Wettable sulphur was tested in the field and may have potential for use as an alternative chemical in rotation, or for use in the non-production period after pruning, pending further testing. The application of wettable sulphur did not cause phytoxicity or leaf burn, despite high temperatures experienced during the trial. Disease levels during the trial were low and the application of wettable sulphur was not significantly more or less effective in reducing disease than mancozeb. Sulfur may be also considered as an option for disease management in deciduous production systems. Sulfur is recommended against rusts (and other diseases) in other fruit tree crops including almond, prune and peach (ipm.ucanr.edu, Magarey 2009).

Non-chemical fungicides (biologicals and plant defence activators)

The efficacy of a range of plant defence stimulators and biological products was tested against blueberry rust and post-harvest fruit rots. Under prevailing field conditions, none of the products tested provided significantly more or less disease control compared with mancozeb. Disease pressure was generally low in all the trials involving non-chemical fungicides and further testing under greater disease pressure is recommended.

Treatments that warrant further investigation include mixing plant defence activating products such as chitosan with chemical fungicides. The dilution of copper with chitosan may give similar results to using copper on its own, while reducing the amount of copper required. While the trial in which chitosan was mixed with copper was statistically inconclusive due to low disease pressure, the addition of chitosan to commercial fungicides has been demonstrated to be effective against a number of pathogens including trunk diseases caused by *Diplodia seriata* and *Phaeomoniella chlamydospora* in grape (Cobos et al. 2015), late blight of potato caused by *Phytophthora infestans* (Hadwiger et al 2006) and *Ralstonia solonaceaearum* in tomato (Kiirika et al. 2012). Chitosan has also been shown to have a synergistic effect when mixed with commercial fungicides including Delan (dithianon), Switch® and Amistar®, effectively reducing disease caused by *Botrytis cinerea* in grapes (Rahman et al 2014). Chitosan has also been shown to be detrimental to mycelial growth of *Botryosphaeria dothidea* and *Alternaria tenuissima* (Xing et al 2016). The dilution of conventional chemicals with synergistically acting products could significantly reduce fungicides used in commercial production, which potential subsequent benefits including reduced residues in fruit and enhanced post-harvest shelf life.

Fish emulsions and seaweed extracts have been shown to effectively control blueberry rust, Septoria leaf spot and other foliar diseases (Arioli et al 2015; Scherm et al 2011). Results from field trials in this project are not conclusive and further testing is required under greater disease pressure. There are many fish and seaweed products on the market, and a major complication with their use is the inconsistency in their composition.

With an understanding of the mode of action of fungicides, taking crop growth stages into account, and a greater understanding of factors that are conducive to disease development, the timing of fungicide application can be optimised and key stages of the infection and sporulation cycle of *T. minima* in blueberry better targeted to manage the disease.

Recommendations

1. Additional fungicides added to the current list of available permits

Applications should be made to the APVMA for Minor Use Permits for fungicides that have been shown to be effective against blueberry rust to provide growers with a greater number of options to manage the disease. To date, permit MUP have been granted for dithianon and copper. Other fungicides have been shown to be effective against blueberry rust and could be considered by industry to add to the list of chemicals permitted for use against blueberry rust.

Future trials should investigate the use of a bioassay to screen larger numbers of fungicides prior to conducting field tests. Conducting field trials relies heavily on weather conditions being conducive for development of disease and can be costly, and unyielding of results, if sufficient disease does not develop to distinguish between treatments. A bioassay would enable screening of a larger number products under more controlled conditions prior to testing the most effective fungicides in the field.

2. Research the timing of application of fungicides to improve efficiency.

This project has demonstrated that, under low disease pressure, there is no statistical difference in disease severity between plants treated with mancozeb (the current industry standard), water, other products including conventional chemicals (eg. tebuconazole) and biological agents (eg. seaweed extract, fish emulsion or potassium silicate).

Additional field trials to investigate the effect of fungicide application at early flowering to reduce the incidence of post harvest rots caused by Botrytis, Colletotrichum and other fungi such as Alternaria and Pestalotiopsis. Many common post-harvest fungi infect from early flowering and application of control measures at this time has been shown to reduce post-harvest disease development.

3. Combining conventional fungicides with plant defence activators.

In the final field trial conducted at Brooklet, copper hydroxide was mixed with chitosan, reducing the amount of copper required per application. The results were not statistically significant, but disease symptoms were at levels not different to those in plants treated with only copper, warranting further investigation. Excellent disease control has been reported in other studies where conventional chemicals have been mixed with chitosan (Rahman 2013). Benefits of reducing fungicide concentrations include reduced residues in fruit, with flow on effects for marketability and human health as well as reduced side-effects such as pressure on pathogens (including non-target pathogens) to develop resistance and reduced detrimental impacts on soil biota (Bending et al 2007; Yang et al 2011)

4. Develop disease-forecasting models for diseases to improve efficacy and efficiency of fungicide use

The epidemiological and biological data collected in this project will be used to develop a preliminary disease forecasting model. Prediction models can be used to inform more targeted and efficient fungicide application (Avelino et al 2015). A number of industries have sophisticated forecasting systems for management of key diseases. The lack of differences between treatments under low disease pressure, and the unreliability of a calendar spray program when conditions are highly conducive to the development of blueberry rust highlights the limitations associated with a reliance on routine chemical control.

5. Cultural practices to remove retained leaves between seasons or to open the canopy.

In the evergreen system, *T. minima* survives between seasons primarily in and on leaves retained on the plant.

Options such as pruning to remove old and infected leaves, treatment of retained leaves and leaf litter treatments could be explored to reduce the carry-over of inoculum from one season to the next.

6. Canopy architecture: Pruning to open the canopy

Observations indicate that orchards in which plants have less dense canopies also have lower incidence and severity of rust. Similar experiences have been reported in coffee plantations affected by coffee rust (Zambolin et al 2016). It is likely that the canopy density and consequential moisture retention also affect other diseases such as anthracnose (*Colletotrichum* sp.). The slower drying time, and warmer microclimate experienced in the dense canopy is conducive to disease development. In addition, more dense canopies are more likely to intercept rust spores in the air (Avelino et al 2006, 2012).

7. Other diseases

Reports and diagnoses of Botryosphaeria stem blight became increasingly more frequent over the duration of the project, either because of a greater awareness, or because of greater frequency or severity of symptoms. The disease symptoms were most frequently reported between November and April. Research is required to determine the factors conducive to the development of the disease and its management. Botyrosphaeriaceous fungi are typically considered endophytes. The factors that trigger the fungi to become pathogens in blueberry production are not understood. Very limited management options are available for Botryosphaeria stem blight. The primary means of control is to cut out and remove affected plant parts.

The incidence of soil borne diseases may become more common as the blueberry industry expands into areas previously used for other crops. Their occurrence and management in blueberry is also largely unknown in Australia.

Scientific refereed publications

Chapter in a book or Paper in conference proceedings

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Intellectual property/commercialisation

No commercial IP generated

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Appendices

Appendix I. Fungicide trials

- 2014 – Fungicide efficacy trial at Corindi
- 2015 – Fungicide efficacy trial at Lindendale
- 2015 – Biological and fungicide trial for post harvest rots at Brooklet
- 2016 – Timing of fungicide application trial at Lindendale
- 2016 – Efficacy of biologicals and 'softer' chemicals against blueberry rust and post-harvest rots at Brooklet
- 2016 - Efficacy of biologicals and 'softer' chemicals against blueberry rust at Brooklet

Appendix II. Disease assessment scale

Appendix III. Preliminary analysis of factors affecting the presence of spores in the orchard

Appendix IV. Disease information sheets

Appendix I. Fungicide trials

Fungicide trials conducted in 2014

Experiment 1. Efficacy of fungicides against blueberry rust.

Aim: To assess the efficacy of selected fungicides against blueberry rust in the field.

Materials and methods

Trial design

The first fungicide trial was established in Corindi, NSW and ran from March until September 2014. The trial was set up as a randomized complete block design with five replicate blocks and 10 plants assigned to each treatment in each block (Table 1). One plant at each margin between treatments served as a buffer and was not included in the assessments. The blueberry cultivar used was C99-42.

Table 2: Randomisation of treatments into five blocks. Each block consisted of 10 plants, of which one on each end of the treatments served as a buffer plant, and the eight plants in between were assessed for disease symptoms. Shaded boxes indicate treatment blocks in which disease developed in September 2014.

	1	2	3	4	5
1	Tebuconazole	Copper	Silica	Silica	Copper
2	Pristine	Dithianon	Dithianon	Mancozeb	Water
3	Dithianon	Pristine	Metiram	Water	Metiram
4	Mancozeb	Mancozeb	Tebuconazole	Pristine	Mancozeb
5	Water	Tebuconazole	Pristine	Dithianon	Dithianon
6	Silica	Metiram	Copper	Tebuconazole	Tebuconazole
7	Copper	Water	Water	Copper	Silica
8	Metiram	Silica	Mancozeb	Metiram	Pristine

Treatments

Six fungicides and one plant defence activator were selected for field trials based on a review of the literature and consultations with chemical company technical representatives (Table 2). The treatments came from five chemical groups. Fungicides were applied every 10-14 days, depending on weather conditions, from March until 28 June using a backpack sprayer. Agral 600 Spray Adjuvant (10 mL/100L) was used for all fungicides

Disease assessment

Defoliation and incidence of rust pustules were assessed every four weeks until September 2014. On each plot, 15 leaves on each of eight plants were visually assessed on a monthly basis from March 2014 to September 2014. The number of blueberry rust pustules were counted and per cent leaf area affected recorded using a visual score (Table 3).

In September 2014, 12 flowers, green fruit and ripe fruit were collected from the treated plants and incubated at room temperature for 14 days to assess the effect of the fungicide treatments on the development of post-harvest diseases.

Table 2. Fungicides tested in blueberry orchards against rust

Active ingredient(s)	FRAC	Rate	Commercial name	Manufacturer
NA		NA	Water (control)	NA
Mancozeb (420 g/L)*	M3	220 g/L	Penncozeb 420 FC	BASF
Boscalid (252 g/kg) + pyraclostrobin (128 g/kg)	7 & 11	125 g/100L	Pristine®	BASF
Dithianon (700g/kg)	M9	75 g/L	Delan® 700 WG	BASF
Metiram (700 g/kg)	M3	150 g/L	Polyram® DF	BASF (Nufarm)
Copper oxychloride (500 g/L)	M1	100 g/L	Copper 500 WP	BASF
Tebuconazole (430 g/L)	3	2 mL/100L	Folicur 430 SC	Bayer CropScience
Silica	NC	990 mL/100L	AgSil	PQ Australia

*Mancozeb was included as the current industry standard.

Table 3: Score allocation for per cent leaf area affected by blueberry rust

Score	Percent (%)
0	0
1	<5%
2	5-15%
3	15-25%
4	25-50%
5	>50%

Data analysis

The data analysis was most descriptive for the last month (September) when symptoms were observed on the water and silica treated plants. A formal test of proportions using Fisher exact tests was applied to the two diseased treatments.

Results and discussion

Blueberry rust

No blueberry rust symptoms were observed on leaves in any of the fungicide or control treatments during the spraying period from March to June 2014, or in August 2014. A final assessment was made on 23-24 September and blueberry rust was detected on plants in the water (control; all 5 plots affected) and silica treatments (3 of 5 plots affected) (Fig.s 1 and 2).

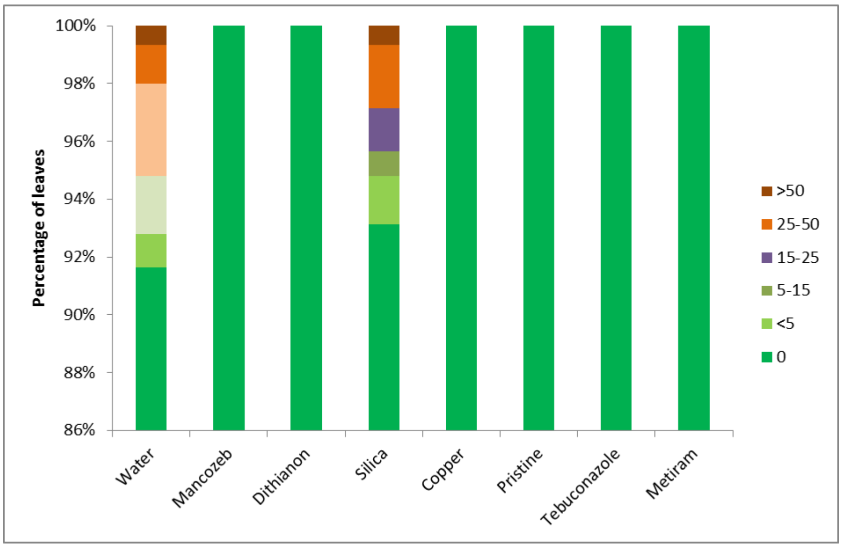

Fig. 1. Number of blueberry rust pustules on blueberry leaves (n=15) sampled in September 2014, two months after the last application of fungicides. Scale: 0=no pustules, 1=<5 pustules, 2=5-15 pustules, 3=15-25 pustules, 4=25-50 pustules, 5=>50 pustules.

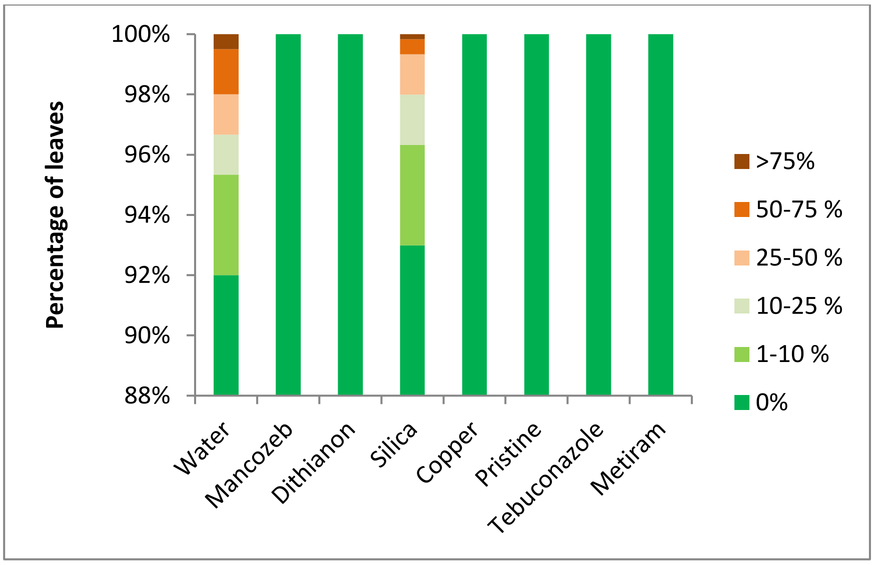

Fig. 2. Mean blueberry leaf area covered by blueberry rust, including pustules and lesion, (n=15) sampled in September 2014, two months after the last application of fungicides. Scale: 0=no pustules, 1=<5 pustules, 2=5-15 pustules, 3=15-25 pustules, 4=25-50 pustules, 5=>50 pustules.

The trial did not provide information about the curative properties of the fungicides tested because disease pressure was too low. Blueberry rust developed on the water (control) and silica treatments three months following the final application of the treatments. Silica is a plant defence activator and it is likely that application needs to be regular and continuous for protection to occur (Dann 2003; Fauteux et al. 2005). No blueberry rust symptoms were observed on blueberry plants treated with the other fungicides within three months of the final fungicide application. These fungicides may provide some protection, either by killing the rust pathogen, or by preventing re-infection from taking place. Mancozeb, metiram, dithianon and chlorothalonil are multi-site broad-spectrum protectant fungicides that act by preventing spore germination. They do not have systemic activity and are not effective once leaves have been infected. Multiple, regular applications are required to maintain effectiveness. It is possible that repeated applications every 14 days prevented any infection from taking place. Tebuconazole is absorbed and translocated upward in the plant, and acts to prevent pustules from forming. It is possible that treatment did prevent disease from developing. However, the lack of symptoms on the untreated control suggests that there were few spores present for infection to occur and develop. Application of tebuconazole, and other Group 3 fungicides should be limited to 2-3 sprays per season according to the label. It must be noted, that given the length of time and frequency of application of the chemicals, the residue of some of the fungicides in plant tissue is likely to be high, and unrealistic for a commercial situation.

While the trial did not elucidate any differences in fungicide efficacy, plotting the disease scores for individual plants the silica and water treatments plots reveals information about the potential spread of blueberry rust from leaves on more heavily infected plants toward neighbouring plants (Fig. 3). For the water treatment, there is moderate disease in blocks 1 to 3, but little in blocks 4 and 5, with only 1 or 2 leaves affected. In block 1 and 3, disease is spread over a number of plants, whereas in block 2, disease is particularly strong in plant 6, where most leaves are diseased. For silica treated plants, only 3 of the 5 plots are affected (blocks 1, 2 and 4). The position of the diseased plots within the experimental design was randomly allocated (Table 2) and although some affected blocks appear to be in close proximity, particularly at the lower left of the design, it cannot be ascertained whether the rust incidence is spatially clustered because of the other treatment effects. The spatial distribution and spread requires further research, but these data supports one hypothesis that the *T. minima* may survive in older, infected leaves between seasons. No disease symptoms were observed on leaves of plants in the other treatments.

The question is: is there sufficient statistical evidence that the concentration of disease in only two of the seven treatments more than just a coincidence?

The experimental unit is the plot. So for water, all 5 plots were affected, for silica only 3 of 5 plots were affected, and for the other treatments 0 of 5 plots were affected. A Fisher exact test can be used to compare the binomial proportions of incidence, as implemented in fisher.test function in the R statistical software. Firstly, a global test of a difference between treatments (Table 4**Error! Reference source not found.**a), then pairwise comparisons (water and silica vs non-affected treatments (Table 4 **Error! Reference source not found.**b and c) and water vs silica (Table 4**Error! Reference source not found.**d). The only significant comparison is water vs the other treatments. All of the fungicides tested resulted in less disease than the water or silica treatments in the September assessment.

Table 4: Tables and p-values for the Fisher exact test applied to a) All treatments (global test) b) Water vs non-affected treatment c) Silica vs non-affected treatment d) Water vs silica. Letters indicating significant differences are shown in the last column in a).

a)

	Dis.	Not D.	
Silica	3	2	ab
Water	5	0	b
Copper	0	5	a
Dithianon	0	5	a
Pristine	0	5	a
Mancozeb	0	5	a
Tebuconazole	0	5	a
Metiram	0	5	a

Fisher test: $P<0.001$ (1E-6)

b)

	Dis.	Not D
Water	5	0
Other	0	5

Fisher test: $P=0.008$

c)

	Dis.	Not D.
Silica	3	2
Other	0	5

Fisher test: $P=0.166$

d)

	Dis.	Not D.
Silica	3	2
Water	5	0

Fisher test: $P=0.444$

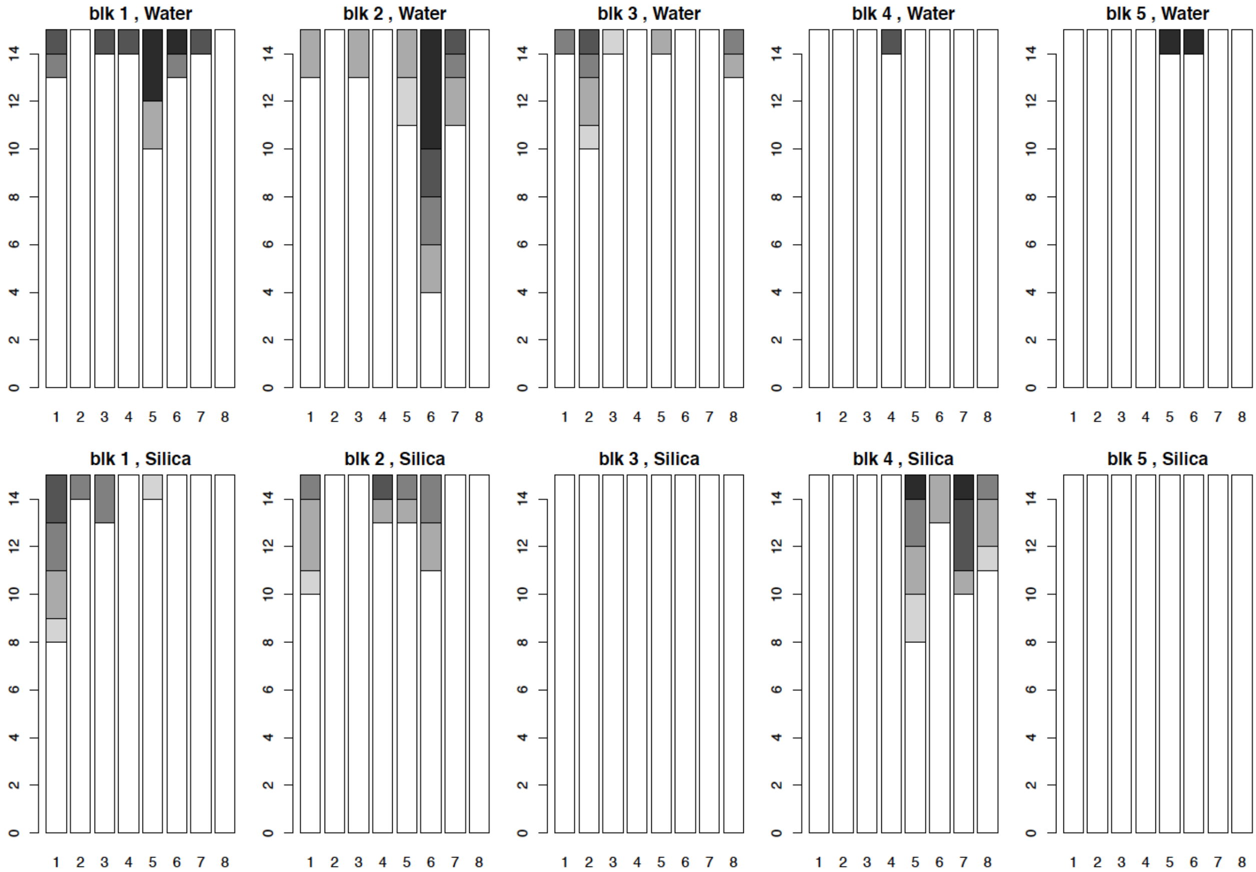

Fig. 3: The plant and leaf number associated with disease for the two treatments, Water and Silica, on which blueberry rust symptoms were recorded in September 2014, 2 months after the last treatment application. Darker cubes indicate more severe disease. In many plots symptoms can be seen to be more severely centred on one or a few plants, and spreading from those to neighbouring plants.

Post-harvest flower and fruit rots

The incidence of Botrytis and postharvest pathogens were very low. Almost all flowers (96.7%) and fruit (99.6%) from the plants in water (control) treated plots were not affected by post harvest rots (Tables 5 and 6). No symptoms developed on green berries, and fungi or bacteria were isolated from green berries. *Botrytis cinerea* and other fungi, including *Penicillium* sp., *Alternaria* sp. and *Pestalotiopsis* sp. were isolated from ripe berries. No *Colletotrichum* species were isolated. The chemicals that were included in the trial were all effective against Botrytis and Colletotrichum, as well as rust. The dry weather experienced during the trial is also likely to have contributed to the low disease levels. The difference between treatments was not significant. Because disease incidence was so low, data from the trial are not sufficient to assess efficacy of the fungicides against post-harvest diseases.

Table 5. Percentage of flowers affected by postharvest pathogens. Flowers were harvested 2 months after the last spray application. 'Other fungi' included *Alternaria* sp., *Pestalotiopsis* sp., and *Penicillium* sp.

Treatment	Uninfected (%)	Botrytis cinerea	Other fungi	Bacteria
Water	96.7	0.4	2.9	0.0
Mancozeb	70.0	0.0	30.0	0.0
Dithianon	93.3	0.8	5.9	0.0
Silica	93.3	0.0	6.7	0.0
Copper	69.6	0.8	29.6	0.0
Pristine	79.6	0.0	20.4	0.0
Tebuconazole	92.9	0.4	6.7	0.0
Metiram	61.3	0.4	38.3	0.0

Table 6. Percentage of ripe berries (n=12) affected by postharvest pathogens. Berries were harvested 2 months after the last spray application. 'Other fungi' included *Alternaria* sp., *Pestalotiopsis* sp., and *Penicillium* sp.

Treatment	Uninfected (%)	*Botrytis cinerea*	Other fungi	Bacteria
Water	99.6	0.0	0.4	0.0
Mancozeb	92.1	0.0	7.5	0.4
Dithianon	99.2	0.0	0.8	0.0
Silica	99.2	0.0	0.8	0.0
Copper	92.5	0.0	7.1	0.4
Pristine	100.0	0.0	0.0	0.0
Tebuconazole	98.3	0.0	1.7	0.0
Metiram	83.8	0.0	15.4	0.8

No phytotoxic symptoms were observed on the plants at the fungicide application rates used in the trial.

Recommendations from this trial

Dithianon, copper and tebuconazole should be tested again under greater disease pressure.

To properly assess Silica as a non-chemical alternative against blueberry rust, it also needs to be tested again under greater disease pressure.

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Fungicide trials conducted in 2015

Experiment 2. Efficacy of fungicides against blueberry rust

Aim: To assess the efficacy of selected fungicides against blueberry rust in the field

Materials and methods:

Trial design

Six fungicides (Azoxystrobin (Amistar), Azoxstrobin+cyproconazole (Amistar Extra), Dithianon, Fenbuconazole, Tebuconazole and Mancozeb) and a water control were evaluated in a field trial for controlling rust in blueberries. The trial was conducted between March and June 2015. The trial was designed as a randomised complete block with five replicate blocks and nine plants assigned to each treatment in each block (Table 1). Fungicides were applied fortnightly in six rounds. Per cent leaf infected was assessed for 20 leaves of each of the 7 interior plants in each plot after the application of fungicide at each round. The blueberry cultivar used was C99-42.

Table 1: Randomisation of treatments into five blocks. Each block consisted of 9 plants, of which one on each end of the treatments served as a buffer plant, and the seven plants in between were assessed for disease symptoms.

	1	2	3	4	5
1	Mancozeb	Amistar	Mancozeb	Dithianon	Fenbuconazole
2	Water	Tebuconazole	Dithianon	Amistar Xtra®	Water
3	Amistar Xtra® (axoxystrobin & cyproconazole)	Fenbuconazole	Tebuconazole	Amistar	Tebuconazole
4	Fenbuconazole	Water	Fenbuconazole	Tebuconazole	Dithianon
5	Amistar (axoxstrobin)	Dithianon	Amistar	Mancozeb	Amistar
6	Dithianon	Mancozeb	Amistar Xtra®	Water	Mancozeb
7	Tebuconazole	Amistar Xtra®	Water	Fenbuconazole	Amistar Xtra®

Treatments

Treatments and rates included in the trial are presented in Table 2. Agral 600 Spray Adjuvant (10 mL/100 L) was used for all fungicides, except for fenbuconazole, where Uptake Spray Oil ® was used as recommended by the manufacturer. Fungicides were applied using a backpack sprayer every 10-14 days, depending on weather conditions, over 12 weeks (ie. six applications).

Table 2. Fungicides and application rates that were evaluated for their efficacy against blueberry rust.

Active ingredient	Trade name	FRAC Code	Formulation[a]	Rate of application (g/100L)
Azoxystrobin	Amistar®	11	250 SC	80 mL
Azoxystrobin + cyproconazole	Amistar extra®	11 & 3	280 SC	65 mL
Dithianon	Delan®	M9	700 WG	50 g
Fenubuconazole	Indar®	3	240 EC	150 mL
Tebuconazole	Folicur®	3	350 SC	175 mL
Mancozeb	Pencozeb®	M3	750 WP	200 g
Water (control)				

[a] Percentage of active ingredient in commercial product formulated as soluble concentrate (SC), water dispersible granules (WG), wettable powder (WP) or emulsifiable concentrate (EC).

Disease assessment

Disease assessments were made every 14 days, alternating with treatment applications. Disease severity was assessed on leaves in the upper, middle and lower part of the canopy. Disease severity assessments were made using a diagrammatic scale based on the percentage leaf area affected by rust pustules (Appendix II). Assessments were made on 20 leaves from seven plants between the two buffer plants in each treatment.

Data analysis

Average per cent leaf infected was calculated at the plot level. Preliminary analysis indicated leaf infected area was much more severe in block 5, likely due to shade and moisture. Therefore it was decided to remove block 5 from the statistical analysis and analyse blocks 1 to 4. Leaf area infected was analysed (on the square root scale for reduced variance heterogeneity) in a linear mixed model consisting of fixed treatment, round and treatment by round effects, and random block, block by round, and plot effects. (Note: Random plot effects achieved a higher log-likelihood than autoregressive order 1 (AR1) correlated errors within each plot.)

Significant treatment and treatment by time interactions were examined using pairwise comparisons between treatments (in the average treatment means across the six rounds) as well as pairwise comparisons between treatments in the changes over the six treatment rounds. Least significant intervals (LSI) of $\pm\sqrt{2}SEM$ are used as error bars for the fitted means (Snee 1981).

All calculations were performed using the R statistical software environment (R Core Team (2014)) and the ASReml-R package (Butler *et al.* 2009) was used to fit the linear mixed model.

Results and discussion

Disease severity was significantly different (p<0.05) between treatments and assessment times for all the treatments, and a there was a significant interaction between treatment and time (Table 1).

Table 1: Preliminary analysis of treatment and round (time) effects on disease severity, and the interaction between treatment and round, using the Wald type F-statistics and their P-values.

	DF	F-stat	P-value
Treatment	6, 18	9.77	<0.001
Round	5, 15	6.51	0.002
Treat. × Round	30, 89	11.82	<0.001

Pairwise comparisons between treatments showed that all treatments were significantly better at reducing disease severity relative to water (control treatment) (Table 2). Disease severity was significantly greater in the water treatment compared with other treatments, and increased significantly over the trial period ($p<0.05$; significant pairwise comparison). Application of fenbuconzale was also more effective than mancozeb at reducing disease severity. Over time, plants treated with azoxystrobin + cyproconazole, azoxystrobin and fenbuconazole ($p = 0.001$) had lower disease ratings than plants treated with mancozeb, and azoxstrobin + cyproconazole was more effective than dithianon. Fig. 2 shows the fitted means over time for each treatment. The significant pairwise comparisons involving water relate to the higher average leaf area affected across the six treatment rounds, and greater increase in leaf area affected across the six rounds, for water compared to the treatments (Table 3). These results indicate that if left untreated, disease builds up over time. The other significant pairwise comparisons, for the treatment by time interaction, relate to the relative reduction in infection over time for some treatments (e.g. Azoxystrobin + cyproconazole and Fenbuconazole) compared to others (e.g. Mancozeb and Dithianon). This suggests that treatment with these fungicides can protect against infection, or reduce infection or inoculum, thereby reducing disease severity.

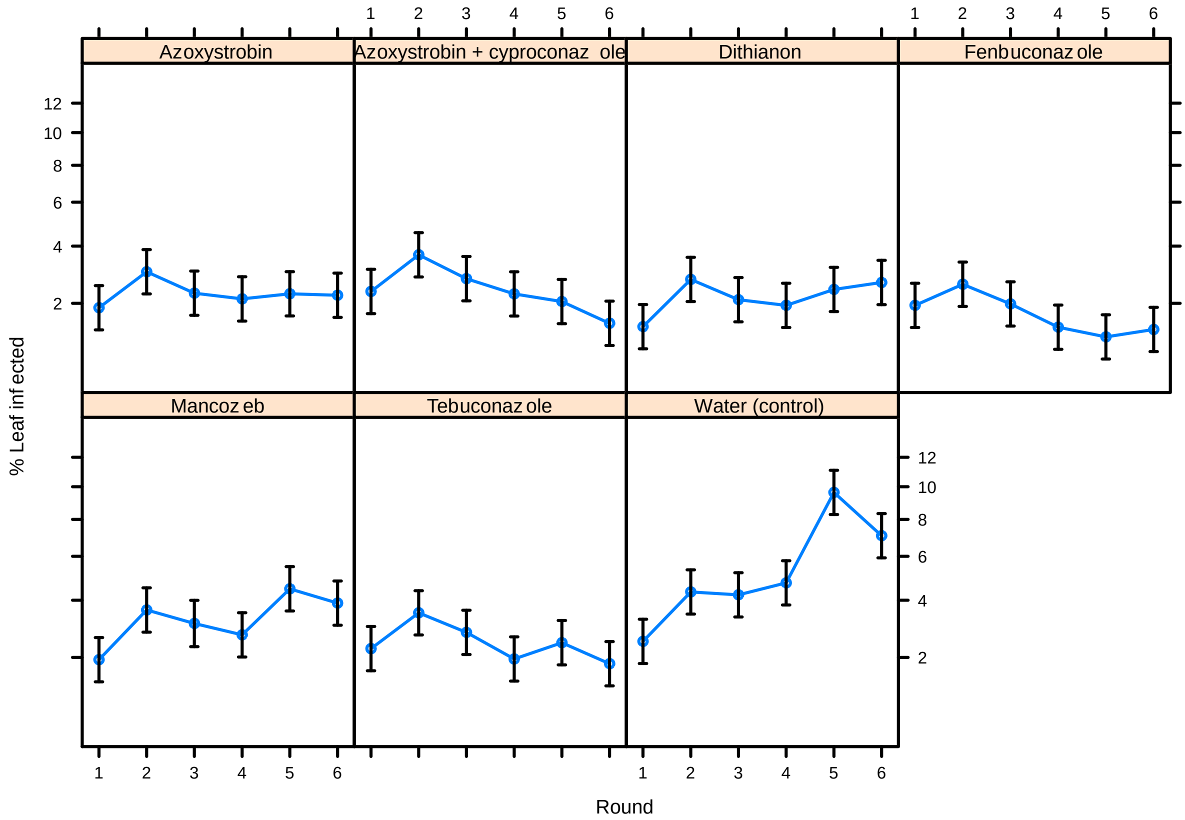

Fig. 2. Percentage of leaf area infected by blueberry rust in blueberry treated every 14 days with azoxystrobin, azoxystrobin + cyproconazole, dithianaon, fenbuconazole, mancozeb, tebuconazle, or water (control). Values are the fitted means of seven replicate plants in 4 replicate blocks. Error bars are $\sqrt{2}$SEM (corresponding to a least significant interval). The y-axis is plotted on the square root scale.

Table 2: Pairwise comparisons between average treatment means (across the 6 application times). All treatments were significantly more effective at reducing per cent leaf area affected by blueberry rust than water. Fenbuconazole also significantly reduced per cent leaf area affected more than mancozeb treatment.

	Azoxystrobin	Azoxystrobin + cyproconazole	Dithianon	Fenbuconazole	Mancozeb	Tebuconazole
Azoxystrobin + cyproconazole	0.843					
Dithianon	0.792	0.645				
Fenbuconazole	0.150	0.105	0.232			
Mancozeb	0.066	0.095	0.039	0.003		
Tebuconazole	0.762	0.917	0.573	0.087	0.116	
Water (control)	<0.001	<0.001	<0.001	<0.001	0.004	<0.001

Table 3: Pairwise comparisons between treatments for the treatment by time interactions. This table shows the relationship between treatments over time and can be used in conjunction with Fig. 2. Over time, treatment with water lead to a significant increase in disease ratings compared with all fungicide treatments. There were also significant treatment x time interactions between Azoxystrobin + cyproconazole, Azoxystrobin and fenbuconazole and mancozeb (the first three fungicides were more effective over time than mancozeb), and Azoxystrobin + cyproconazole and dithianon (Amistar Xtra was more effective than dithianon over the period of the trial).

	Azoxystrobin	Azoxystrobin + cyproconazole	Dithianon	Fenbuconazole	Mancozeb	Tebuconazole
Azoxystrobin + cyproconazole	0.011					
Dithianon	0.325	<0.001				
Fenbuconazole	0.018	0.264	<0.001			
Mancozeb	0.001	<0.001	0.194	<0.001		
Tebuconazole	0.219	0.445	0.001	0.185	<0.001	
Water (control)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Some phytotoxicity symptoms were observed on leaves of plants treated with fenbuconazole.

Results from this trial show that all chemicals tested were active against blueberry rust when compared with water (control) plants. The DMI fungicides fenbuconzaole and tebuconazole, the strobilurin + DMI fungicide azoxystrobin + cyproconazole gave the best control over time. Fenbuconzaole was also more effective in reducing disease severity than mancozeb, the current industry standard for control of blueberry rust.

Chemicals from both the DMI and QoI groups are used to effectively control rust diseases in a range of host plants (Friskop et al. 2015; Honoratio Junior et al. 2015a, b). The QoI fungicides are more effective if applied before infection occurs, or during the early stages of infection. The chemicals are generally absorbed by the cuticle and act as protectants. They are not systemic, and consequently, do not protect new leaves that develop following application. The DMI triazoles vary in their effectiveness. They are generally absorbed and translocated upwards in the plant. They can protect new growth and prevent pustules from forming.

While these chemicals are effective in reducing disease incidence, they must be used according to label, and their use is restricted to three applications per season to avoid the development of resistance in the pathogen. It is highly recommended that chemical groups be rotated to reduce the risk of resistance developing in the pathogen.

Dithianon also gave good reduction in disease severity, particularly early in the trial, and may be considered as an alternative option for rotation with other chemicals. The drop in its effectiveness later in the trial may be attributed to its surface acting properties and its mode of action to prevent spore germination and germ tube growth, rather than containing already existing infections. It is likely that the effectiveness of dithianon declined as the pathogen became well established in the blueberry plants over the course of the trial. Dithianon has been used against prune rust (Kable et al 1987) and is registered in Australia for use against rust in a range of stone fruit. Dithianon has the advantage that it adheres well to the leaf surface and is relatively persistent and rainfast. Dithianon is also reactivated on the plant surface by rain and run off, resulting in a certain level of protection to new growth (agchemaccess.com).

In summary, the results of this trial indicate that DMI, strobilurin and dithianon fungicides are effective in controlling blueberry rust under high disease pressure.

Recommendations

Tebuconazole, fenbuconazole, azoxystrobin + cyproconazole and dithianon should be considered for inclusion into the chemicals made available for use by the industry to manage blueberry rust.

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Experiment 3. Efficacy of biological treatments against post-harvest fruit rots

Aim: to assess the efficacy of selected biological fungicides against Botrytis and Anthracnose post-harvest rots in blueberry

Materials and Methods

Trial design

Four biological (melaleuca extract Ausoil 23 EC, DC-122 Bacillus subtilis strain QST 713) and chemical (captan, mancozeb) fungicides were evaluated for efficacy against postharvest diseases in blueberry in a field trial conducted between June and October 2015. The trial was designed as a randomised complete block with five replicates for each treatment. Nine plants of cultivar 'Misty' were assigned to each treatment in each block, with two plants at the margins between treatments included as buffers and the central seven plants assessed.

Treatments

Treatments and fungicide application rates included in the trial are detailed in Table 1. Rates were based on labels or as recommended by the manufacturer. Agral 600 Spray Adjuvant (10 mL/100L) was used for all treatments. Treatments were applied using a backpack sprayer every 10-14 days, depending on weather conditions. DC-122 was applied every 7 days according to manufacturer's recommendations.

Table 1. Treatments and application rates that were evaluated for their efficacy against botrytis, anthracnose and other post-harvest rots of blueberry.

Active ingredient	Trade name	Formulation[a]	Application rate (/100L)
Bacillus subtilis strain QST 713	DC-122	WP	200 g
Melaleuca extract	Ausoil 23 EC	Liquid	1 L
Captan		900 WG	110 g
Mancozeb	Penncozeb	750 WP	200 g

Flower and fruit set

Prior to spraying, three twigs on three plants were tagged to monitor flower and berry set. The number of flowers and berries on the marked twigs were recorded at the beginning and end of the trial.

Incidence of postharvest fruit rots

At maturity, 18 berries were collected from three plants in each treatment block. Berries were collected from the top (6), middle (6) and bottom (6) of the plants. Berries were incubated in microwell plates at room temperature and assessed daily for 21 days for the development of symptoms and signs of fruit rots due to Botrytis, Colletotrichum, Alternaria, and other pathogens. Affected berries were removed as they were assessed to avoid cross-contamination. Postharvest fungi were subcultured for identification where required.

Data analysis

For the analysis of berries and flower set, data were aggregated to the plot level (as the mean berries/flowers per bud) and analysed as a RCBD in a linear mixed model, with fixed treatment and random block effects.

For the analysis of each disease, the number of diseased berries for each disease was counted for each plot. This was modelled using a quasibinomial distribution (allowing over-dispersion) in a generalized linear mixed model (GLMM), with fixed treatment effects and random block effects. Back-transformed means and lower and upper error bars (mean$\pm\sqrt{2}$SE) are presented.

Additionally, components of variation were examined. For disease data, the presence or absence of disease for each berry was modelled as binomial, in a generalized linear mixed model consisting of fixed treatment effects, and random location, block, location by block, plot, plot by location, plant, plant by location effects. Components of variation (as a percentage of the residual variance) are reported, as well as the residual variance itself.

The R statistical software language (R Core Team (2014)) was used for all calculations, and ASReml-R (Butler et al. (2009) was used to fit the mixed models.

Results and Discussion

Berry and flower set

Treatments did not have a significant effect on the mean number of flowers (p = 0.663) or berries (p=0.608) that set on plants (Fig. 1). The mean number of berries was around 3.5 per bud and the mean number of fruit around 5.5 fruit per twig.

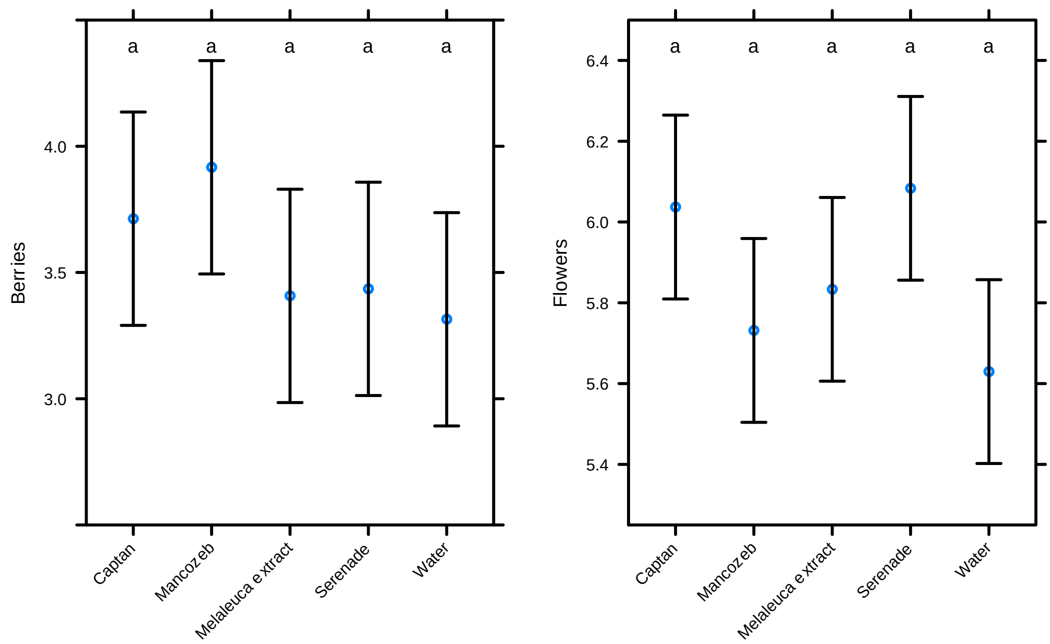


Fig. 1: Mean number of flowers and berries set on twigs for each fungicide treatment. There were no significant differences between treatments (p <0.05). Error bars are SEM.

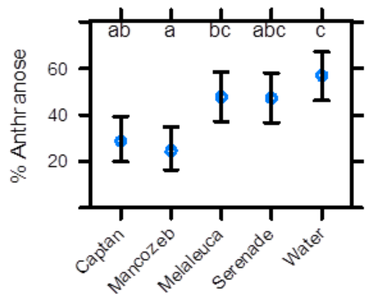
Post harvest disease

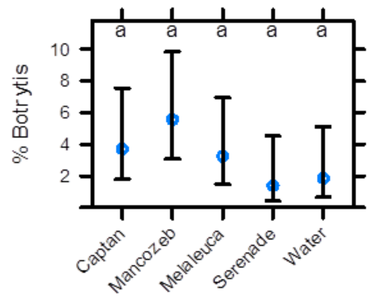
Fungicide treatments had a significant effect on the per cent of berries affected by Anthracnose (Table 2). Other post-harvest diseases were present at low levels and no treatment effects were observed.

Table 2. Wald tests to assess treatment effects for each pathogen/disease.

Pathogen (Disease)	DF	F-stat	P-val
Collectotrichum (Anthracnose)	4,12	3.26	0.050
Botrytis (Grey mould)	4,15	0.810	0.537
Alternaria (Alternaria rot)	4,15	1.03	0.424
Other	4,11.9	1.32	0.316

There was a significantly (P < 0.05) lower incidence of anthracnose in berries sampled from plants treated with mancozeb and captan compared with the control (water) treatment (Fig. 2; Table 3). The incidence of Botrytis (< 6%), Alternaria (< 10%) and 'other' fungi (<15 %) was low making comparisons between treatments difficult.





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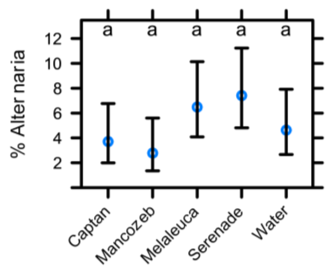

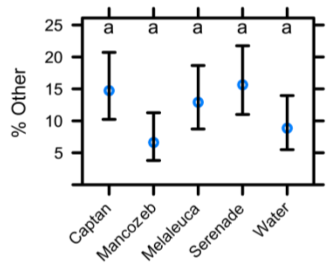

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Fig. 2: Mean per cent of berries affected by (A) anthracnose (*Colletotrichum* sp.), (B) botrytis (*Botrytis cinerea*), (C) alternaria fruit rot (*Alternaria* sp.) and (D) other fungi. Other fungi included Botryosphaeria and Pestalotiopsis. post harvest diseases following fungicide treatments. Data presented is the back transformed mean of the diseased berries in each plot. Lower and upper error bars are mean ±sqrt(2)*SE. Different letters at each column indicate significant differences between treatments (P < 0.05).

Table 4. Means from the disease analyses, as shown in Fig. 2 (with lower and upper limits).

	Anthracnose			Botrytis			Alternaria			Other		
	Mean	Low	Upp	Mean	Low	Upp	Mean	Low	Upp	Mean	Low	Upp
Captan	28.7	20.0	39.3	3.7	1.8	7.5	3.7	2.0	6.8	14.7	10.2	20.7
Mancozeb	24.5	16.4	34.9	5.6	3.1	9.9	2.8	1.4	5.6	6.6	3.8	11.3
Melaleuca	47.7	37.2	58.4	3.2	1.5	6.9	6.5	4.1	10.1	12.9	8.7	18.7
Serenade	47.2	36.7	57.9	1.4	0.4	4.5	7.4	4.8	11.2	15.6	11.0	21.7
Water	57.0	46.1	67.2	1.9	0.7	5.1	4.6	2.7	7.9	8.8	5.5	13.9

This trial demonstrated that mancozeb and captan provided better control of post-harvest anthracnose than the melaleuca extract and DC122 and the water control treatment. No conclusions can be drawn on the effect of the treatments on the other diseases because of the low level of infection.

There was large variation between plants and blocks in the trial. There was a lot of variation in plant vigour at the trial site. It is likely that a site with a more even distribution of healthy plants would provide a more representative outcome. In addition, it is likely that sampling of a greater number of berries per plant will improve the ability to detect differences between treatments.

Recommendations

No recommendations can be made in terms of treatments tested. Disease levels were low and plant health and productivity were inconsistent. In future trials, the trial site should include plants of more even vigour and health and the number of berries sampled should be increased to around 50 or more berries per plant.

References

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Fungicide trials conducted in 2016

Experiment 4. Effect of timing of application of fungicides

Aim: To assess the effect of applying fungicides at two different start times

Materials and methods:

Trial design

Five fungicides, were applied in different series (Table 1) starting at two time intervals four weeks apart to assess the effect of applying fungicides earlier in the season (Fig. 1). The trial was conducted on an orchard in northern, NSW from January to May 2016. The trial was designed as a randomised complete block with four replicate blocks and six plants assigned to each of the 11 treatments in each block. One plant at each margin between treatments acted as a buffer and only the four middle plants were assessed for rust development. The blueberry cultivar used was C99-42.

Table 1. Treatments applied in this trial commenced at different times. The same treatments were applied, the second treatment commencing 4 weeks after the first treatment (highlighted by the dashed boxes). Mancozeb was applied when the orchard returned to standard grower practice.

Treatment #	Weeks 0 & 2	Week 4	Weeks 6 & 8	Weeks 10
1	Chlorothalonil	Pristine	Mancozeb	Mancozeb
2	Chlorothalonil	Fenbuconazole	Mancozeb	Mancozeb
3	Dithianon	Pristine	Mancozeb	Mancozeb
4	Dithianon	Fenbuconazole	Mancozeb	Mancozeb
5	Fenbuconazole	Pristine	Mancozeb	Mancozeb
6	Mancozeb	Chlorothalonil	Pristine	Mancozeb
7	Mancozeb	Chlorothalonil	Fenbuconazole	Mancozeb
8	Mancozeb	Dithianon	Pristine	Mancozeb
9	Mancozeb	Dithianon	Fenbuconazole	Mancozeb
10	Mancozeb	Fenbuconazole	Pristine	Mancozeb
11	Mancozeb	Mancozeb	Mancozeb	Mancozeb

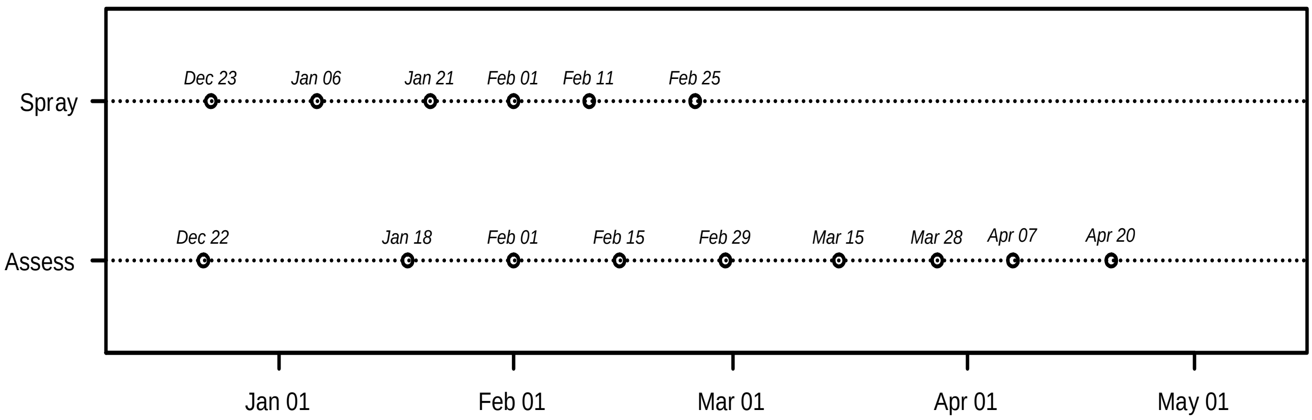

Fig. 1. Schedule of treatment applications and assessment dates.

Treatments

Treatments and application rates included in the trial are presented in Table 2. Mancozeb was included as the control treatment rather than water as it is the standard fungicide used by the industry. The first application of fungicides was made two days after pruning. Agral 600 Spray Adjuvant (10 mL/100 L) was used for all fungicides, except for the application of fenbuconazole, where Uptake Spray Oil® was used as recommended by the manufacturer (500 mL/100L). Fungicides were applied using a backpack sprayer every 10-14 days, depending on weather conditions. Treatments commenced three days after plants had been pruned.

Table 2. Fungicides and application rates evaluated for their efficacy against blueberry rust.

Active ingredient	Trade name	FRAC Code	Formulation[a]	Rate of application (/100L)
Chlorothalonil	Bravo®	M5	720 SC	144 mL
Boscalid+ pyraclostrobin	Pristine®	7 + 11	WP	125 g
Dithianon	Delan®	M9	700 WP	50 g
Fenubuconazole	Indar®	3	240 EC	150 mL
Mancozeb	Pencozeb®	M3	750 WP	200 g

[a] Percentage of active ingredient in commercial product formulated as soluble concentrate (SC), water dispersible granules (WG), wettable powder (WP) or emulsifiable concentrate (EC).

Disease assessment

Disease severity was assessed on leaves in the upper, middle and lower part of the canopy every 14 days, alternating with treatment applications. Disease severity assessments were made using a diagrammatic scale based on the percentage leaf area affected by rust pustules (Appendix II; Table 3). The first assessment was done prior to treatment. After this, spraying was done every 2-3 weeks, followed by assessment (Fig. 1**Error! Reference source not found.**). The assessment times are labelled 0 (pre-treatment) to 7.

Table 3: Visual scoring of disease. Score vs % leaf area affected.

Score	% leaf area affected
0	0
1	1-5
2	6-10
3	11-15
4	16-25
5	26-50
6	51-75
7	75-100

Data analysis

Since the response is ordinal (ordered categorical data) and involves several levels of sampling, statistical methods are not fully developed, and two approaches for analysis were examined. The first approach was the calculation of a mean score, which assumes a linear scale on the scores. The second, fitting an ordinal mixed model, relies on the proportional odds assumption and the use of an approximate estimation procedure.

Treatment effects were broken down into contrasts reflecting the treatment structure, viz.

CvR: Control (mancozeb) vs all other treatments (1 DF)= Treatment 11 vs treatments 1-10

EvL: Early vs late application (1 DF) = treatments 1-5 vs treatments 6-10

Chem: Chemical combination (4 DF)= treatments 1&6 vs 2&7 vs 3&8 vs 4&9 vs 5&10

EvLxChem: Interaction of (2) early vs late with (3) chemical application (4 DF)

Means are presented with error bars as ±0.5LSD.

<u>Mean scores</u>

A mean score (across plants and leaves) was calculated for each plot and time (or equivalently, a sum of scores, assuming the scores were equidistant on an underlying scale). The plot is the experimental unit.

Note that the assessment at time 0 was prior to treatment, and so the mean score at time 0 was used as a covariate. An arcsin transformation (since the mean score was bounded between 0 and 7) was used to reduce variance heterogeneity. A mixed model was fitted comprising fixed effects of initial score (Score at time 0), treatment and time and their interactions, and random effects of replicate, replicate by time and plot (note that this implied “equicorrelation” model from fitting plot effects give a higher log-likelihood than fitting autoregressive order 1 (AR1 errors). Fitting heterogeneous time errors did not converge.). Another model was fitted for just the time points post the full round of treatment (times 4 to 7). Both analyses were conducted using ASReml-R 3.0 (Butler *et al.* (2009)).

<u>Ordinal analysis</u>

The raw data (without T0, or just T4-T7) was fitted using an ordinal mixed model in ASReml 4.1 (Gogel *et al.* (2015)). The ordinal mixed model consisted of fixed treatment and time effects and their interactions, and random replicate, replicate by time, plot, plot by time, plant (within plot) and plant (within plot) by time. This model implied a proportional odds assumption (viz. an underlying latent variable).

Predictions from the model are shown as stacked barcharts, showing the fitted proportions in each class for each treatment (and time).

Results and discussion

Based on the mean scores analysis, there were no significant differences in disease ratings between treatments (Fig. 2). This was consistent over time (Fig. 3).

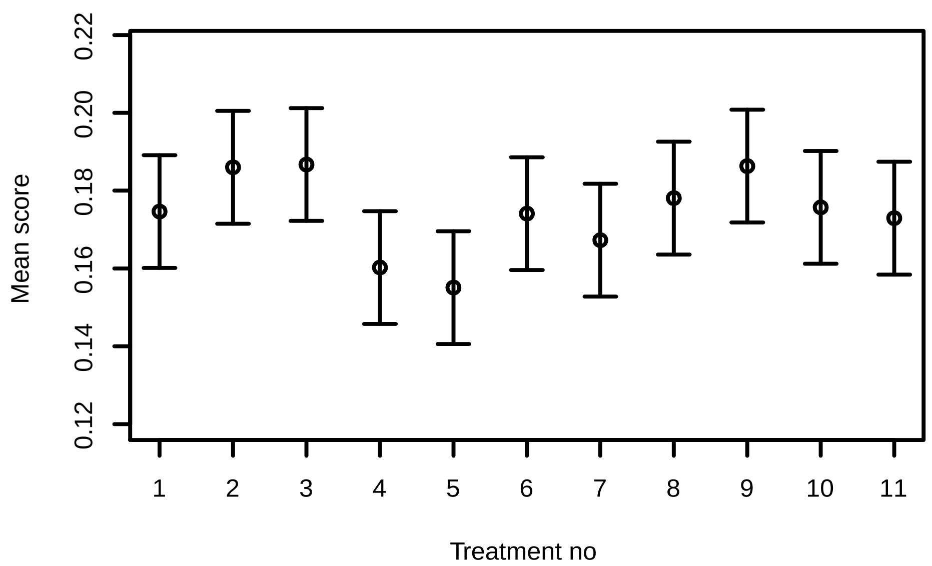

Fig. 2: Treatment effects from mean score analysis (all data). Treatment numbers refer to those listed in Table 1. Error bars are ±0.5 LSD.

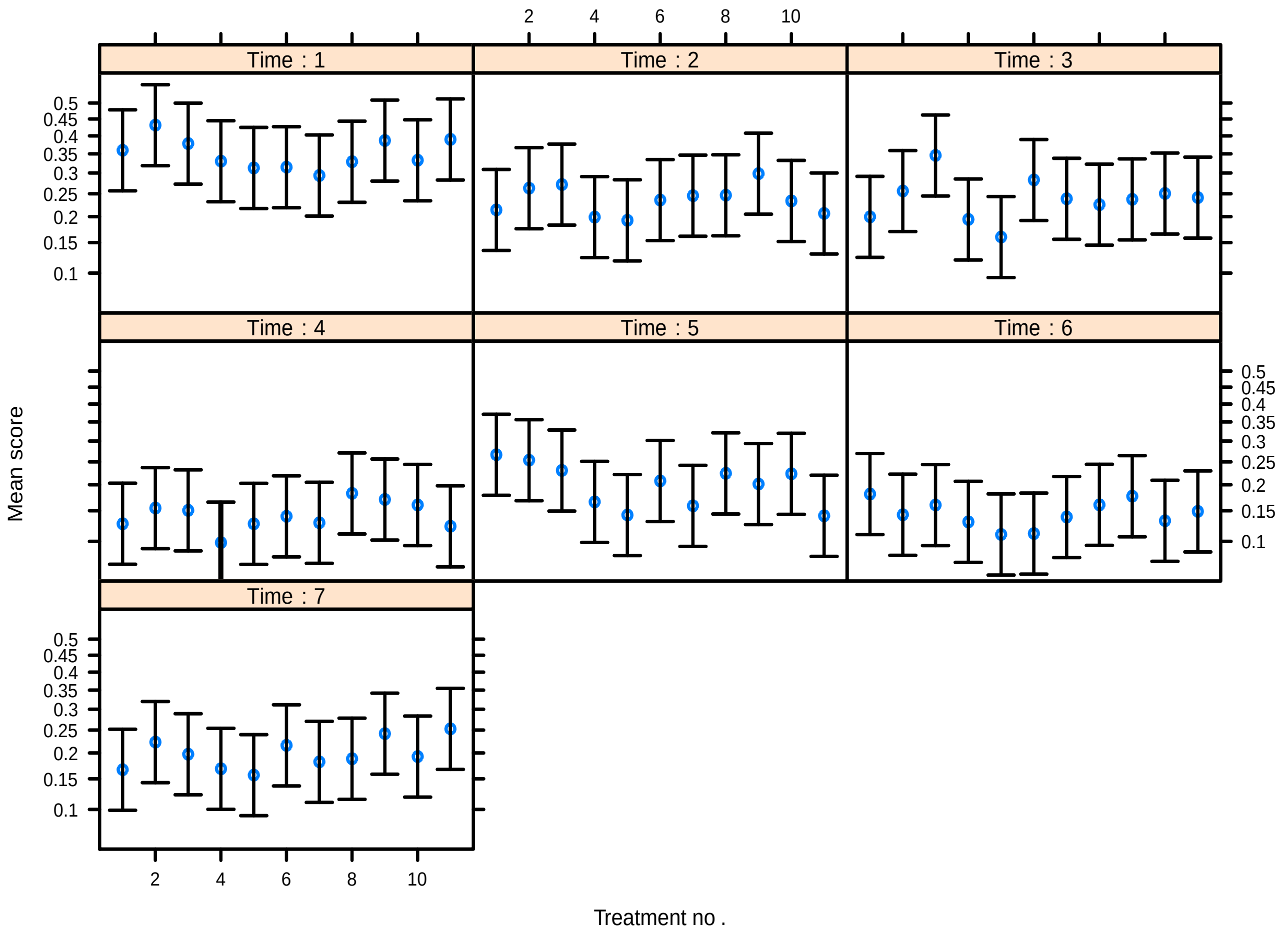

Fig. 3: Treatment (Table 1) by time effects from mean score analysis: all data. Time refers to the assessment time. Error bars are ±0.5 LSD.

Ordinal analysis also showed no significant differences in disease ratings between fungicide treatments and application times. There were large replicate effects and plot and plot, and plant effects, but little interaction between plot or plant and time for the analysis of all data (Table 4**Error! Reference source not found.**).

Table 4. Variance components of the ordinal model a) all timepoints b) last four timepoints.

	All data			Last four timepoints		
Term	DF	Sigma^2	Sig/SE	DF	Sigma^2	Sig/SE
rep	4	0.3071	1.17	4	0.3314	1.12
rep×time	28	0.0509	2.49	16	0.0869	1.86
plot	44	0.0634	2.76	44	0.0481	1.90
plot/plant	176	0.0462	3.94	176	0.0046	0.28
plot×time	308	0.0000	0.00	176	0.0615	3.00
plot/plant×time	1232	0.0000	0.00	704	0.0000	0.00

Levels of rust were low across all treatments tested. By the end of the trial, there was no significant difference in rust severity between treatments, including the control (mancozeb) ($p>0.05$) (Fig. 4). There were also no differences between the early and late application of similar treatment programs.

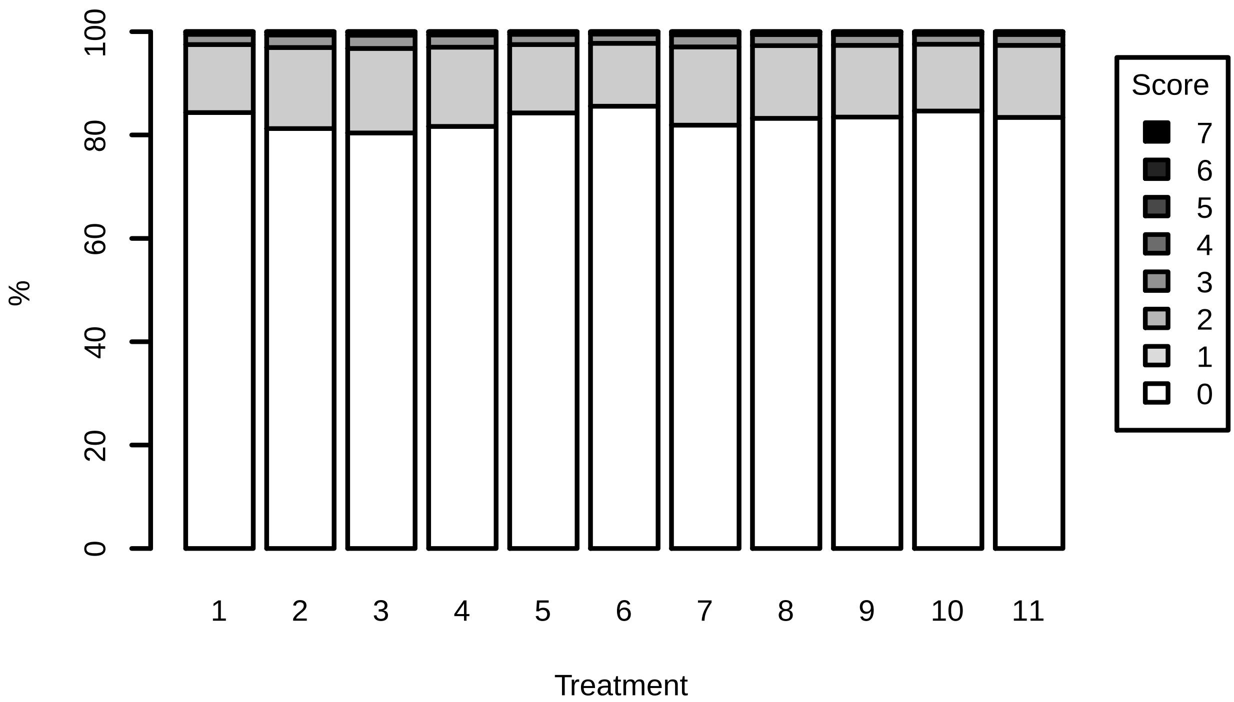

Fig. 4: Fitted proportions in each score class for each treatment from the ordinal analysis (all data) showing no differences in disease ratings between treatments.

Discussion

The incidence of rust was low under all treatment regimes, and did not differ significantly from the mancozeb treatment (control) that was included as the industry standard. A water treatment was not included as a control because of the high losses that can be incurred when no management strategies are in place (eg. Experiment 2 above). This makes it difficult to draw conclusions from the advantage of any of the treatments compared with not spraying early. Furthermore, mancozeb was applied to those plants in Treatments 6-10 that were part of the second application timing. It is likely that mancozeb also provided protection against infection and disease development during this period.

The application of treatments began two days after pruning. This means that any remaining foliage on the plants was treated. No new growth was present at the first treatment. It is possible that the chemicals restricted pathogen development on retained foliage, and on any new foliage that developed after pruning. The results and anecdotal evidence suggest that application of rust treatments soon after pruning to protect new shoots may help to reduce the impact of rust later in the season since rust incidence remained low under the grower's standard practice for eight weeks after the last application of treatments. This is particularly likely to be the case if weather conditions and rust development are monitored, and an appropriate management program is maintained. The literature recommends early application, particularly when conditions are conducive and rain is expected (Honorato Junior et al 2015; Zambolim 2016). Future trials should stagger the application of only one effective chemical at a time to identify the effect of timing of application on disease development, and use water as a control treatment.

Recommendations

Fungicide treatments should be made to protect new shoots as they emerge after pruning, particularly if conditions are favourable for the development of rust.

References

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Honorato Junior J, Zambolim L, Silva Silveira Duarte H, Aucique-Perez1 CE and Avila Rodrigues F (2015a). Effects of epoxiconozale and pyraclostrobin fungicides in the infection process of *Hemileia vastatrix* on coffee leaves as determined by chlorophyll a fluorescence imaging. *Journal of Phytopathology* 163, 968-977.

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Experiment 5. Efficacy of plant activators against Blueberry rust and post-harvest fruit rots

Aim: to assess the efficacy of selected plant activators and fungicides against Blueberry rust and Botrytis and Anthracnose post-harvest rots in blueberry

Materials and Methods

Trial design

Three plant defence activators, one biological and one chemical treatment were evaluated for efficacy against blueberry rust and postharvest diseases in a field trial conducted in northern NSW between January and May 2016. The trial was designed as a randomised complete block with four blocks and five replicate plants assigned to each treatment in each block. Two plants at the margins between treatments were included as buffers and the central three plants assessed. The cultivar used in the trial was OP1 (11-11).

Treatments

Treatments included in the trial are detailed in Table 1. Agral 600 Spray Adjuvant (10 mL/100L) was used for all treatments, except when conditions were wet, in which case Designer® (500 mL/100 L) was used. Treatments were applied using a backpack sprayer every 10-14 days, contingent on weather conditions (Fig. 1). Applications continued until one week before the berries were harvested. The trial site was returned to the grower's standard practice after harvest.

Table 1. Treatments and application rates that were evaluated for their efficacy against botrytis, anthracnose and other post-harvest rots of blueberry.

Active ingredient	Trade name	Formulation[a]	Application rate (/100L)
Bacillus subtilis	DC-122	WP	150 g
Marine proteins	Aminogro	Liquid	500 mL
Chitosan	Taikang	Liquid	166 mL and 333 mL
Potassium silicate	AgSil	Liquid	1000 mL
Copper hydroxide	Kocide 500	500 WP	105 g
Mancozeb	Penncozeb	750 WP	200 g

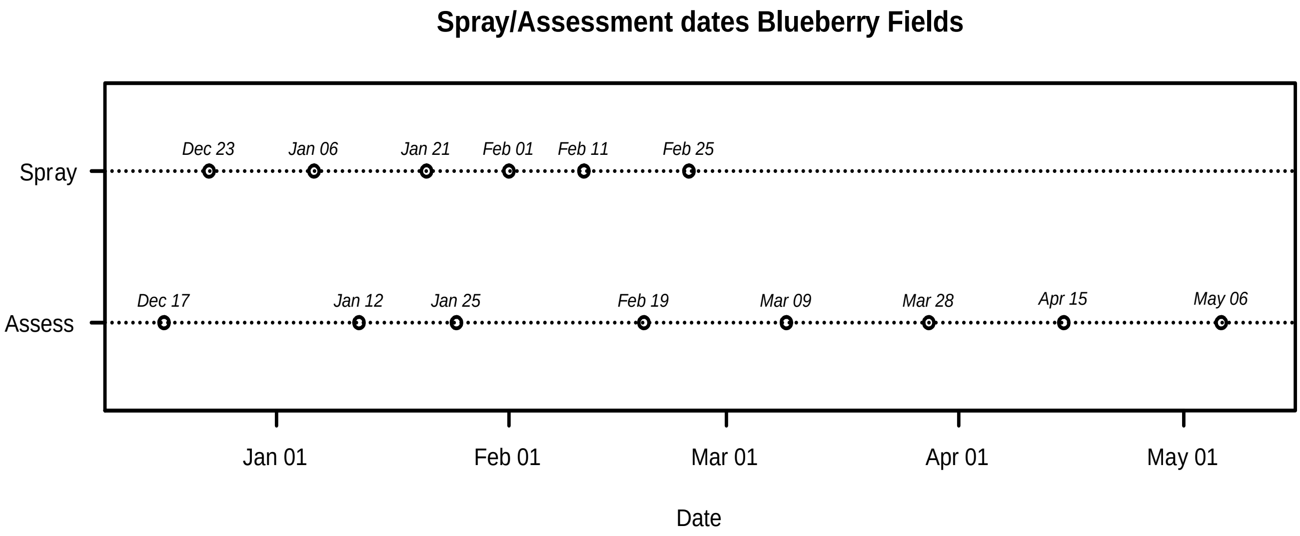

Fig. 1: Treatment and assessment dates.

Disease assessments

Blueberry rust severity was assessed on leaves in the upper, middle and lower part of the canopy every 14-21 days, alternating with treatment applications as described above using the diagrammatic scale (Appendix II). Assessments were made on 20 leaves from the three middle plants in each treatment.

Post-harvest fruit rots were assessed by sampling 30 ripe berries from each plant in May. Berries were collected from the top (6), middle (6) and bottom (6) of the plants and incubated in plastic multi-well plates at room temperature. They were monitored for 21 days and the development of symptoms and signs of botrytis, Colletotrichum and 'other' fruit rots recorded. Affected berries were removed as disease symptoms developed to avoid cross contamination. Post-harvest fungi were identified microscopically.

Data analysis

<u>Blueberry rust assessments</u>

The data was analysed as repeated measures in two different ways: mean scores and ordinal analysis.

Firstly, calculating a mean score for each plot (treatment by replicate) at each timepoint. An arcsin transformation (since the score was bounded between 0 and 7) was applied to reduce variance heterogeneity. A linear mixed model was fitted to this mean score from time 2 on (post-treatment), consisting of fixed effects of initial mean score, treatments, times and their interactions, and random effects of replicate, replicate by time and plot (treatment by replicate). **Error! Reference source not found.** Analyses were conducted using ASReml-R 3.0 (Butler *et al.* (2009)).

The raw data (without T0, or just T4-T7) was fitted as an ordinal model in ASReml 4.1 (Gogel *et al.* (2015)). The ordinal mixed model consisted of fixed treatment and time effects, and random replicate, replicate by time, plot, plot by time, plant (within plot) and plant (within plot) by time. This model implied a proportional odds assumption (viz. an underlying latent variable).

Diseased fruit

The number of diseased fruit (other than healthy) was analysed as a binomial variate in a logistic mixed model, with fixed effect of treatments and random effects of replicate, plot and plant (within plot).

Results and discussion

Blueberry rust

The mean scores for disease ratings for blueberry rust assessments are shown in Fig. 2. There were significant differences between treatments over time (p = 0.005). Mancozeb and copper hydroxide were generally significantly more effective in reducing disease than the other treatments, at the different assessment times.

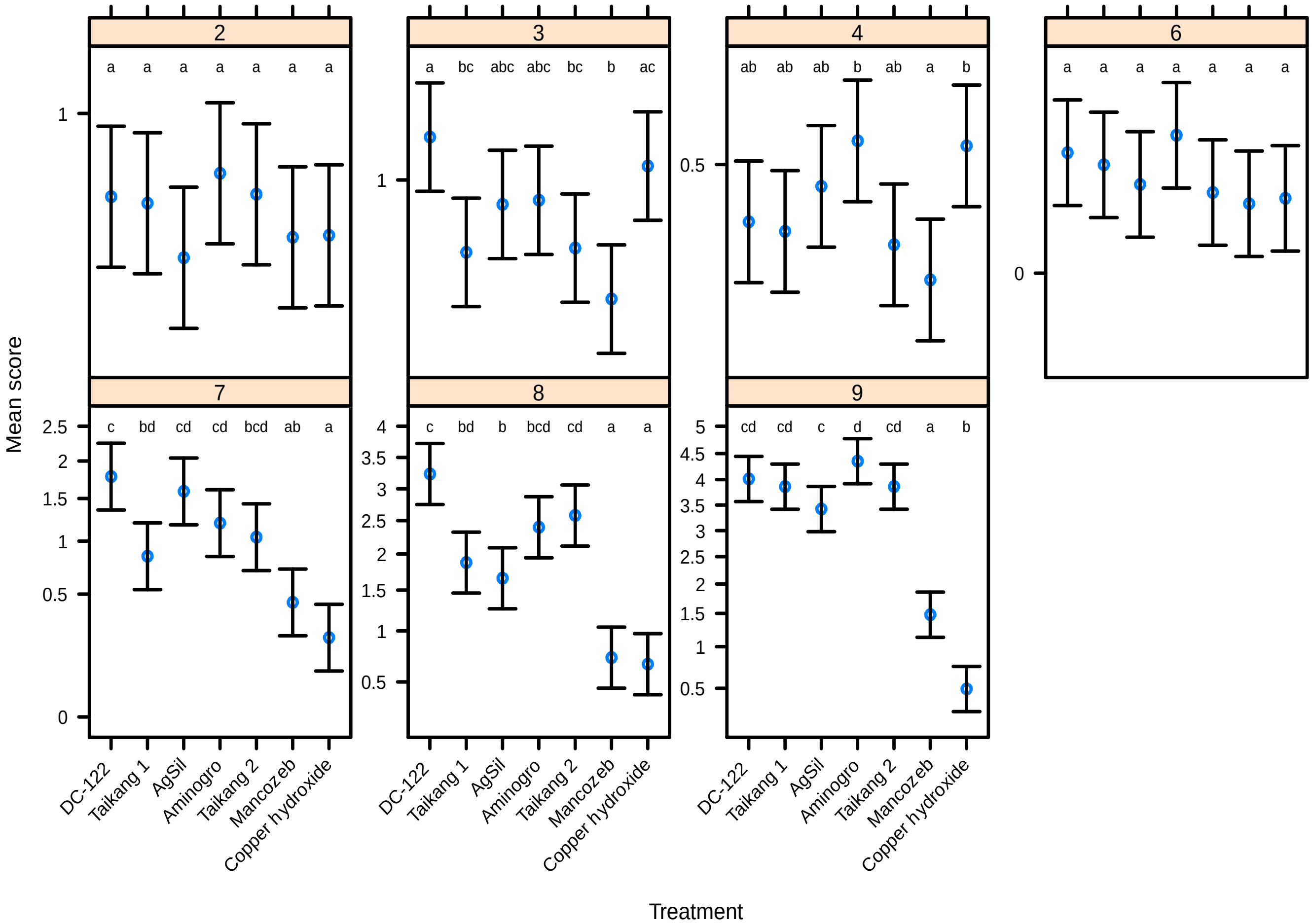

Fig. 4: Mean scores for each treatment at each timepoint. Error bars are ±0.5LSD at that timepoint. Letters indicate significant differences at each timepoint (treatments with no matching letters are significantly different).

Ordinal analysis

Ordinal analysis of the data also showed significant interactions between treatment and time ($p<0.001$; Fig. 5).

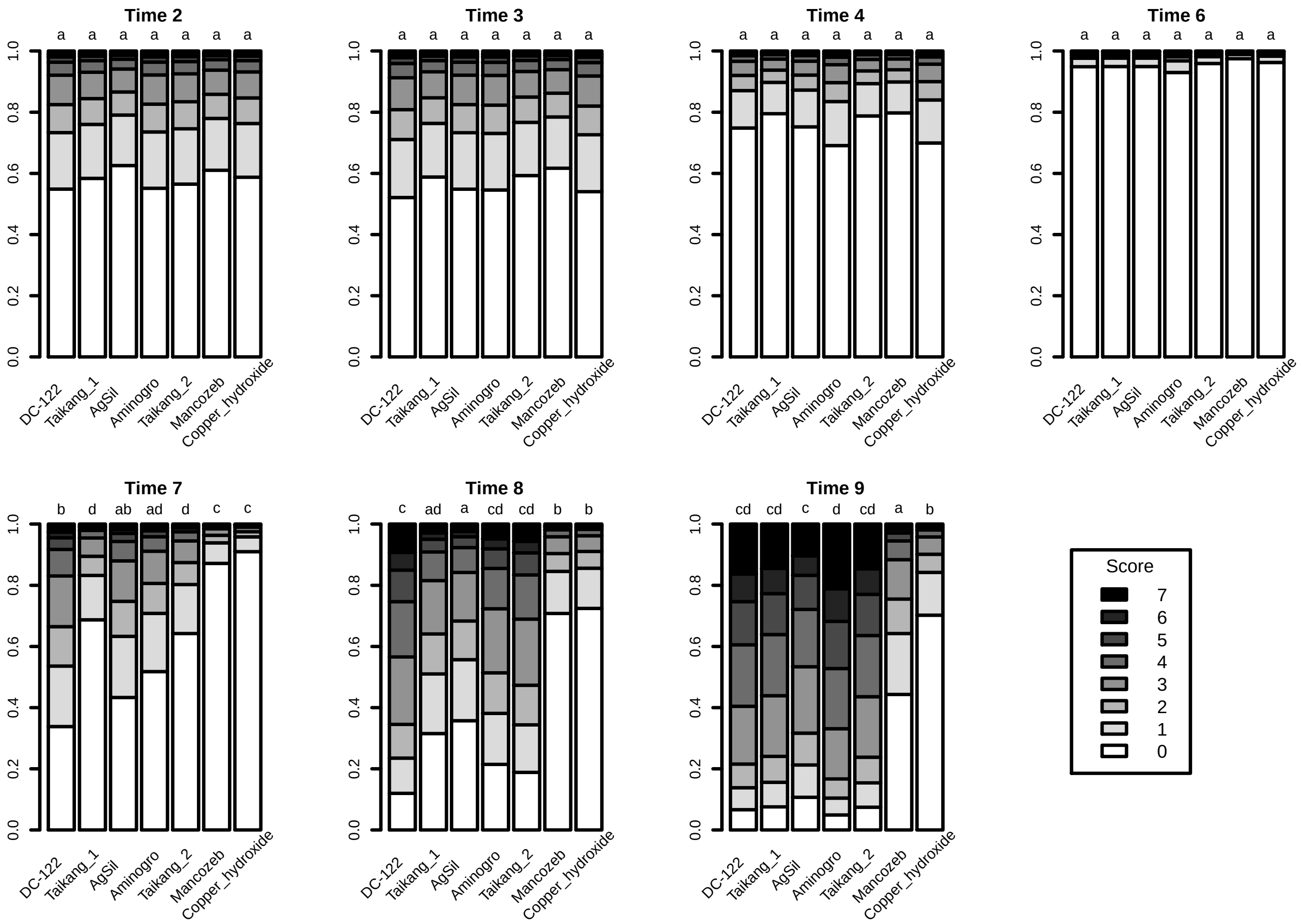

Fig. 5: Mean scores for each treatment at each timepoint. Letters indicate significant differences at each timepoint (treatments with no matching letters are significantly different).

The application of copper alternating with mancozeb application every 14 days, and mancozeb on its own applied every 14 days resulted in the greatest reduction in disease symptoms. The effect of the other treatments was variable throughout the season.

This trial demonstrated that copper alternating with mancozeb was effective at controlling rust, particularly as disease pressure increased during the course of the trial. Of the plant defence activators and biopesticides evaluated, potassium silicate and chitosan were more effective than DC-122 and Aminogro at reducing disease severity, however, the efficacy appeared to vary greatly throughout the trial. Further work to look at rates of application of these products may identify more effective levels of control.

It should be noted that care should be taken when comparing the effectiveness of plant defence activators and fungicides because they work through different mechanisms.

Post-harvest fruit rots

The incidence of post-harvest disease was high within two weeks after incubation. More than 66 % of fruit had developed a post-harvest rot. Application of treatments had a significant effect on the proportion of fruit affected by postharvest diseases (p<0.009). The proportion of fruit in each category ("Colletotrichum","Botrytis","Other","Healthy") is shown in Fig. 6 **Error! Reference source not found.**. It can be seen that of the diseased fruit (non-white columns), most of the fruit are diseased with Colletotrichum (black).

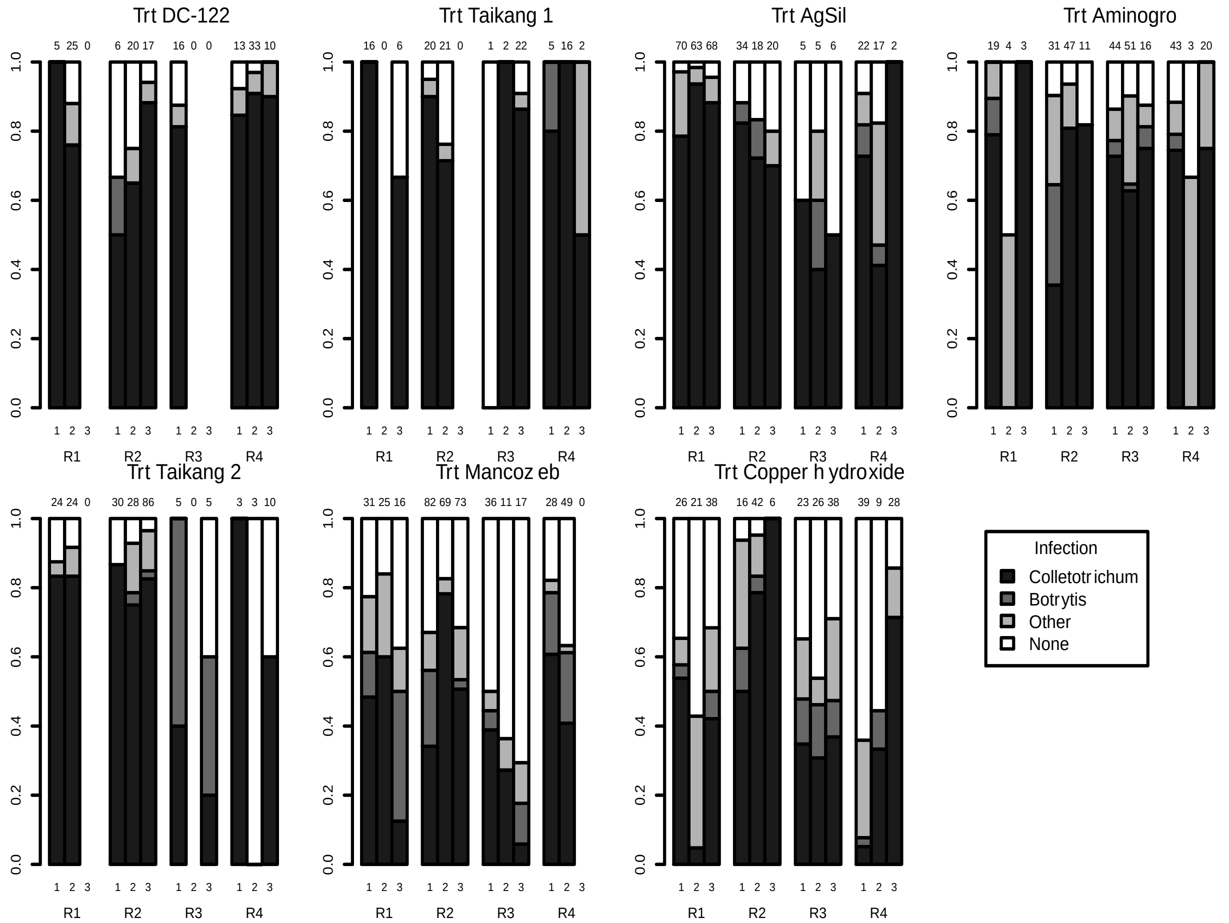

Fig. 6: Proportions of fruit affected by each disease for each treatment, replicate and plant. The number of fruit assessed is shown above each bar.

Copper hydroxide alternating with mancozeb application every 14 days was the most effective treatment in reducing post-harvest Anthracnose in this trial (Fig. 7). The *B. subtilis* product DC-122 was most effective in reducing the incidence of Botrytis, followed by the lower rate of Taikang, potassium silicate and Aminogro™. Of the two chemical treatments, copper hydroxide alternating with mancozeb was more effective than mancozeb alone at reducing Botrytis mould. Copper also protected berries from post-harvest Anthracnose. Botrytis was controlled most effectively by application of DC-122, chitosan, potassium silicate and Aminogro.

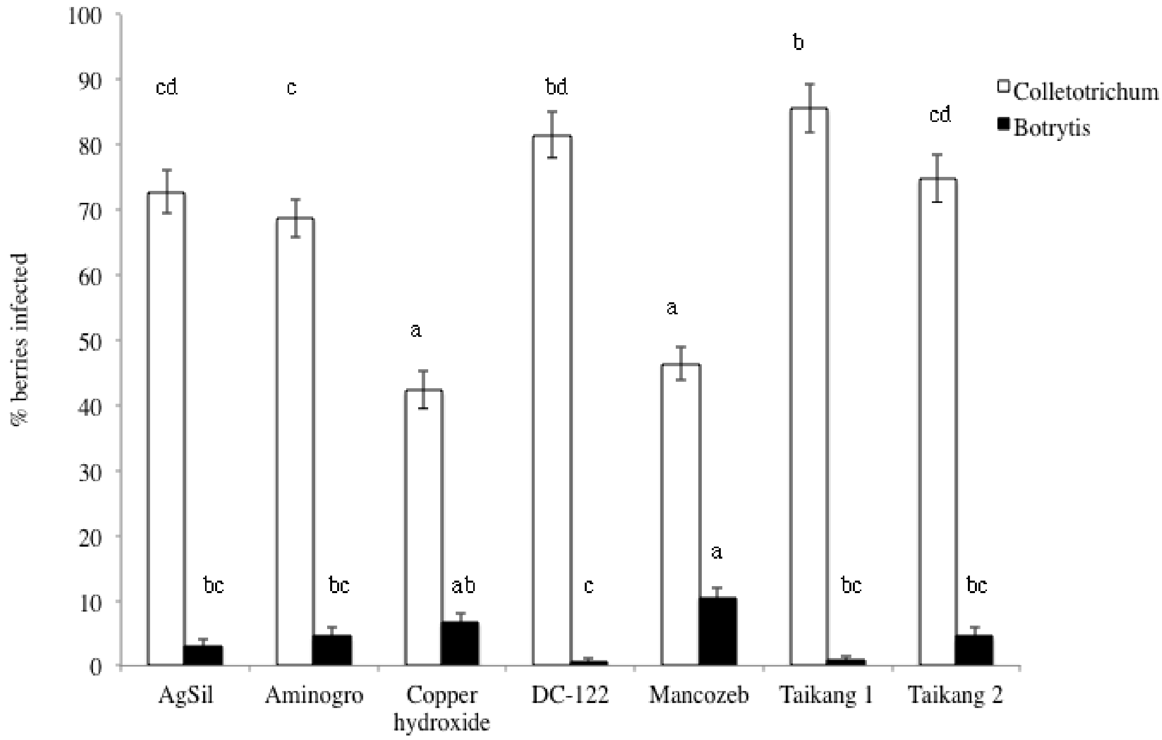

Fig. 7. Proportion of fruit affected by Colletotrichum (Anthracnose) and Botrytis (Grey mould) by treatment (treatments with no matching letters are significantly different; p<0.05). Data presented are the means of per cent berries affected by post-harvest rots. Error bars are ± standard error of the mean. Fruit were assessed up to 21 days after harvest.

Recommendations

Copper should be considered as part of the fungicides made available for management of blueberry rust. This could be expanded to other states. Copper and mancozeb also reduced the proportion of fruit that were affected by Botrytis and Anthracnose. The post-harvest component needs to be repeated before any conclusions can be drawn for use of these treatments against postharvest rots.

Future trials may also consider calcium silicate in place of potassium silicate as it has been shown to be more effective and requires fewer applications.

Statistical Report BB13002 Experiment 6. Efficacy of 'softer' chemicals and biological products against Blueberry rust

Aim: to assess the efficacy of selected 'softer' chemicals and biological products against Blueberry rust

Materials and Methods

Trial design

Three fish and seaweed products, copper and sulphur were evaluated for efficacy against blueberry rust and postharvest diseases in a field trial conducted at Brooklet NSW between October and December 2016. The trial was designed as a randomised complete block with four blocks and five replicate plants assigned to each treatment in each block (Table 1). Two plants at the margins between treatments were included as buffers and the interior three plants assessed. The cultivar used in the trial was OP1 (11-11). Mancozeb was included as the standard industry practice to serve as a control.

Table 1: Randomisation of treatments into four blocks (B1-B4).

B1	Sulphur	B3	Mancozeb
	Copper hydroxide		Seasol
	Seasol		Fish hydrolysate
	Fish emulsion		Copper/chitosan
	Fish hydrolysate		Sulphur
	Mancozeb		Fish emulsion
	Copper/chitosan		Copper hydroxide
	Buffer		
B3	Seasol	B4	Mancozeb
	Copper hydroxide		Fish emulsion
	Copper/chitosan		Fish hydrolysate
	Sulphur		Seasol
	Fish hydrolysate		Copper hydroxide
	Mancozeb		Sulphur
	Fish emulsion		Copper/chitosan

Treatments

Treatments included in the trial are detailed in Table 1. Agral 600 Spray Adjuvant (10 mL/100L) was used for all treatments, except when conditions were wet, in which case Designer® (500 mL/100 L) was used. Treatments were applied using a backpack sprayer every 10-14 days, contingent on weather conditions.

Table 1. Treatments and application rates that were evaluated for their efficacy against botrytis, anthracnose and other post-harvest rots of blueberry.

Active ingredient	Trade name	Formulation[a]	Application rate (/100L)
Fish hydrolysate	Dickers Plant and Soil Booster 100% pure fish	Liquid	666 mL
Fish emulsion	Rutec Neptune Fish	Liquid	7.5 L
Seaweed extract	Seasol	Liquid	7.5 L
Chitosan/copper mix	Taikang™ + Kocide	Liquid	200 mL chitosan + 73 g copper
Wettable sulfur	Barmac Wettable Sulphur	800 WP	200 g
Copper	Kocide	500 WP	105 g
Mancozeb	Penncozeb	750 WP	200 g

Disease assessments

Blueberry rust severity was assessed on leaves in the upper, middle and lower part of the canopy every 14-21 days, alternating with treatment applications as described previously. Assessments were made on 20 leaves from the three interior plants in each treatment.

Data analysis

Two methods of analysis were compared. The first method is to calculate a mean score for each plot (assuming the score is a numeric value). The mean score was fitted as a linear mixed model consisting of fixed treatment, time and treatment by time interactions, and random replicate, replicate by time and plot effects.

The second method is to analyse the data as ordinal data, with fixed effects of treatment, time and treatment by time, and random effects of block, plot and plant (within plot), and their interactions with time.

Analysis was performed using ASReml-R (Butler *et al.* (2009)) within R for the mean scores analysis or standalone ASReml (Gogel *et al.* (2015)) for the ordinal analysis.

Results and Discussion

Based on the mean score analysis there were no significant differences in the severity of blueberry rust between treatments tested ($p=0.259$; Fig. 1) or between assessment dates ($p=0.935$).

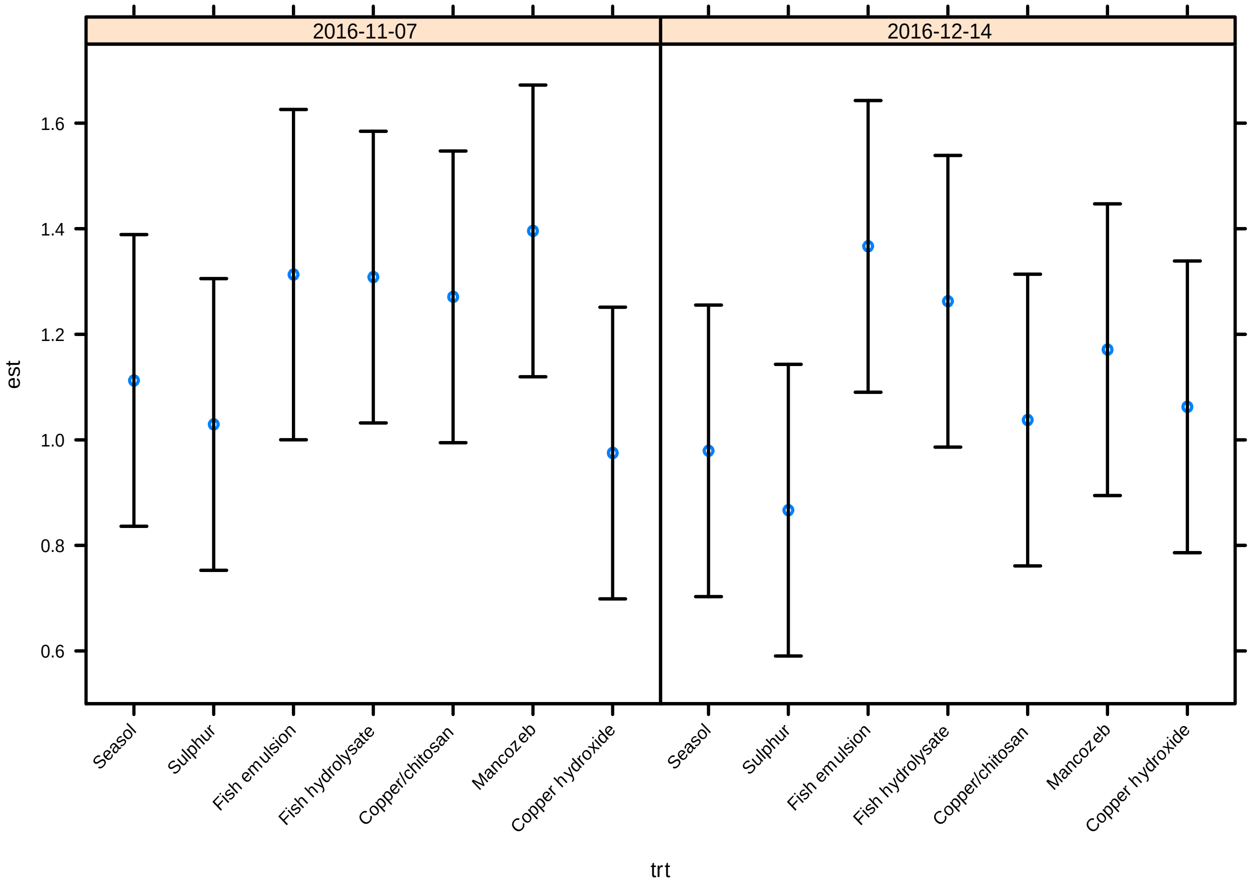

Fig. 1: Treatment mean scores at the beginning and end of the trial. Error bars are SE.

Ordinal analysis also found no significant differences between treatments ($p=0.239$) or assessment dates ($p=0.067$).

The fitted proportions of the disease ratings are presented in Fig. 2.

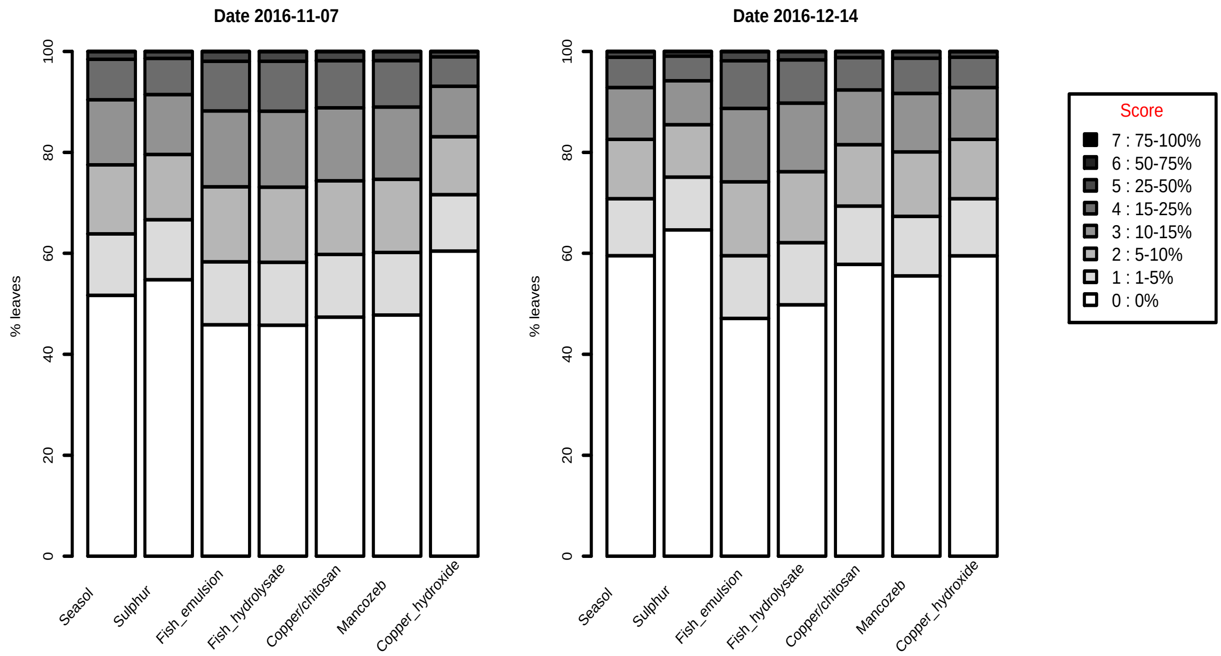

Fig. 2: The fitted proportions in each score category from the ordinal model by date and treatment.

This trial would have benefited from data collection over more dates and a longer time period to provide more data.

While the differences between treatments applied in this trial were not significant, sulphur and Seasol™ warrant further investigation. Fish products have been shown to be effective in reducing blueberry rust and Septoria leaf spot (Scherm et al 2011), however, the composition of these products is highly variable and thus their activity is likely to differ. The lack of differences between treatments observed in this trial may be attributed to prevailing weather conditions not being conducive to the development of higher levels of disease, and the short time period over which the trial was conducted.

Recommendations

Future trials could investigate the application of these products at different times, and under greater disease pressure. Commercial products containing specific compounds or agents isolated from seaweed are also available (eg. Stimplex™) and could be tested against rust, and other blueberry diseases, in the future. Future trials could be conducted under controlled conditions in the greenhouse or in a bioassay system.

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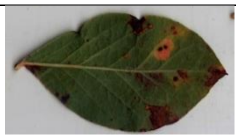
Appendix II. Key for assessing severity of blueberry leaf rust

Disease rating scale based on the per cent leaf area affected by pustules, lesions and chlorosis due to infection by *Thekopsora minima.* Leaf area was calculated using the Image Analysis function of Image J. Examples are given on leaves collected from the field and in shaded images.

Rating	% leaf area affected	Example of leaf	
0	0		
1	1-5		
2	5-10		
			
3	10-15		
4	15-25		
			
5	25-50		

Disease index to assess overall disease severity on plant

Category	Description
1	Minor infection. Lesions small in size and covering less than 10% of the total leaf/shoot area.
2	Minor to moderate infection. Lesions still fairly small. 1-2 leaves/shoots showing less than 25% infection.
3	Moderate infection. Lesions on 25-50% leaves.
4	Moderate-severe infection. Lesions on 50-100% of leaves, new shoots and/or stems.
5	Severe infection. Lesions on 50-100% leaves. Defoliation.

Appendix III. Identification of factors affecting the presence of spores in a blueberry orchard

Presented here is an analysis of blueberry rust spore counts resulting from air samples collected in a commercial orchard from September 2013 – December 2014, and from January 2016 to March 2017. Alternative modelling approaches are being explored and any new information will be included in the variation report in May 2018. Presented here are the findings of the spore sampling, and a comparison with rusts of other woody hosts from the literature.

Aim: To determine the occurrence and factors affecting the presence of blueberry rust urediniospores in a blueberry orchard.

Specific aims were to determine if:

1. there any correlation between the number of spores and
   (a) temperature
   (b) relative humidity
   (c) dew point
   (d) solar exposure (from BOM)
   (e) rainfall in the last 14 days and 24 hours
2. there is a most common time of spore release during a 24 hour period using the 2016-2017 data?

Methods

Spore trapping

Spore sampling was conducted from September 2013 - Dec 2014 and Jan 2016 - March 2017 using a Seven-day recording volumetric spore trap (Burkard Manufacturing Co., UK) placed in a commercial orchard at Corindi, NSW. The volumetric spore trap sampled onto Melinex tape coated with silicon grease. The number of spores deposited on the tape was counted under a microscope. Urediniospores of *T. minima* were identified based on morphology. The number of spores on each slide was converted to spores per cubic meter (Lacey and West 2006). In the 2016-2017 sampling, spores were counts were separated into 2 hourly blocks. In March 2017 the trap broke and collection of samples was terminated.

Weather data

Temperature and rainfall data was obtained from the Bureau of Meteorology (bom.gov.au; Corindi and Woolgoolga weather stations) and from the grower's onsite data loggers.

Data analysis

The analyses here are largely descriptive – to see if there is any evidence of relationships between spore data and weather data that could be further explored using formal statistical analysis.

The results here are divided into three sections – (1) descriptive analysis of each of the data items in turn on a daily basis, followed by (2) relationships of daily spores with each of the climatic variables, and then (3) within day spore counts.

(1) For the descriptive analysis, each climatic variable and spore counts is plotted daily over time for each period. For responses measured at 15 or 10 min intervals, such as RH% and dewpoint, the daily minimum, mean and maximum values were plotted. For spore counts and rainfall, a squareroot transformation (squareroot axis) was used to reduce some of the skewness (i.e. isolated large values) and improve the readability of the graph (i.e. reduce the dominance of large values). For responses measured in both periods, the x-axis is aligned to visually compare seasonal patterns between periods (i.e. for 2013-14, the x-limits are 2013-08-25 to 2015-04-01 and for 2016-17, the x-limits are 2015-08-25 to 2017-04-01).

(2) For the relationships to daily spores, daily spore counts were plotted as time series above each daily climatic variable, as well as direct scatter plotting. For the latter scatter plots of daily spore counts versus daily climatic variable, a Spearman correlation is shown as a summary measure of any apparent monotonic association (linear or otherwise) visible in the plot. It is very important to note, in the interpretation of these scatterplots or associated correlation coefficients, that no allowance is made for the time series nature of each variable, in particular the strong seasonality of most climatic variables – so caution should be exercised. No statistical significance (p-value) is reported against the correlation for this reason.

Results

Descriptive analysis of each of the data items in turn on a daily basis

<u>Temperature</u>

Two sets of temperatures were available, from the farm itself in 2016-17 (at 15 min intervals) and from the BOM records at the nearby Corindi weather station for both periods (daily minimum and maximum values).

The temperature data was available at 15 minute intervals, from which daily mean, minimum and maximum temperatures were calculated and shown in Fig. 1. Note that these mean, minimum and maximum temperatures closely track one another over time, as expected. Daily minimum and maximum temperatures available from the Corindi BOM weather station show very similar trends to those for the farm (Fig. 2).

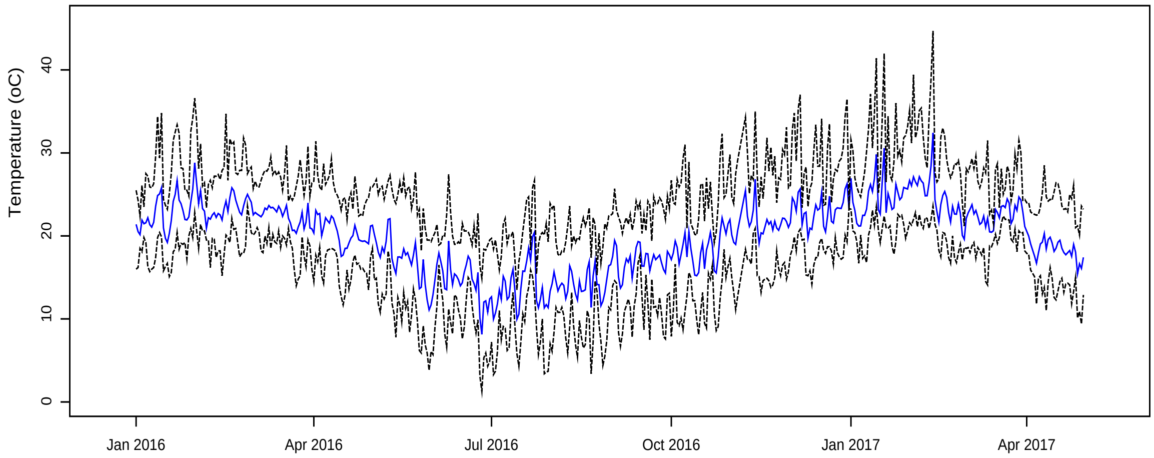


Fig. 1. Daily temperatures in 2016-17 period from the farm data. The blue line is the mean, with dotted black lines for minimum and maximum temperatures.

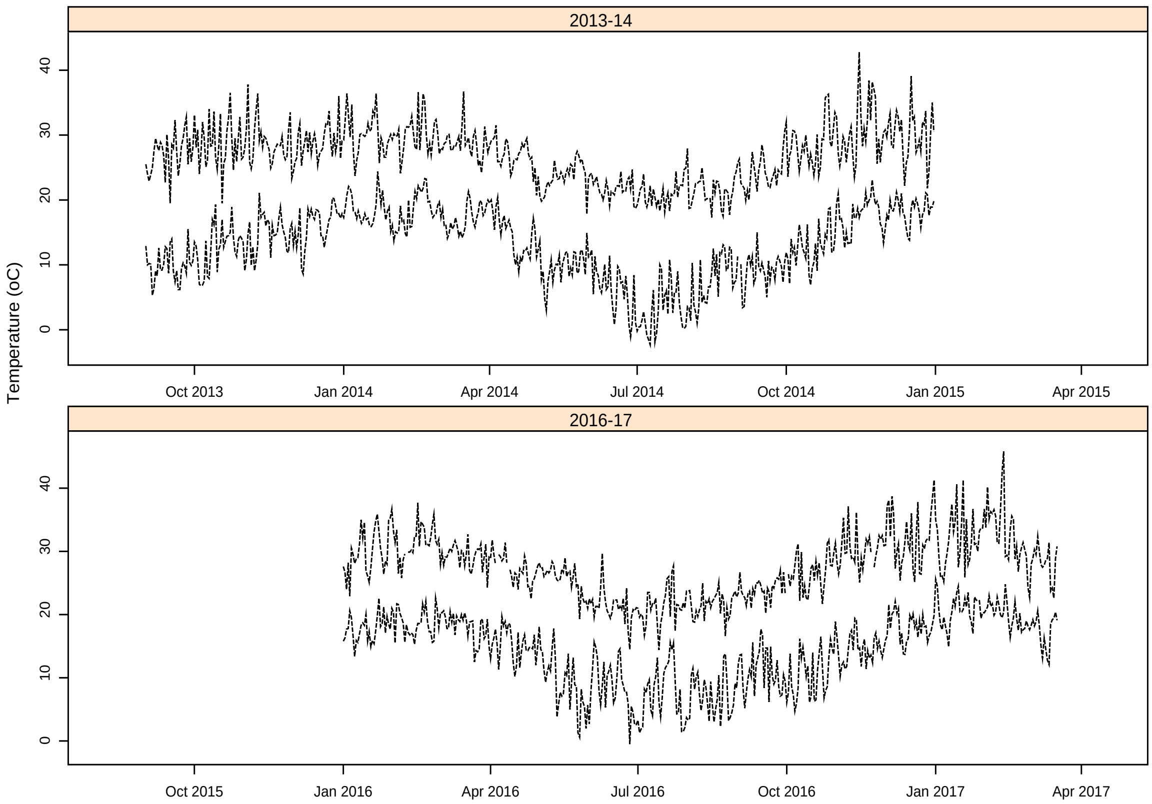


Fig. 2. Daily minimum and maximum temperatures from BOM data in each period. The blue line is the mean, with dotted black lines for minimum and maximum temperatures.

<u>Relative humidity</u>

Relatively humidity (RH%) was captured at 10 minute intervals on the farm in both periods. Daily mean, minimum and maximum RH% is shown in Fig. 3. Unlike other climatic variables, there is little evidence of seasonal patterns. Note that there is little variation in maximum RH% – it is normally close to 100%. Minimum RH% appears to closely follow mean RH%. Therefore, mean RH% may be adequate for comparing against spore counts in the next section.

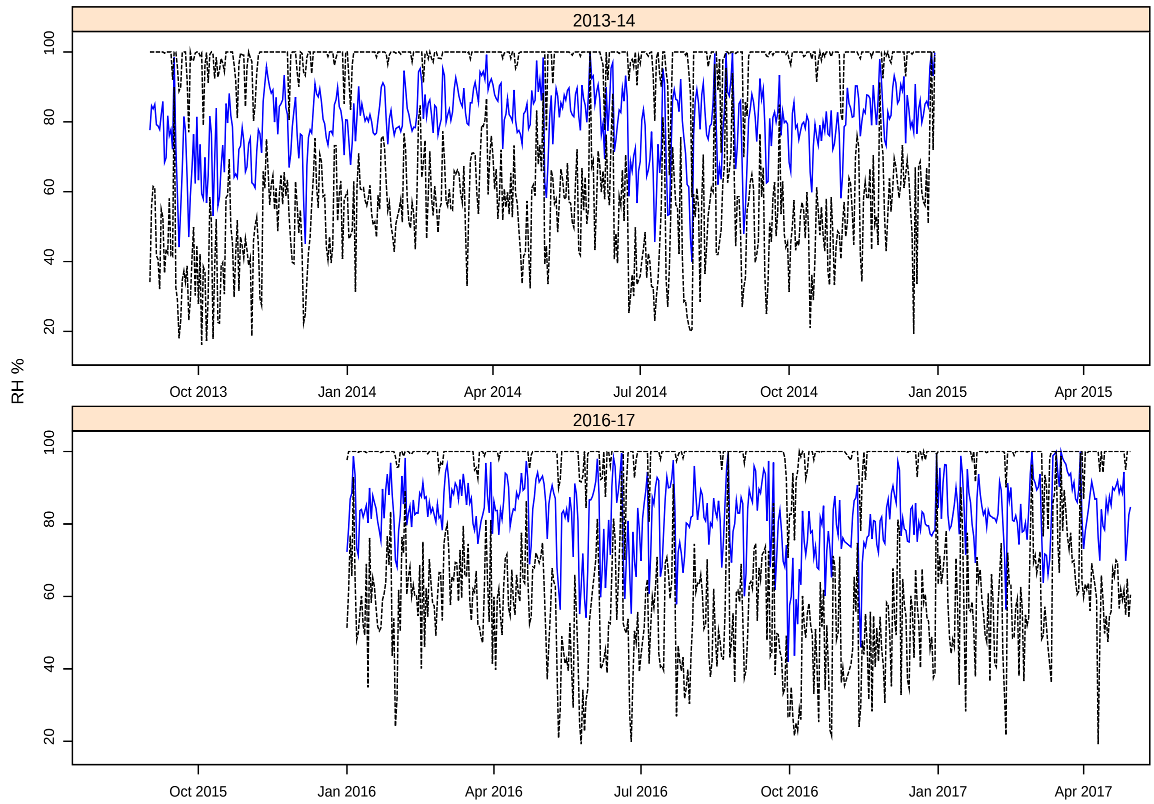


Fig. 3. Daily RH% in each period (2013-14 and 2016-17). The blue line is the mean, with dotted black lines for minimum and maximum.

Dew point

Dewpoint is the atmospheric temperature below which water droplets begin to condense and dew can form. Dewpoint was collected in 15 minute intervals in 2016, from which the mean, minimum and maximum were calculated (Fig. 4). Dew point showed an obvious seasonal pattern. Note that mean, minimum and maximum dewpoint followed each other closely over time.

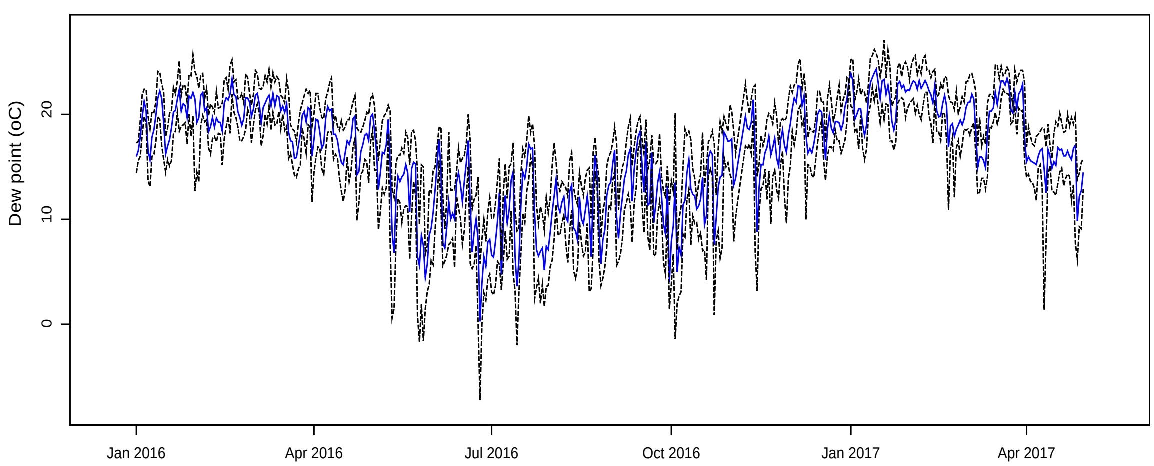


Fig. 4. Dewpoint in 2016-17 period. Blue line is the mean dewpoint, with dotted black lines for minimum and maximum dewpoints.

Solar exposure (from BOM)

Solar exposure was available on a daily basis from the BOM weather station at Corindi. Similar to dewpoint, a very strong seasonal variation is present in the maximum obtained solar count during the year, following a sinosoidal pattern over the year (Fig. 5). However, despite this overall seasonal trend in the maximum solar exposure, there is still strong day to day variation in the minimum solar exposures, suggesting some promise of a link with variation in daily spore counts.

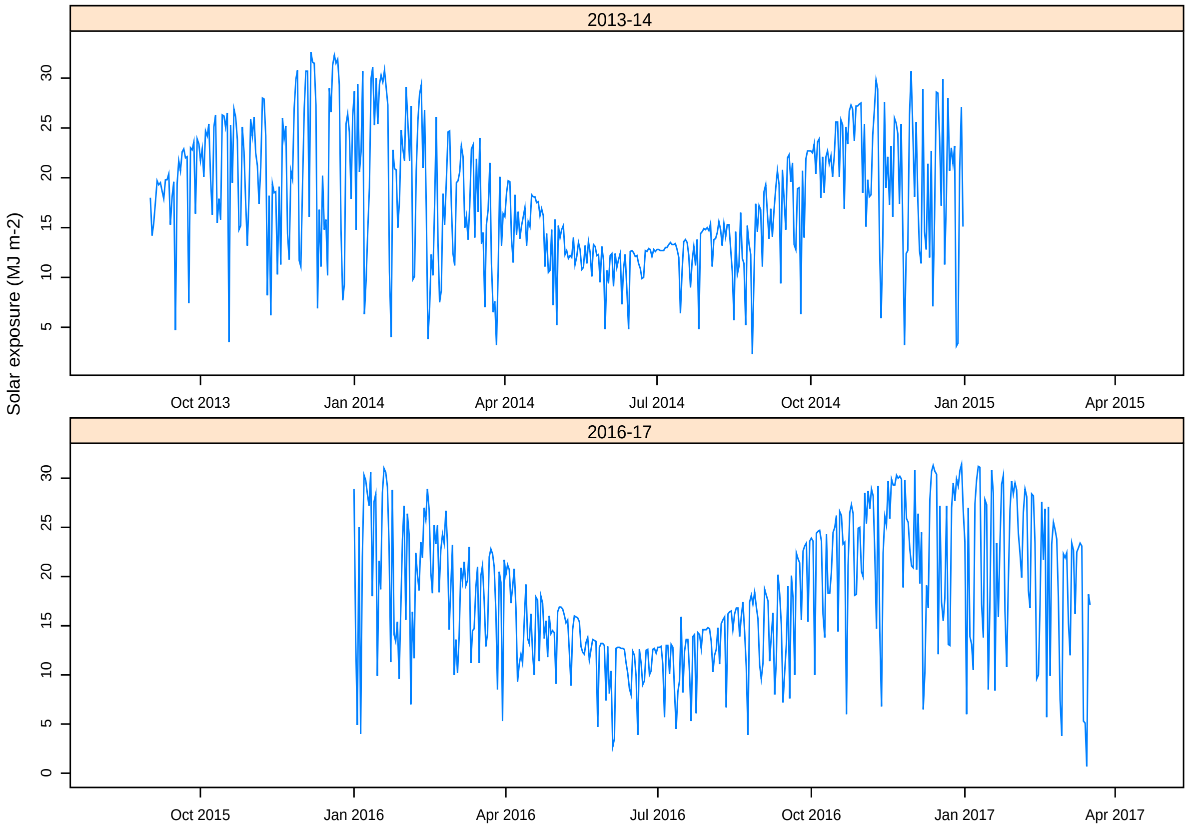


Fig. 5. Solar exposure in each period (2013-14 and 2016-17) Data from bom.gov.au.

Rainfall

Daily rainfall was available from both the farm and the nearby BOM weather station. Daily rainfall on the farm is shown for each period in Fig. 6. There is no pronounced seasonal pattern for either period. As expected, the daily rainfall available from the nearby BOM weather station largely followed the pattern on the farm (Fig. 7).

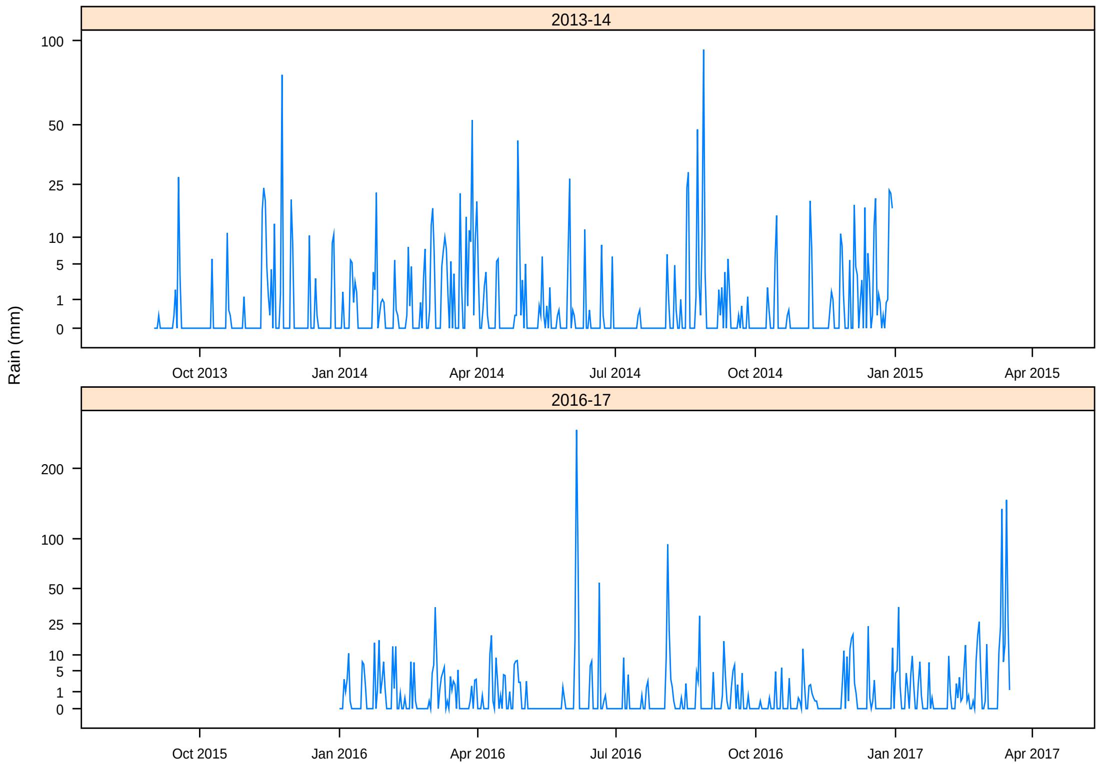


Fig. 6: Daily rainfall in each period (2013-14 and 2016-17). Note that a square root scale is used on the y-axis, and the y-limits for each period are different.

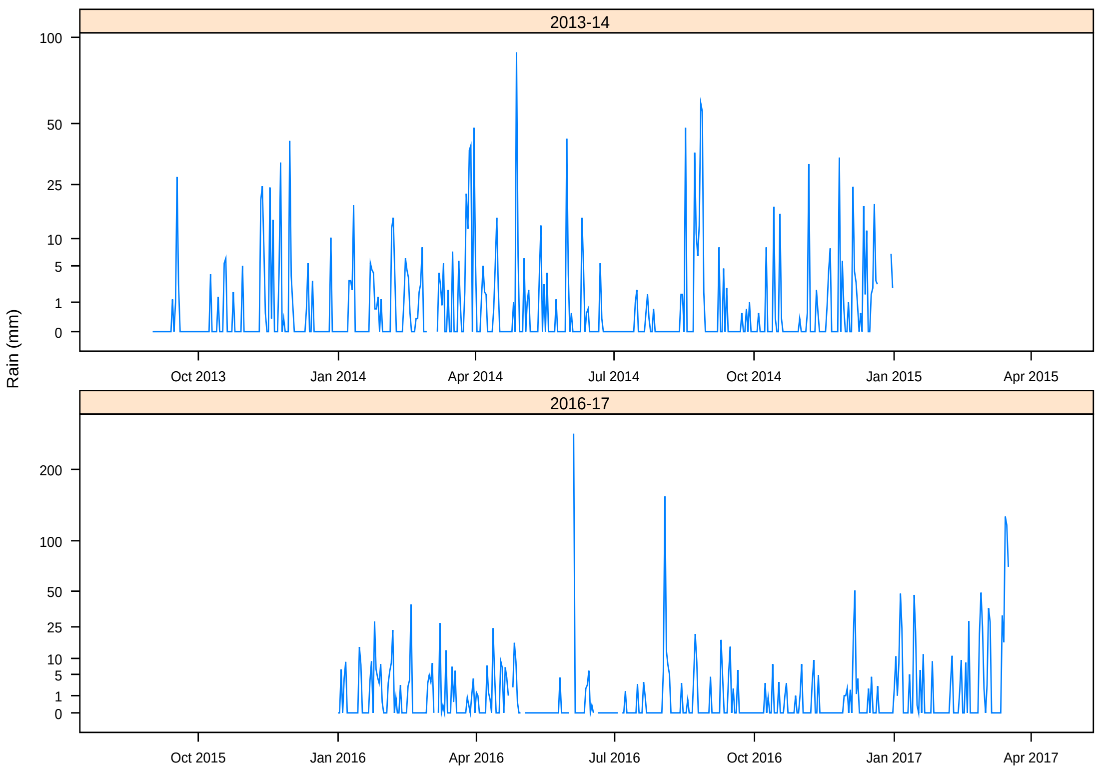


Fig. 7: Rainfall in each period (2013-14 and 2016-17) from the BOM weather station. Note that a square root scale is used on the y-axis, and the y-limits for each period are different.

Daily spore counts

Daily spore counts for both periods are shown in Fig. 8. Two points about the pattern of spore counts should be noted.

Firstly, there are two orders of magnitude difference in daily spore counts between the two periods. Daily spore counts in 2016-17 vary up to 500 spores/m3, whereas in 2013-14, the maximum spore counts was just over 10. (Note that different y-limits are used for each period in Fig. 8.)

Secondly, there appear to be different patterns in spore counts for each period. For 2013-14, there were spores observed (albeit low) from Sep 2013 up to August 2014, but then no spores at all for the last 4 or so months (from Aug 2014 to Dec 2014). It is interesting to note the lack of consistent seasonality here in the repeated Sep-Dec interval, comparing Sep-Dec 2013 (where there were spores present) against Sep-Dec 2014 (where there were no spores present). For 2016-17, there are few spores from January to March 2016, then spores were consistently present through April-May 2016 (i.e. consistent in that virtually all days had spores). This was followed by few spores in June, and then, from July, spore counts increased again into August through September (although less consistent than April-May - i.e. some days of high spore counts, and others with little/no spores). From Oct 2016-March 2017, spore counts were low.

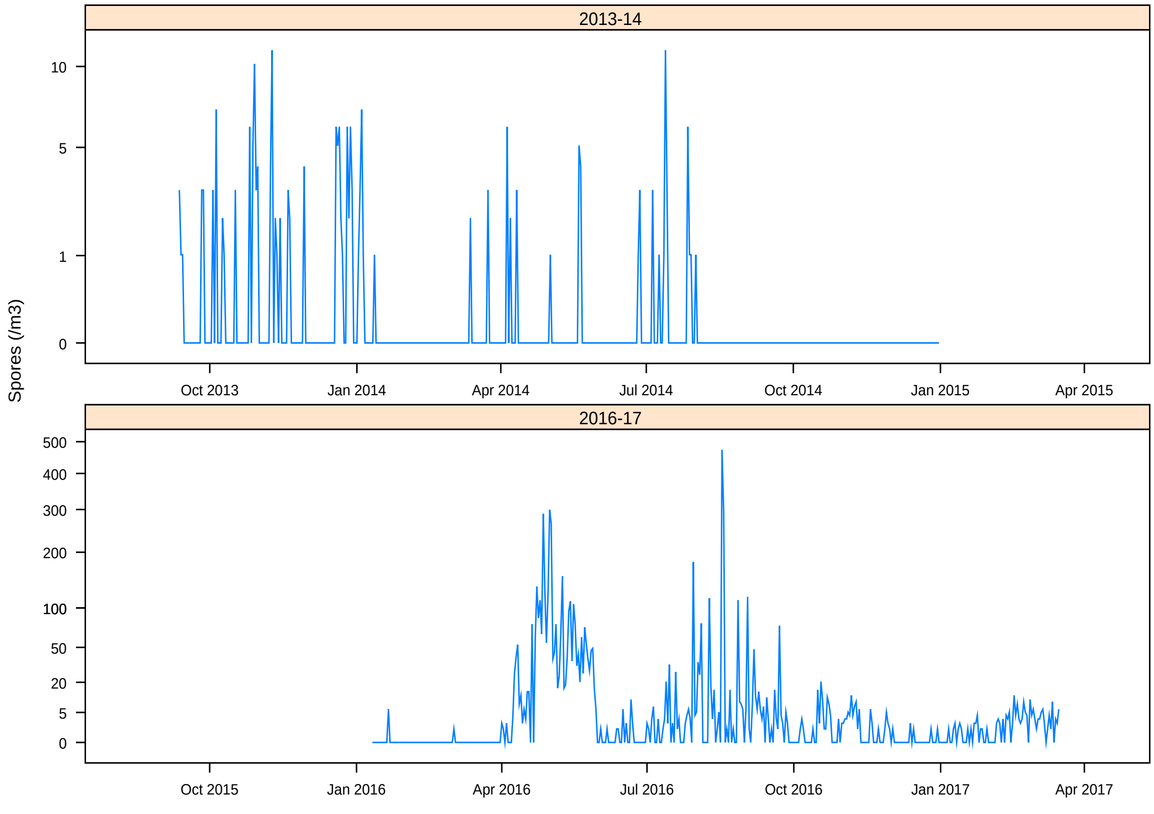


Fig. 8. Daily spore count in each period (2013-14 and 2016-17). Note that a squareroot scale is used on the y-axis, and the y-limits for each period are different.

Relationships of daily spores with each of the climatic variables

Effect of temperature on spore counts

The BOM temperatures are used here, as these are available for both periods, whereas the on farm temperature is only available in 2016-17. There is little or no evidence of a relationship over time in either period (Fig.s 9 and 10). Temperature follows an obvious seasonal pattern as already described, whereas the spore counts have no seasonality.

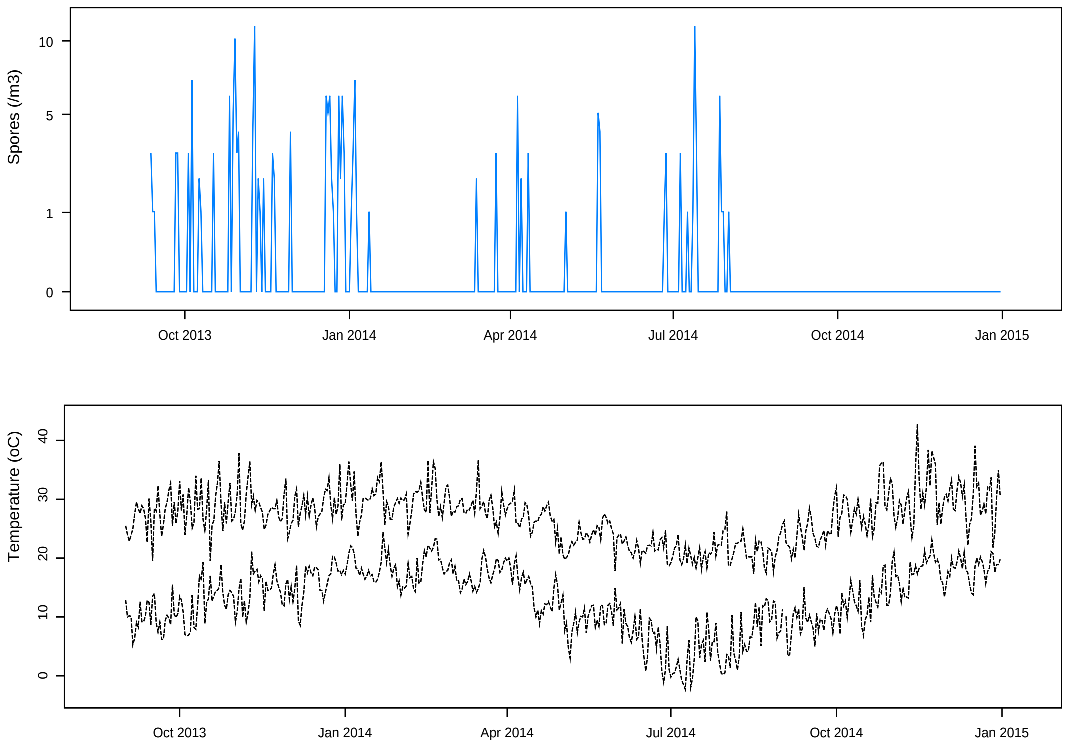


Fig. 9: Daily spore count (top) and temperature (below) from the BOM weather station over time, 2013-14.

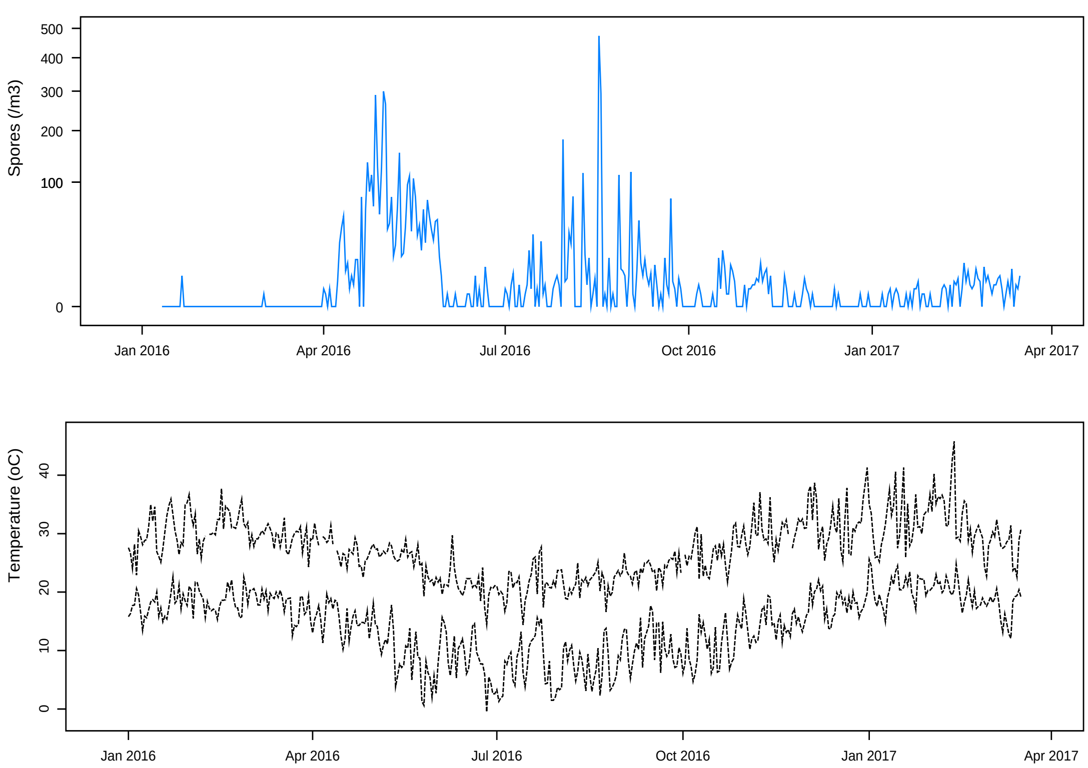


Fig. 10: Daily spore count (top) and temperature (below) from the BOM weather station over time, 2016-17.

When plotted directly against one another, there is no obvious relationship between spore counts and temperature in either period (Fig. 11 and 12). The correlation coefficients for 2016-17 are negative, but, as noted in the methods, no allowance for the time series nature of the data has been made. One observation that may be made from these plots is that higher spore counts in 2016-17 (>10) were only observed in the middle range of maximum temperatures (between 20 and 30ºC), albeit there was a greater number of observations in this range.

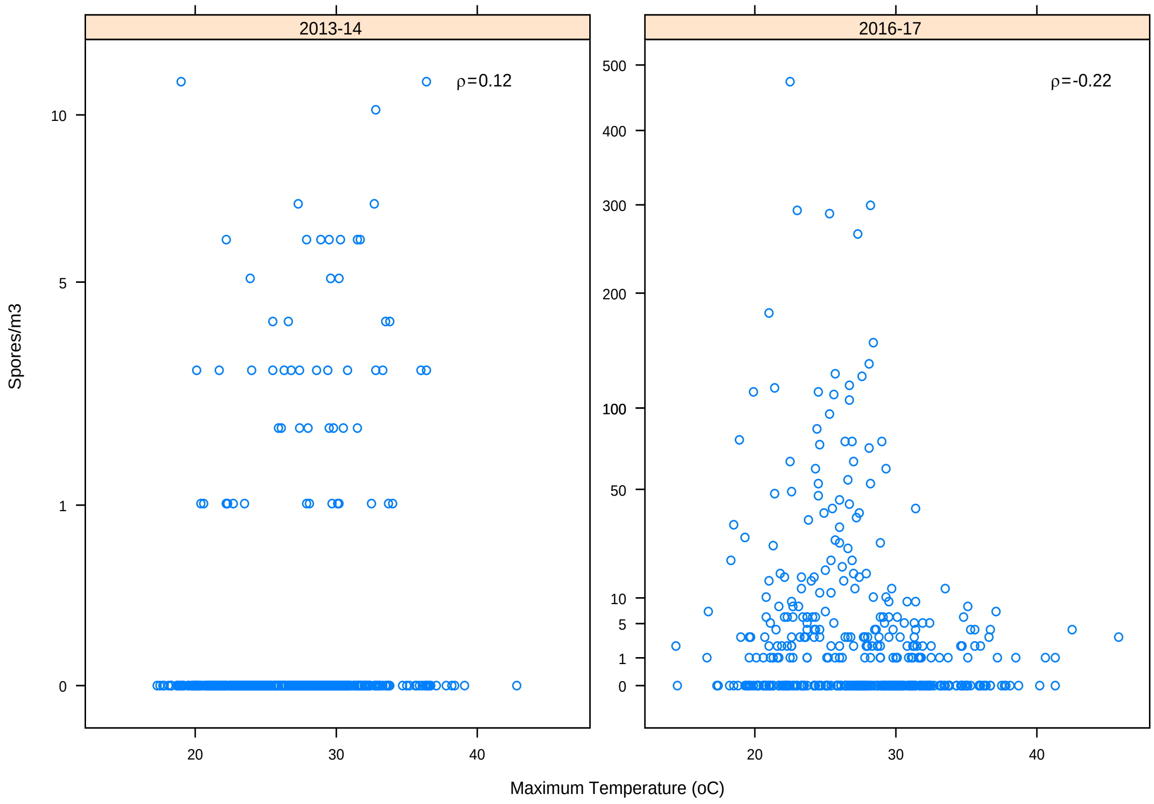


Fig. 11: Daily spore count versus maximum temperature (BOM) by period.

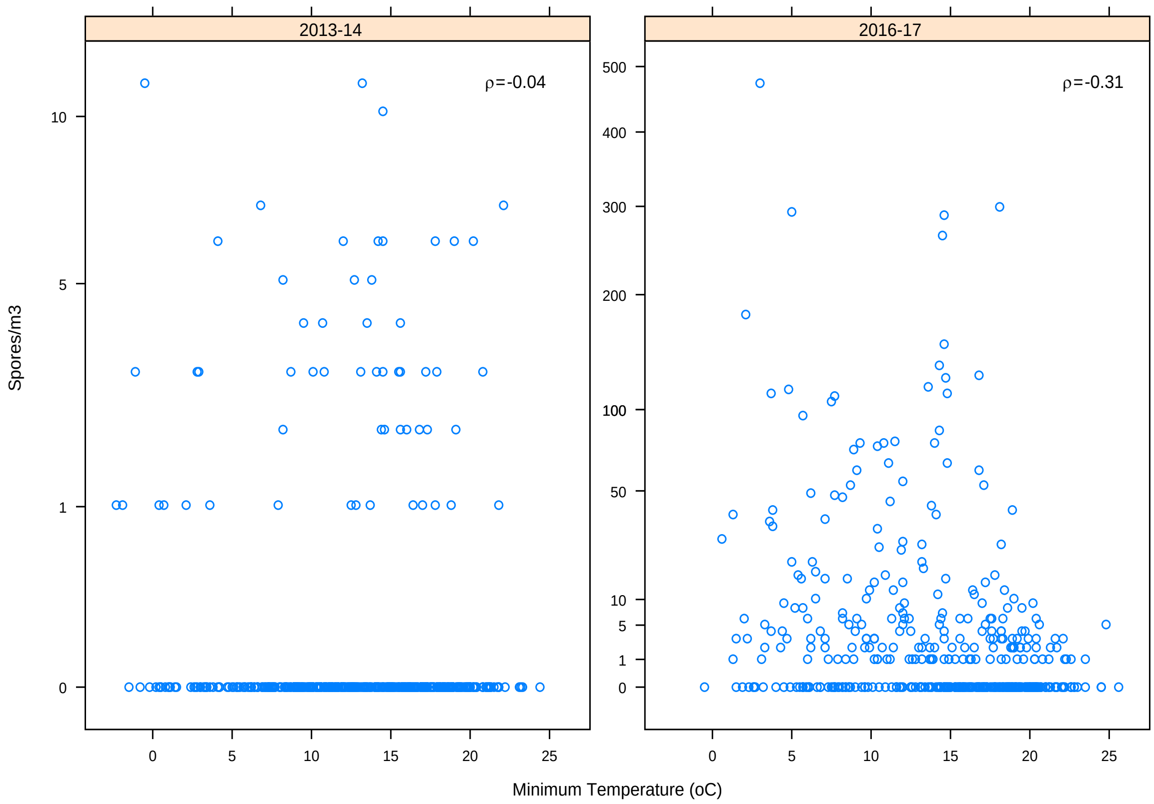


Fig. 12. Daily spore count versus minimum temperature (BOM) by time period.

<u>Effect of relative humidity on spore counts</u>

There may be some suggestion of a possible relation in 2013-14 (Fig. 13), but little in 2016-17 (Fig. 14). More long term data is required to confirm this.

In 2013-14, there are spore counts from October to January (Fig. 13). It is also apparent that mean (or minimum) RH% is generally lower from October to November than at other times (mean RH% is less than 80% in this period – whereas it is generally greater than 80% in the remainder). This could be coincidental and more data is required to confirm this. The period in late June/early July also corresponded with a lower RH% (<80%) but many spores were observed at this time.

For 2016-17, the two periods of higher spore counts (April-May and Aug-Sep) did not appear to correspond to lower or higher RH% (Fig. 14).

The direct scatterplots suggested a negative association between mean or minimum RH% (Fig.s 15 and 16) for 2013-14, but less so for 2016-17. (As indicated previously, the correlation does not account for the time series nature of the data.)

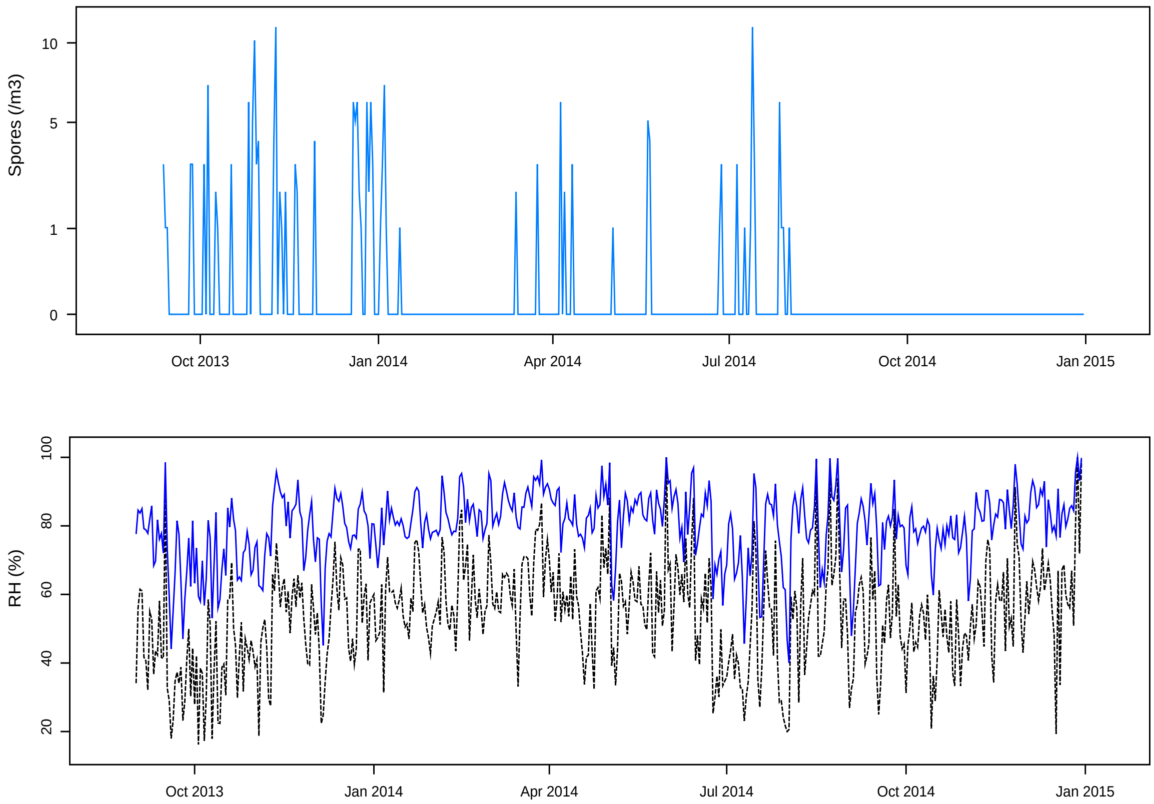


Fig. 13: Daily spore count and RH% over time, 2013-14. Note that a squareroot scale is used for daily spore count. For RH%, daily mean (blue) and minimum (black dotted) RH% are shown.

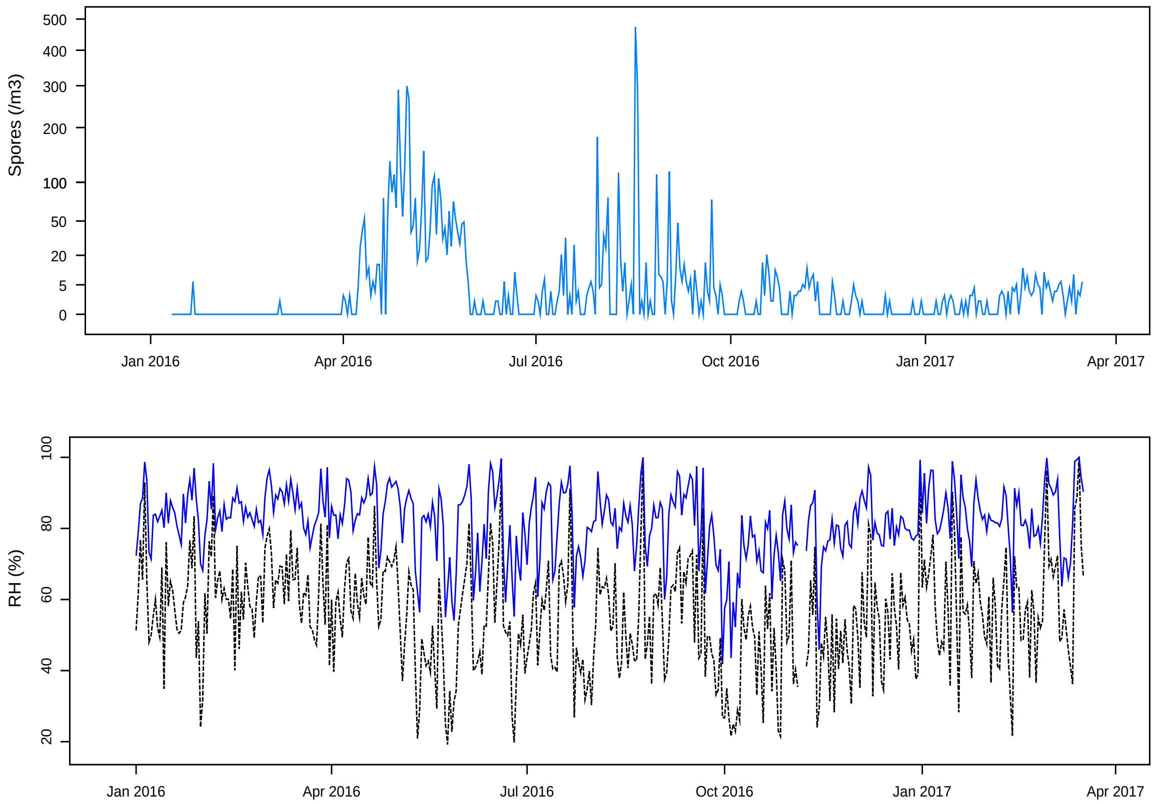


Fig. 14: Daily spore count and RH% over time, 2016-17. Note that a squareroot scale is used for plotting spore count. For RH%, daily mean (blue) and minimum (black dotted) RH% are shown.

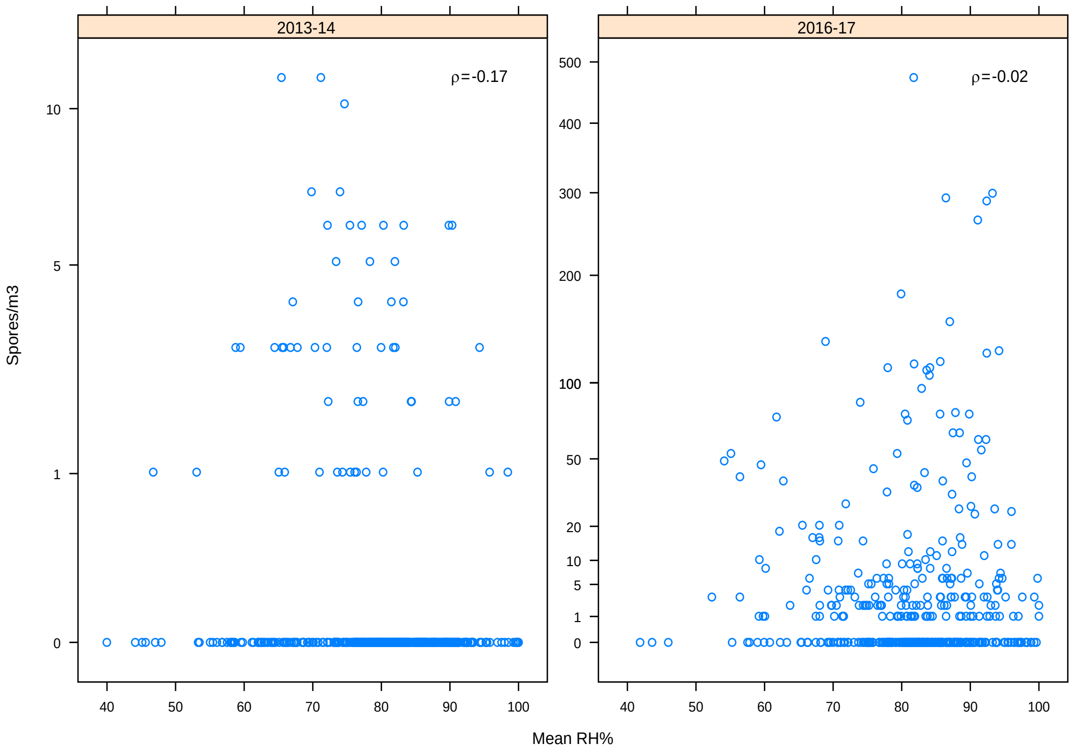


Fig. 15: Daily spore count vs mean RH% by period

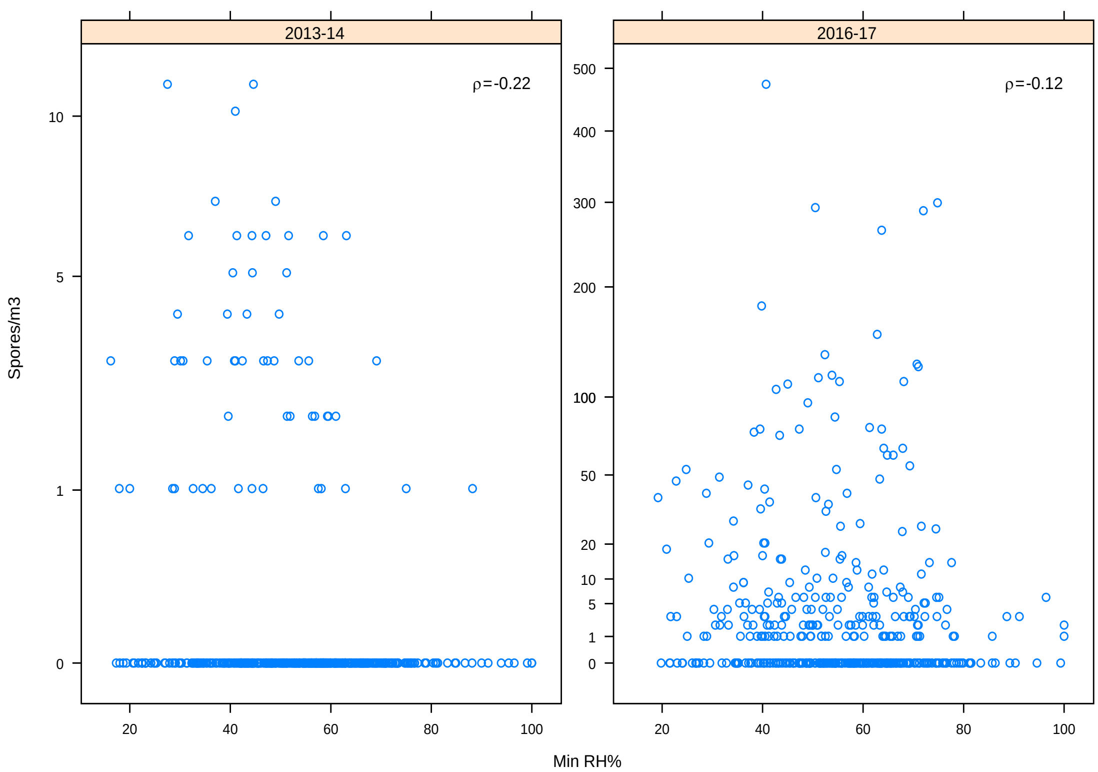


Fig. 16: Daily spore count vs minimum RH% by period

Effect of dewpoint on spore counts (2016-17 only)

There is no apparent relation between daily spore counts and dewpoint in 2016-17 (Fig. 17). The two periods of higher spore counts (April-May and Aug-Sep) did not appear to correspond to lower or higher dewpoint. The correlation was negative (Fig. 18), but the same caveats as indicated for the comparison to temperature apply (no adjustment for time series or seasonality).

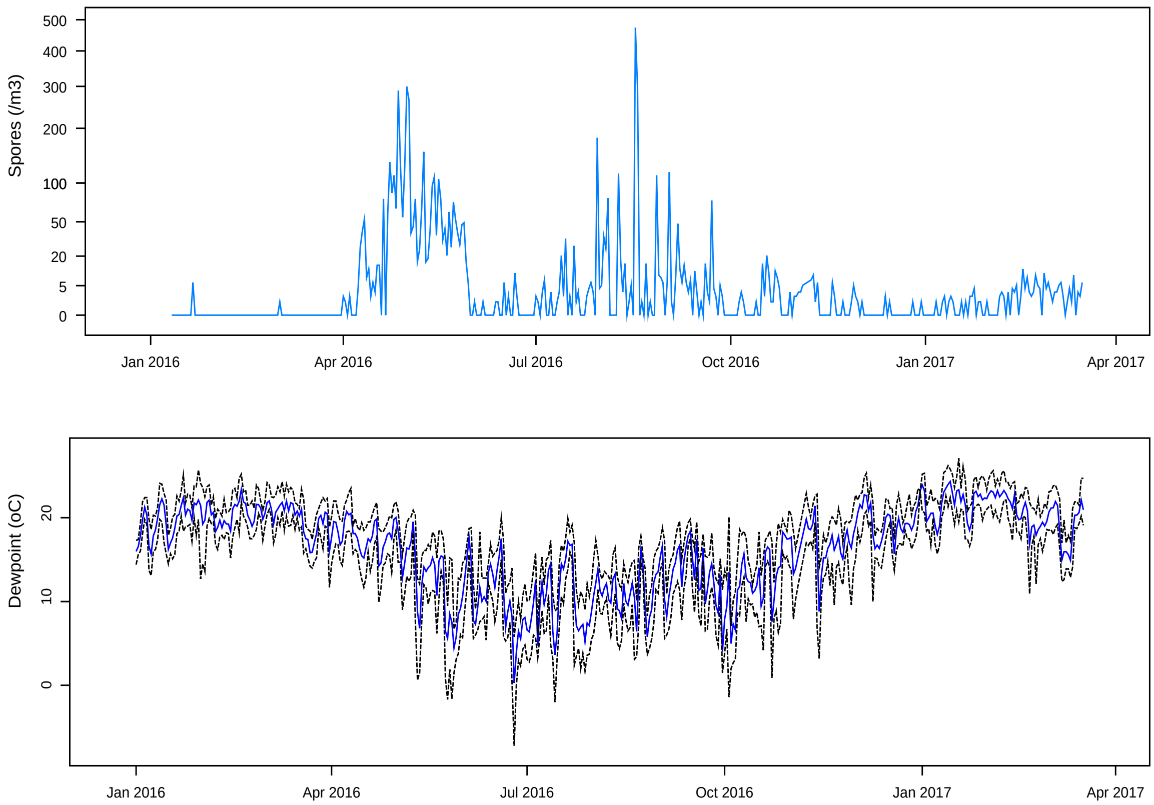


Fig. 17: Daily spore count and dewpoint over time in 2016-17

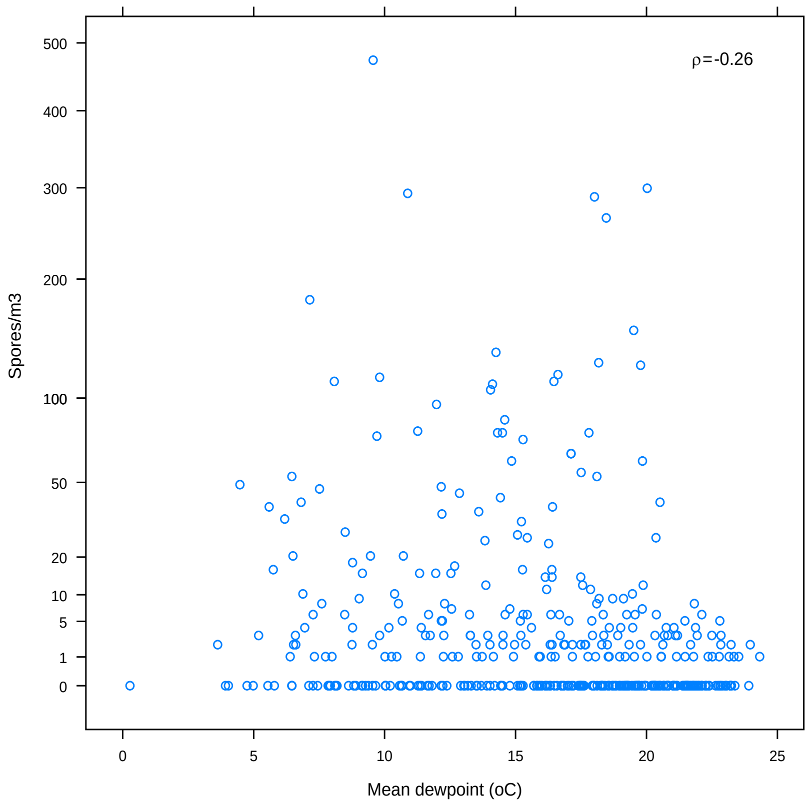


Fig. 18: Spore count vs dewpoint, 2016-17

Effect of solar exposure on spore concentration

Little correlation between spore counts and solar exposure is apparent in either period (Fig.s 19 and 20). There is little apparent correlation in the direct scatterplots (Fig. 21).

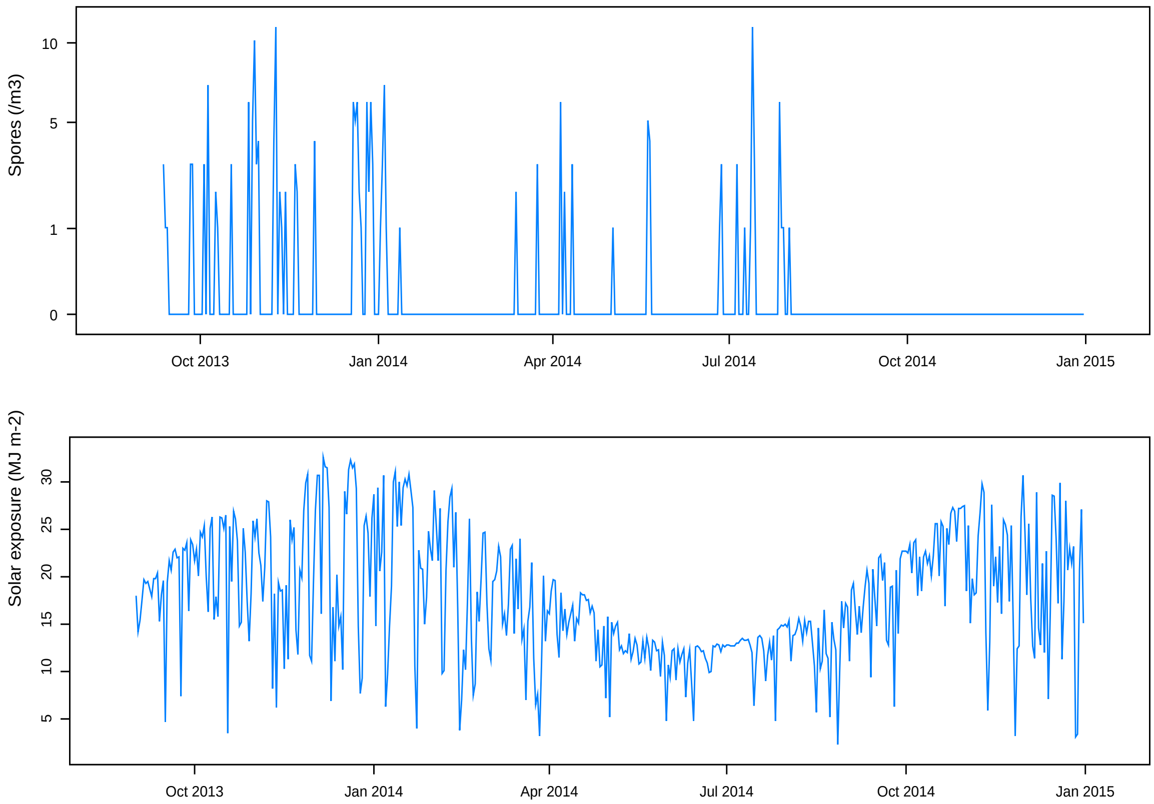


Fig. 19: Daily spore count and solar exposure over time, 2013-14.

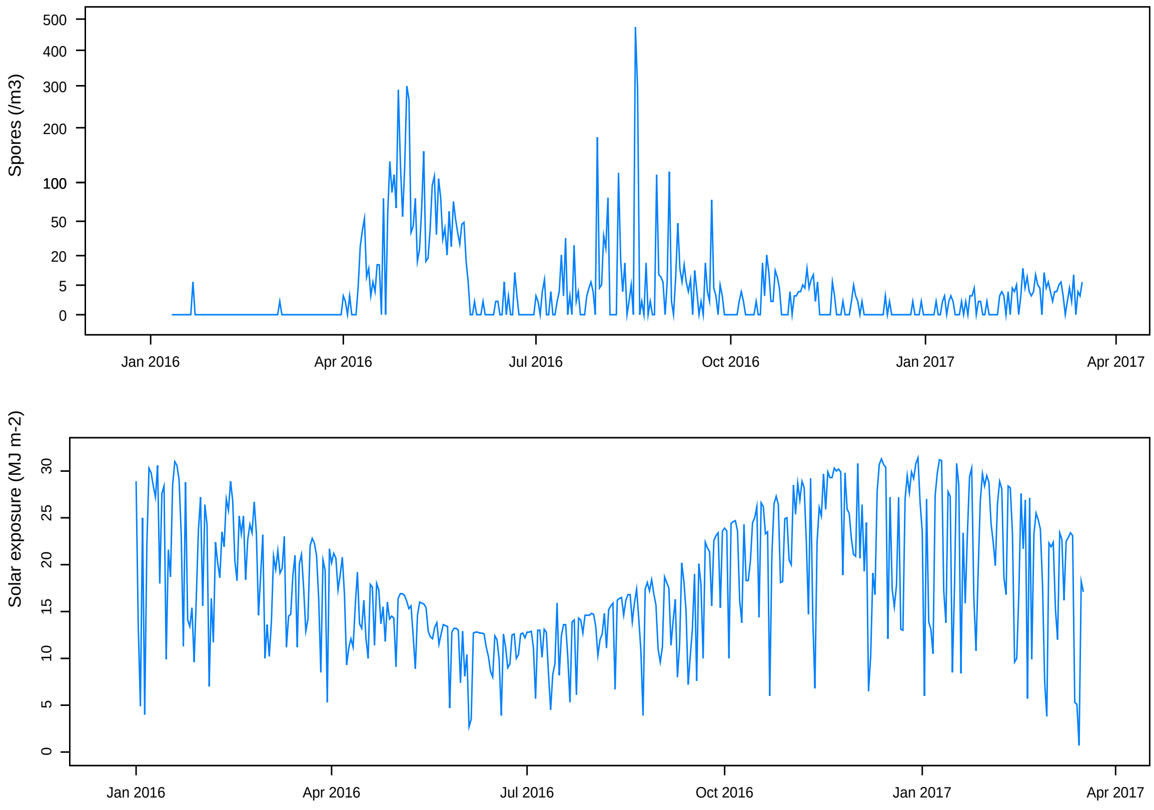


Fig. 20: Daily spore count and solar exposure over time, 2016-17.

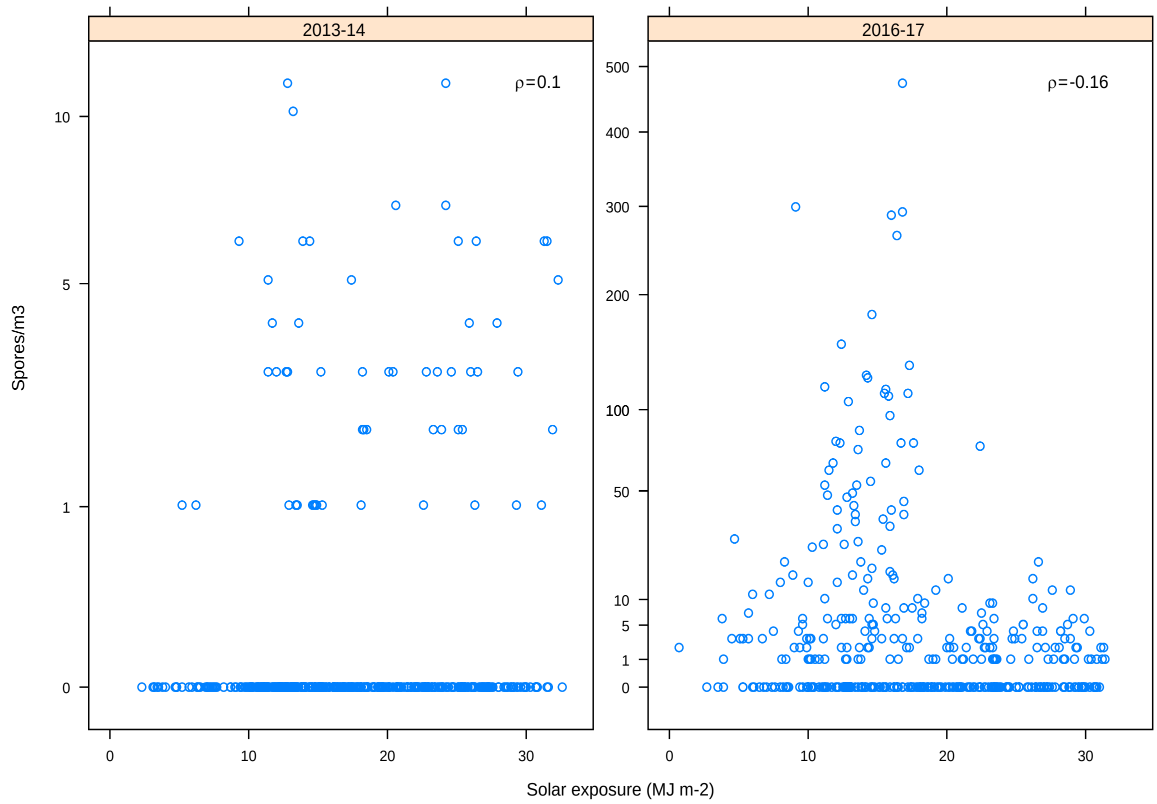


Fig. 21: Daily spore count vs solar exposure by period (2013-14, 2016-17)

Effect of rainfall on spore numbers

A. Daily rainfall

There was little obvious correlation between rainfall and spore concentration over time. In 2013-14, periods of higher rainfall (e.g. Jan-Apr 2014; Fig. 22) or 2016-17 (Fig. 23) did not correspond to higher spore counts.

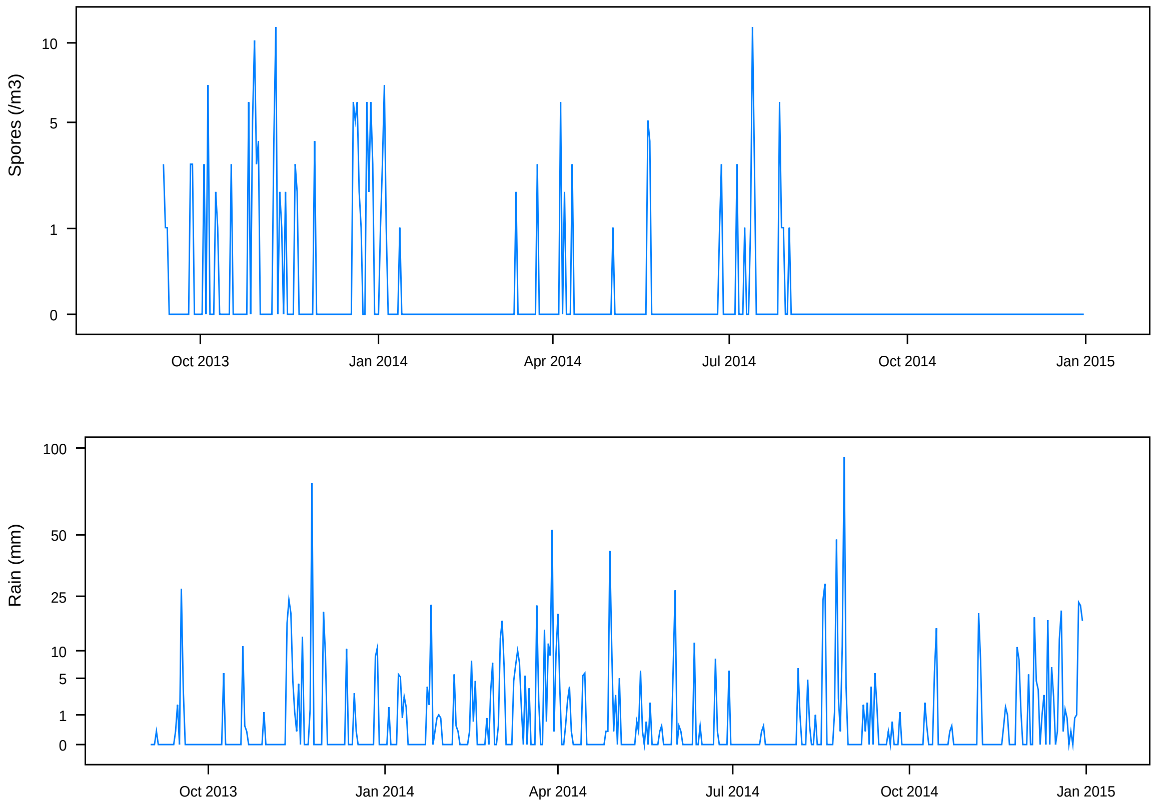


Fig. 22: Spore count and rainfall over time, 2013-14.

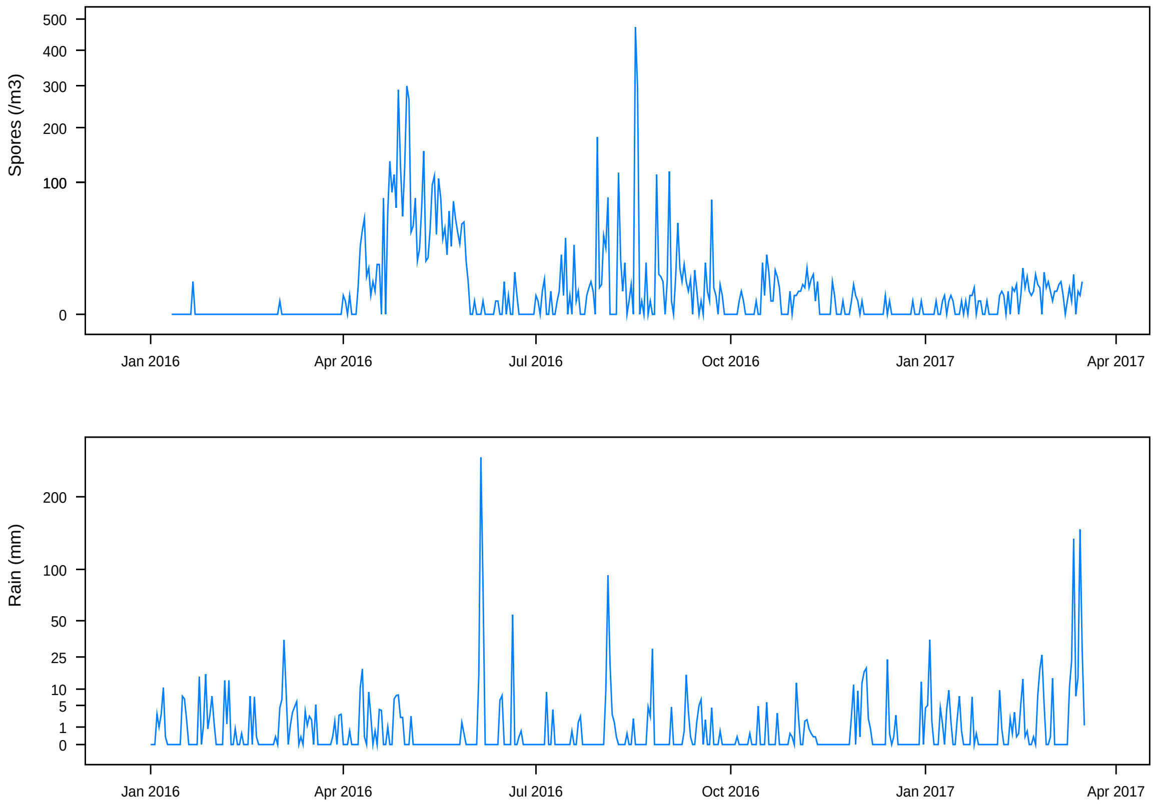


Fig. 23: Spore count and rainfall over time, 2016-17.

There was little correlation when spore counts were directly plotted against rainfall in each period (Fig. 24).

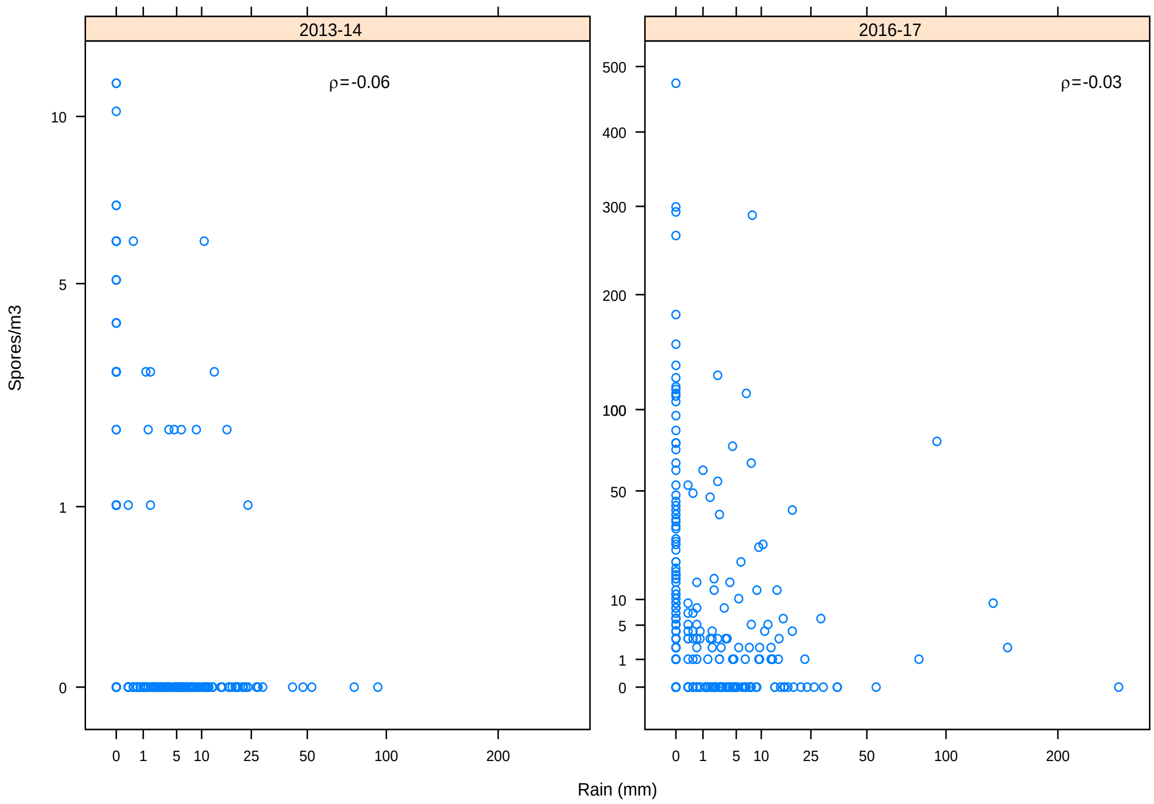


Fig. 24: Spore count vs rainfall, by sampling periods (years)

B. Fortnightly Rainfall

Average daily rainfall for the previous fortnight was calculated for each day. There was little increase in the correlation compared to the daily rainfall (Fig.s 25, 26 and 27).

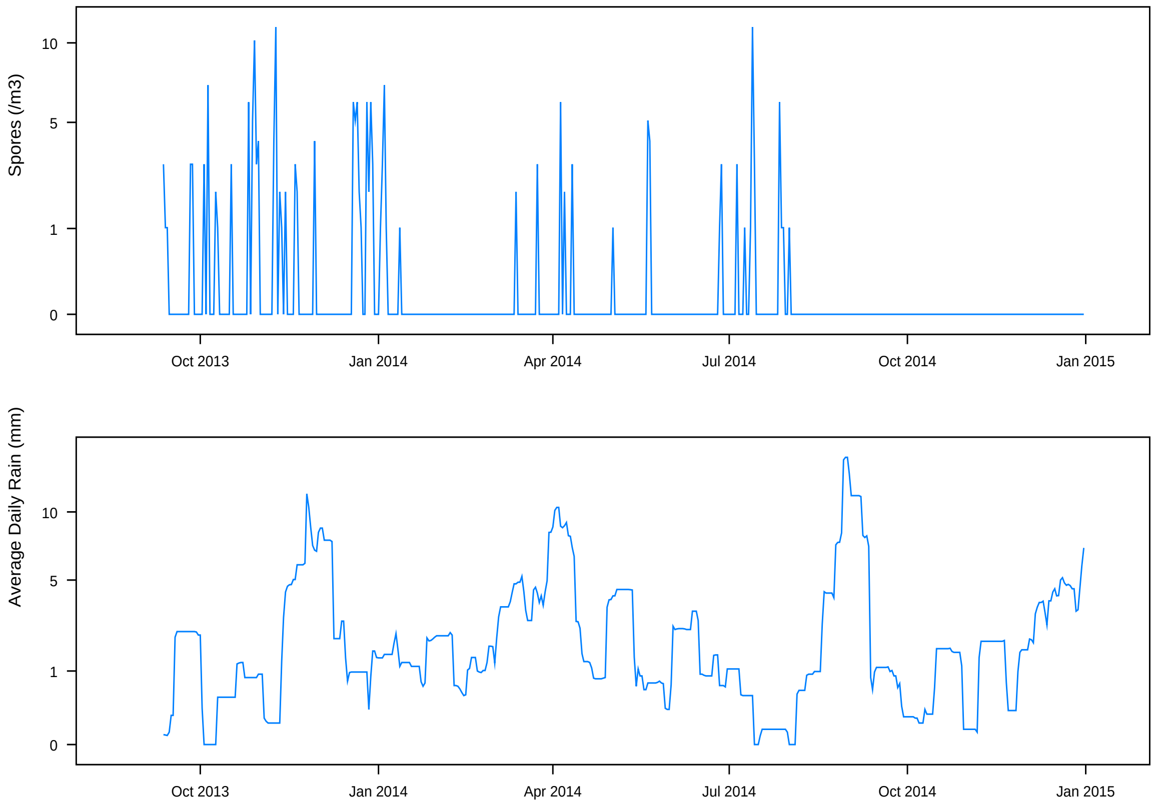


Fig. 25: Spore counts and average daily rain in previous fortnight over time, 2013-14.

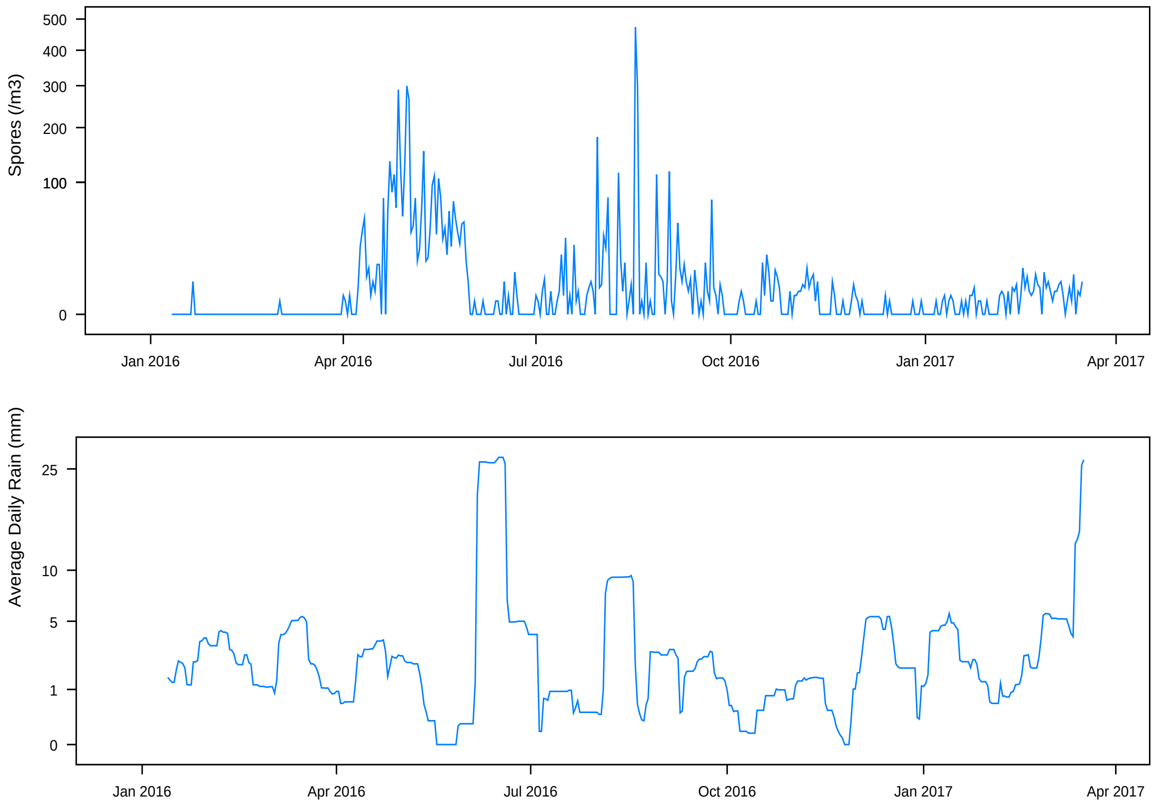


Fig. 26: Spore count and average daily rain in previous fortnight over time, 2016-17.

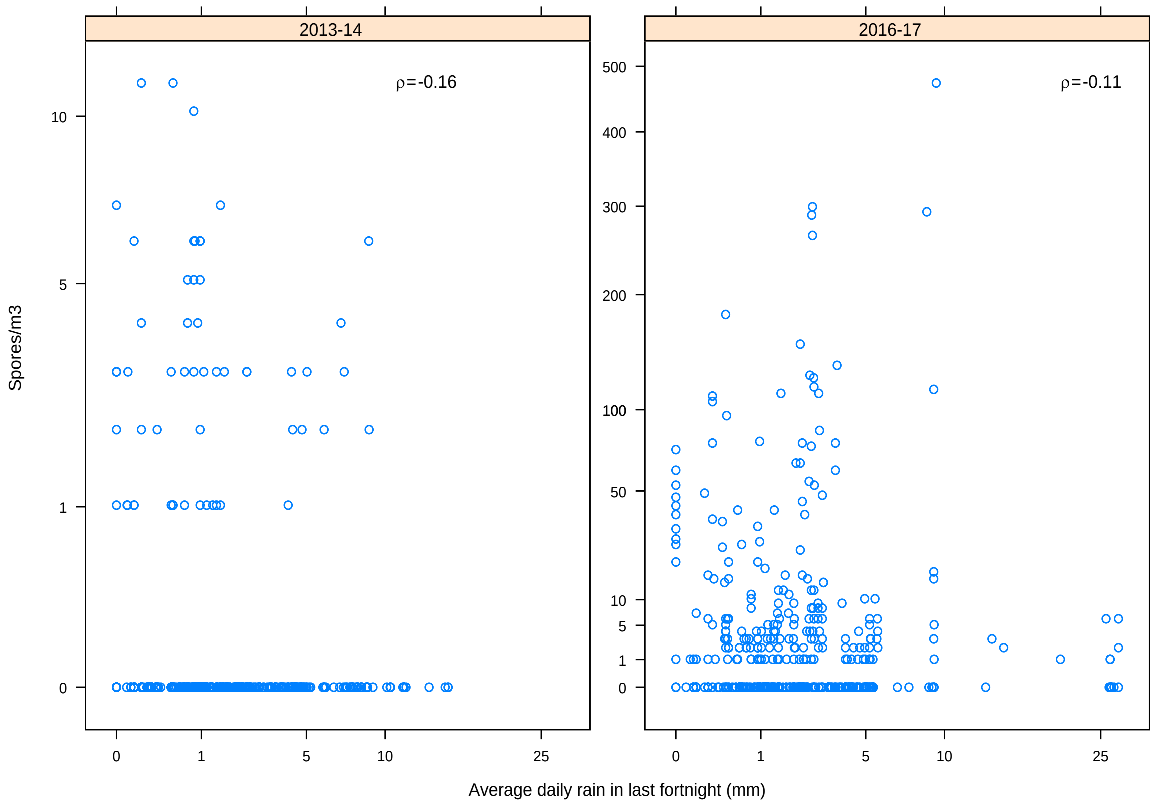


Fig. 27: Spore count vs average daily rain in the previous fortnight by period.

Two hourly spore counts

In considering this data, it should be noted that only 15% of the time spores were recorded. Therefore, as well as mean spore counts, the presence of spores and then mean spore counts (when present) were also calculated. The raw spore count data is shown in Fig. 28. The proportion of occasions where spore counts were observed (>0) varied between 10% and 20% (10.8% at 10am and 12pm and 17.1% at 8pm).) However, there may be some indication that spore numbers are higher at night (from 8pm until 4am). Where spores were observed, the mean spore count varied little by time period, and was between 5 and 10 spores/m3 (blue line in Fig. 28). Including the zeros, the mean spore count was around 1 spore/m3 (red line). By overlaying these means on the raw data, it shows that the variation in the means is rather minor compared to the variation in the raw data. These means are also plotted separately in Fig. 29.

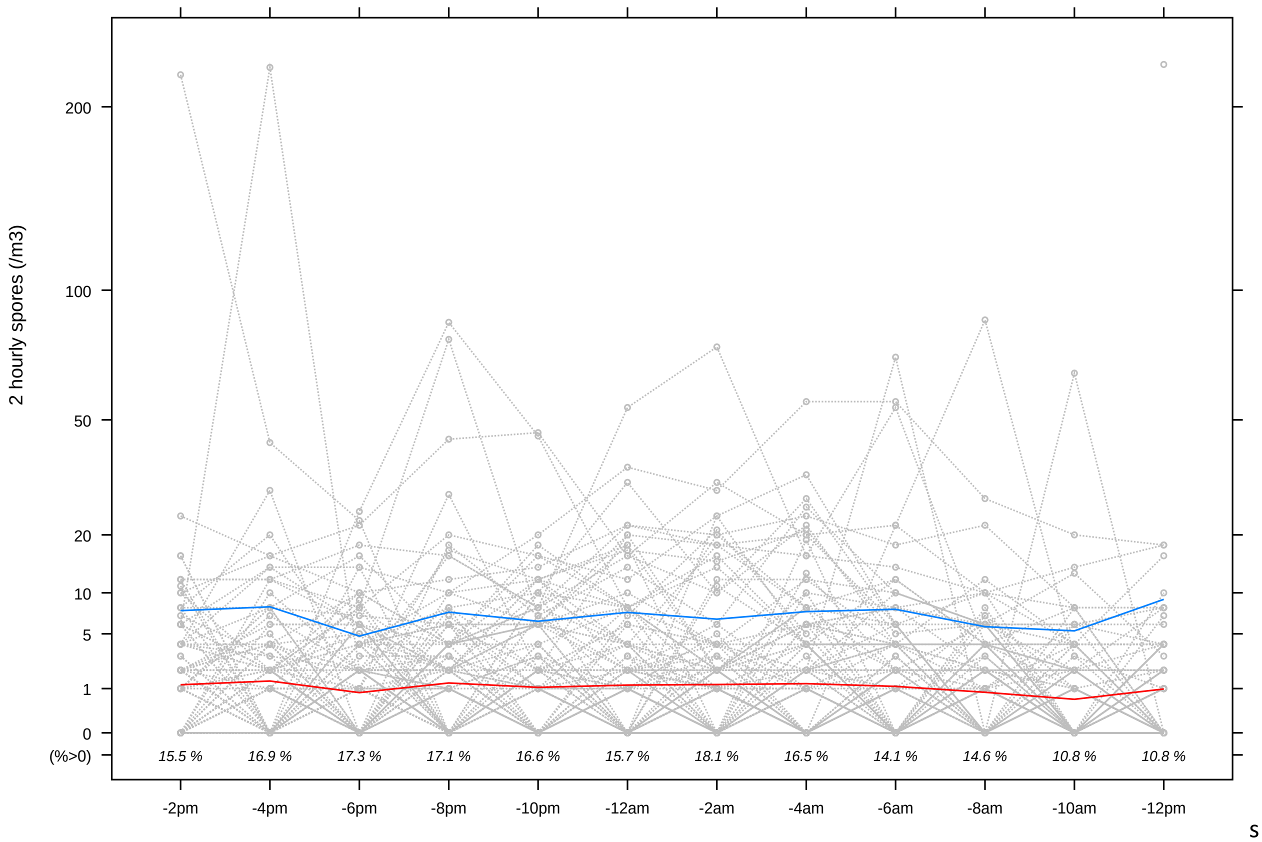


Fig. 28: Spore count versus hour for 2016-17 with the proportion of occasions where spores were observed (base of the plot, just above x-axis) as well as the mean spore count when spores were observed (blue line) by two hour period, and the overall mean spore count (including zeros) (red line).

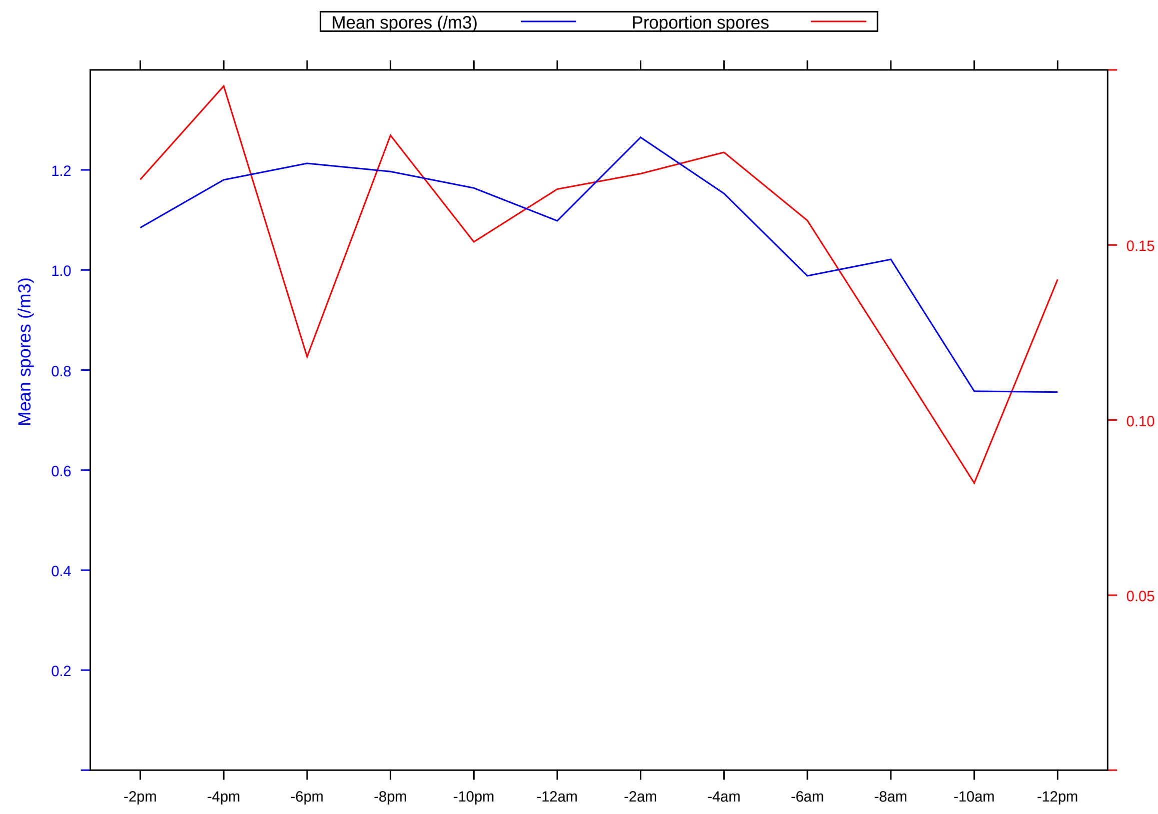


Fig. 29: Mean spore count and proportion of occasions with spores (non-zero) vs time of day for 2016-17.

Appendix IV. Disease information sheets

FUNGUS FEBRUARY 2017

Stem blight and dieback

***Neofusicoccum parvum, Lasiodiplodia theobromae* and others**

Stem blight and branch dieback

Botryosphaeria stem blight and dieback

Botryosphaeria fungi associated with this disease in Australia include *Neofusicoccum parvum, N. australe, N. oculatum, N. macroclavatum, Lasiodiplodia theobromae, L. pseudotheobromae* and *Botryosphaeria dothidea*.

The fungi survive in infected wood and leaves of blueberry and other woody hosts. Spores produced on infected plant material are dispersed in air or by water-splash to infect shoots, stems, branches and buds. Infection is best managed by pruning out diseased plant parts during dry weather.

Signs and symptoms

Infection usually begins in the branches, resulting in reddening and necrosis of leaves on one or more branches and a characteristic 'flagging' appearance of a dead branch with leaves still attached.

A uniform, pale brown-grey discolouration can be seen down the inside of infected stems. In severe cases the infection progresses into the base of the plant resulting in systemic branch dieback over a period of weeks or months, eventually killing the plant. Raised black fruiting bodies may occur on infected stems.

Favoured by high relative humidity, rainfall and a wide range of temperatures (5-35°C).
Favoured by plant stress and injury.

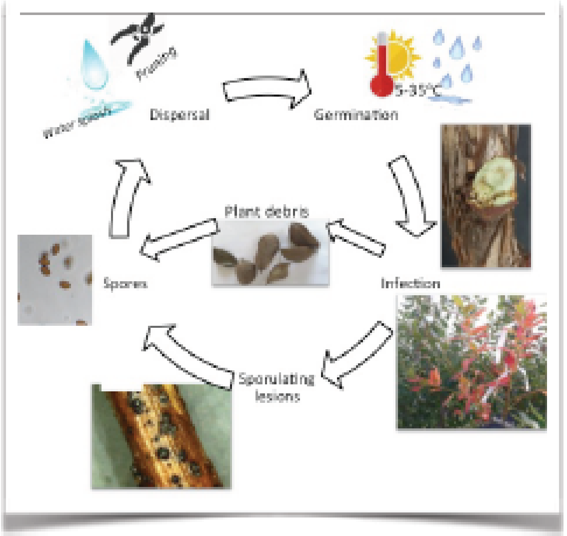
Stems and branches
Typical wedge-shaped internal branch necrosis.

Branch dieback
Typical leaf 'flagging' as the infected branch dies back.

Internal browning The fungus grows down into the base of the plant causing browning in the crown.

Disease Cycle

Botryosphaeria fungi survive in infected wood of blueberry and many other woody hosts, but not in soil. New infections frequently develop in the warmer, wetter months, although infection can take place all year round when inoculum and susceptible plants are present.



The fungi enter the host plant through wounds, including herbicide injury, pruning wounds and insect damage. They can also enter through natural openings such as growth cracks, leaf scars, lenticels (stem pores) and root to root contact.

Spores germinate and infect the vascular tissue causing internal browning of the stem and base. The fungi may remain latent in the plant, not causing symptoms until the plant becomes stressed. Drought stress, for example, predisposes the plant to stem blight. Black fruiting bodies (pycnidia), from which spores ooze, form along infected stems. Spores are dispersed by rain splash and run-off water at any time of the year. Spores germinate under a range of conditions (5-35°C; RH >85%).

After infection, the fungus invades the shoots and stem, resulting in flagging and dieback symptoms.

MANAGEMENT

Put in place biosecurity best practices to prevent entry, establishment and spread of stem blight onto and from your property. Practice "Come clean, go clean".

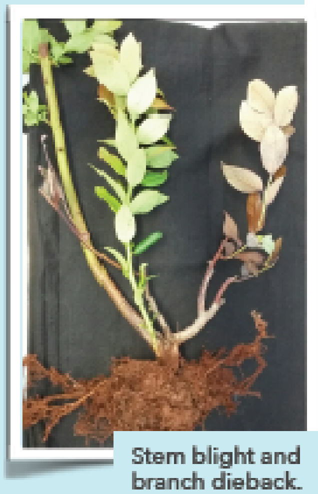
Source clean, disease-free planting material when establishing a new block or orchard.

The best defence against stem blight and dieback is to avoid plant stress and injury and to employ appropriate sanitation measures.

Best control is achieved by pruning out infected plant parts and removing them from the orchard. Prune at least 15-20 cm beyond diseased wood to prevent the infection spreading.

Prune during dry periods to reduce spread. Disinfect tools between plants. Cutting at an angle when pruning can promote water runoff.

Application of fungicides to protect pruning wounds may reduce infection. However, wounds can be susceptible to infection for up to 2 months, so repeated application is necessary. Febuconazole, cyproconazole, fluilazole, azoxystrobin, pyraclostrobin, fluopyram + tryfloxystrobin, trifloxystrobin and carbendazim have been shown to be effective wound protectants in some overseas studies.



Stem blight and branch dieback.

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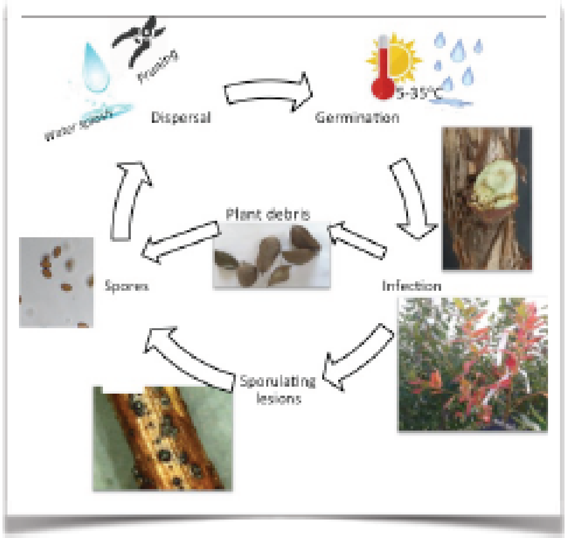

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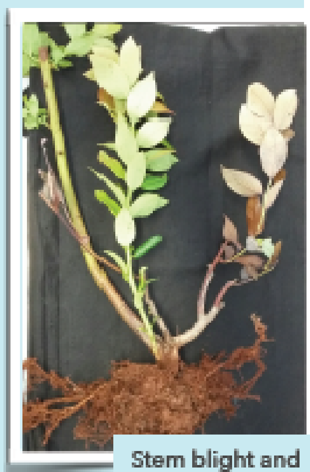

Stem blight and branch dieback.

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The best defence against stem blight and dieback is to avoid plant stress and injury and to employ appropriate sanitation measures.

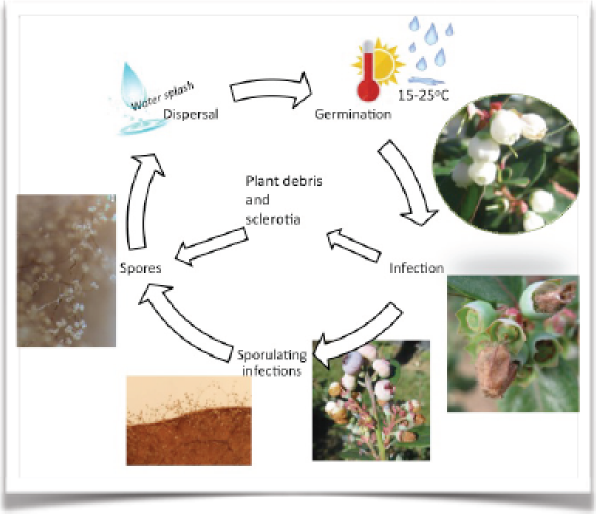
Best control is achieved by pruning out infected plant parts and removing them from the orchard. Prune at least 15-20 cm beyond diseased wood to prevent the infection spreading.

Prune during dry periods to reduce spread. Disinfect tools between plants. Cutting at an angle when pruning can promote water runoff.

Application of fungicides to protect pruning wounds may reduce infection. However, wounds can be susceptible to infection for up to 2 months, so repeated application is necessary. Febuconazole, cyproconazole, fluilazole, azoxystrobin, pyraclostrobin, fluopyram + tryfloxystrobin, trifloxystrobin and carbendazim have been shown to be effective wound protectants in some overseas studies.

Disease Cycle

Botrytis survives in blueberry plants, or plant debris. Spores are produced by mycelia and germinating sclerotia in the presence of moisture.



Spores are carried by air currents and water-splash. Flowers, leaves, twigs and mature berries are susceptible. Flowers are most susceptible shortly after they open, although infection is possible earlier. Slow pollination and ageing flowers can favour infection. Non-pollinated ovaries from which petals have shed are also highly susceptible to infection. They can remain attached for 10 days and become a source of secondary inoculum. The fungus can grow from these ovaries into the stalk to infect other flowers and fruit in the cluster. It can also grow into the stem causing twig blight.

Botrytis is present all the time, but causes serious losses when weather is wet and cool for several consecutive days. Infection is favoured by high relative humidity, fog and long wet periods. Studies have found 6 hours of leaf wetness is required for infection at 20°C.

Green berries are not susceptible. Fruit infected during flowering, can rot during post-harvest storage and handling. *Dotrytis cinerea* can grow at very low temperatures, making it difficult to control.

MANAGEMENT

Put in place biosecurity best practices to prevent entry, establishment and spread of Botrytis onto and from your property. Practice "Come clean, go clean".

Source clean, disease-free planting material when establishing a new block or orchard.

Promote air circulation and drying of the canopy, for example through pruning and weed management.

Prune infected plant parts, and remove infected debris from the orchard to remove inoculum sources.

Open canopies can improve penetration of fungicide sprays.

Apply fungicides as soon as flowers open, particularly if conditions are wet.

Sprays during the non-production period can reduce the incidence of fruit rot by targeting the dormant fungus.

Alternate and rotate chemical fungicides as resistance to fungicides is known to develop in Botrytis.

Permitted fungicides can be found on the APVMA website.

Blueberry rust

Thekopsora minima

Pustules on the underside of the leaf are a source of inoculum for new infections. Spores are spread by air or water-splash.

Blueberry rust

Blueberry rust is caused by the fungus *Thekopsora mtntma*.

Blueberry rust primarily affects the foliage and fruit. Yellow to brown lesions develop on the upper surface of the leaf and yellow to orange spore pustules form on the corresponding lower leaf surface. Small purple lesions, and pustules, develop on fruit. Management currently relies largely on application of fungicides.

Signs and symptoms

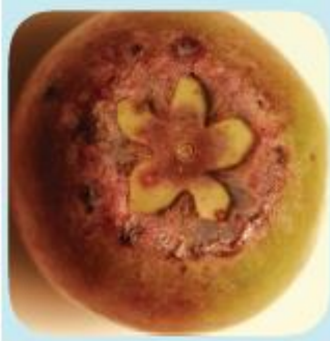
Look for small chlorotic (yellow) spots on the upper leaf surface. As the disease develops the spots become darker, red-brown and larger, coalesce and become necrotic. Yellow-orange pustules develop on the corresponding lower leaf surface. The pustules contain spores that can infect new leaves. There can be thousands of spores in a single pustule. If the disease is severe, infected leaves may drop prematurely. Entire plants may be defoliated.

Lesions and pustules may also form on fruit, reducing berry quality and marketability.

Favoured by high relative humidity, rainfall and mild-warm temperatures (18-25°C).

Early symptoms
Small yellow lesions on upper leaf surface.

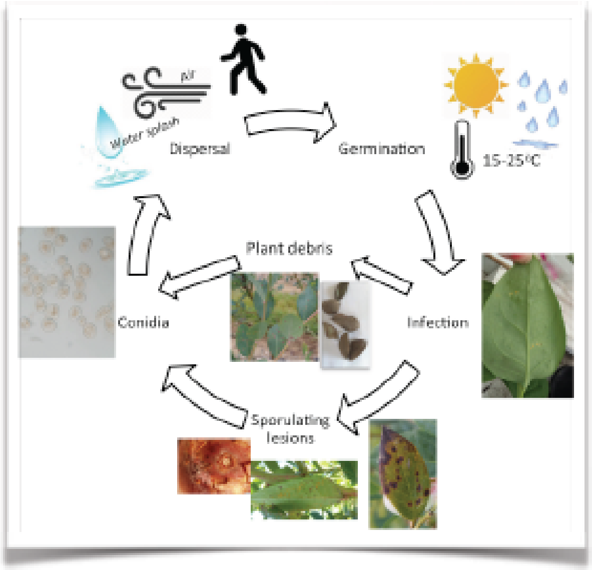
Older lesions
Dark spots on upper leaf surface. Old infections are a source of inoculum. Rust is well established at this stage.



Fruit lesions and pustules can develop on fruit under high disease pressure.

Disease Cycle

The blueberry rust fungus infects only living cells. In the evergreen system, spores spread from old infections to infect new tissues. Infected leaves that remain on the plant after pruning can become a source of inoculum for new infections. Young leaves are the most susceptible.



Long periods of leaf wetness (7h at 21°C) are required for infection to occur. The fungus grows into the leaf and, depending on environmental conditions, pustules can develop as soon as 10 days after infection. When the pustule erupts through the leaf surface the spores are moved by air or moisture to infect new tissues. Spore numbers can build up rapidly, and these spores can be responsible for many infection cycles throughout a season.

Spores survive at least 4-8 weeks in leaves on the orchard floor, although viability declines over time.

In the evergreen system, under favourable conditions, spores can be produced and dispersed at any time of the year.

MANAGEMENT

Put in place biosecurity best practices to prevent entry, establishment and spread of blueberry rust onto and from your property. Practice "Come clean, go clean".

Source clean, disease-free planting material when establishing a new block or orchard.

Promote airflow through the orchard to reduce the build up of moisture in the foliage.

Remove as much diseased plant material from the orchard as possible. Including infected leaves that remain on the plant after pruning.

Rust control in blueberry currently relies largely on the use of a spray program.

Protect new shoots after pruning and through the season, particularly when conditions are warm and moist. This will help to reduce the build up of inoculum.

Apply controls when conditions are favourable for infection (warm, moist, high relative humidity).

Protectant sprays function on the plant surface to inactivate the fungus prior to its entry into the plant. They protect the surface to which they are applied. They do not protect after infection has commenced and are most effect when applied prior to infection

Curative sprays are taken up through the foliage and can inhibit further fungal growth. They are best applied prior to infection or as soon as possible after infection.

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FUNGUS

FEBRURARY 2017

Anthracnose

***Colletotrichum simondsii*, *Colletotrichum* spp.**

Blueberry fruit with orange spore masses and characteristic sunken lesion. Spores are slimy and can spread by contact and moisture.

Anthracnose

In Australia, Anthracnose on blueberry is caused by the fungi *Colletotrichum simondsii* and other *Colletotrichum* species.

The fungi can infect leaves, twigs, shoots, canes, flowers and fruit. Although infection of fruit takes place during flowering, most losses occur when infected ripe berries rot after harvest and during storage.

Signs and symptoms

Infection of fruit begins during flowering. Infected fruit remain symptomless until berries ripen. First symptoms may be shrivelling of berries on the plant and the development of characteristic sunken lesions, particularly during warm, moist conditions. On ripe fruit, orange-pink spore masses form under humid conditions. Often symptom development is delayed until after harvest.

Flower and twig blights, and leaf spots may develop under very humid or moist conditions. Pink spore masses may also be observed on infected leaves, fruit stems, leaf stems and twigs.

Anthracnose is favoured by wet conditions over several consecutive days.
Flowering is the most critical time for infection.

Blueberry flowers become brown under humid conditions.

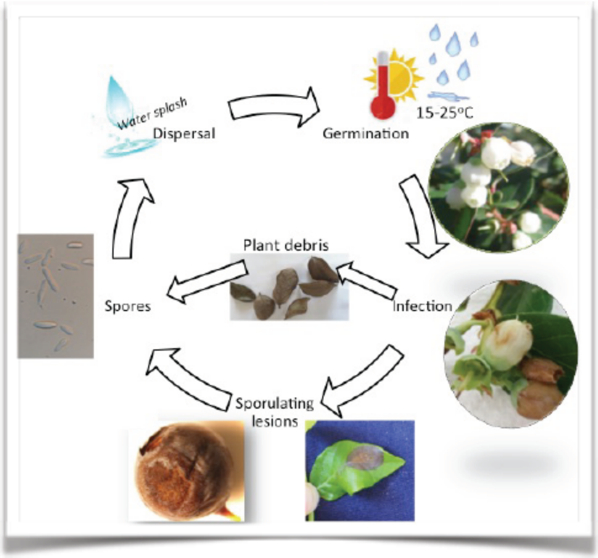
Shoot tip blight may develop on rapidly growing, succulent shoots.

Leaf lesions vary from small brown spots to large dark necrotic lesions.

Disease Cycle

The fungus survives in infected shoots, twigs, fruit stems and bud scales surrounding floral and vegetative buds. It also survives in plant debris and soil.

Spores are dispersed from, often symptomless, infections on leaves and shoots or plant debris to flowers and other susceptible tissues when conditions become warm and wet. At least 8 hours of continuous wetness is required for infection at 25ºC. The wetness period required for infection increases at temperatures higher and lower than this.



Fruit infection begins during flowering and generally remains latent and symptomless until berries ripen. Under humid conditions, ripening berries may shrivel on the plant.

Anthracnose is characterised by sunken lesions and slimy, pink-orange coloured spore masses that develop during warm, humid conditions. These spores are a source of inoculum.

Disease is most severe when conditions are warm and wet during flowering, or just prior to harvest.

MANAGEMENT

Source clean, planting material when establishing a new block or orchard.

Promote ventilation and drying of the canopy.

The best control is achieved by reducing the infection during flowering. Commencing sprays during early flowering have been shown to be most effective.

Treating plants during non-flowering and non-fruiting periods may assist in controlling the pathogen surviving in infected plant tissues.

Post-harvest disease development may be reduced by timely harvests, rapid post-harvest cooling and sanitation of sorting lines.

A range of broadspectrum and more selective strobilurin fungicides have been shown to be effective. DMI fungicides are reported to vary in their efficacy.

Permitted fungicides can be found on the APVMA website.

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Department of Primary Industries

primefact

Blueberry establishment and production costs

September 2015, Primefact 133, fourth edition

Phillip Wilk & Melinda Simpson, Industry Development - Blueberry, Wollongbar Primary Industries Institute, Wollongbar NSW 2477

Blueberry production is capital intensive with high development and labour costs. However the short time interval between establishment and first returns with Southern Highbush varieties coupled with high demand and reasonable prices offsets the high costs and gives growers positive cash flow within only a few years.

The figures used in these estimates apply to an average farm situation and production costs over a five year period and they will vary from season to season and be influenced by the managerial skills of the owners.

The following calculations for northern NSW are based on the establishment and production costs for one hectare with 3700 plants for a 4 ha farm of blueberries. In northern NSW, growers using Southern Highbush redevelop blueberry beds in year 8-12 so the production cycle is from year 4 to year 8 to 10 (6 years).

Southern Australian establishment and production costs are based on one hectare with 2000 plants for a farm of 4 ha of blueberries.

Assumptions

All labour including the owner/manager has been costed at $25.34/hour which is made up to include the NSW Horticulture Employees Award Rate ($21.09) plus 9.5% superannuation, 5.45% payroll tax and 4.99% Workcover.

In many situations the owner/manager or their family may choose to ignore their own labour cost but these costs should be included when calculating a whole enterprise budget.

All machinery variable costs have been included for each operation under Fuel, Oil Repairs and Maintenance (FORM). It is assumed that the operator has a tractor (77-90 HP, 57 -66 HP), slasher and air blast spray unit. The machine cost for the tractor, spray and slasher has been costed at $49.00/hr plus labour costs. The large bed former unit 125HP (93kW) tractor was also costed at $49/hr plus labour costs.

The minimum size of an orchard necessary to achieve a reasonable scale of production is 4 ha provided the operator packs product with a packing group. It would be economical for an orchard 4 hectare in size or greater to pack their own product and they would need to include packing shed infrastructure. The costing for the packing shed and coolroom has been calculated and can be included if required but is usually treated as an infrastructure fixed cost and not included in gross margins.

In northern NSW there are 3700 plants per hectare in mounded rows 3m apart. Plants are 0.8m apart within the row. Each mature four year old or greater plant produces an average of 4kg of fruit per season. Some growers will obtain yields above this figure but many plants produce less depending on the season. Full production occurs in year 3 or 4 with the first year in the ground giving zero production as most growers remove fruit and flowers to help in establishment. Year 2 plants yield 0.5-1kg and year 3 plants yield 2-3kg fruit.

In southern Australia there are 2000 to 2100 plants per hectare. Each plant produces 8-10 kg of fruit. Full production does not occur until year five.

Punnets are packed at 140g, which allows for 8-10% shrinkage given a nominal weight of 125grams per punnet. Trays weigh1.5 kilograms (12 punnets) and prices range from $60 early in the season down to $20 dollars. $30/tray and $35/tray for southern Australia and northern NSW respectively, was used as an average price throughout the season.

The plant rows are covered with a poly weedmat with two irrigation lines laid beneath the mat at the time of hilling and woodchip mulch is applied around the planting hole to reduce weeds.

Southern Growers install permanent drip irrigation lines suspended 300mm above the beds attached to a wire trellis. Wood chip mulch is used instead of weedmat and is replaced annually. Costs include purchase and machine costs to spread the mulch.

Preliminary trials indicate that blueberries require 3-5ML/ha of water. Fertigation is the preferred method of supplying fertiliser to plants. A typical fertiliser injection system (D20 Dosatron®) and filters has been included in the establishment costs which includes installation. The double drip line delivers 1.3L/hr per dripper where the single delivers 1.6L/hr per dripper.

The costs of building a dam and providing liners, pumps, filters, mains etc. for a 4 ha orchard have not been included in the establishment costs due to the many variations that will be specific to a farm or site.

Chemical costs were collected from a local supplier and were correct at the time of publication.

Total exclusion netting is essential for production. The cost of netting one hectare is included on the gross margin, which is permanent bird netting supplied and erected by a contractor. The netting costs could be delayed until year 3 or 4 but is far more cost effective to erect netting before mounding and planting. Temporary netting will save initial set up costs but there will be an additional annual cost of removing and re-netting the orchard each season.

These costs are only a guide. They do not include overhead, fixed costs or GST.

The management practices or products outline in the budget does not imply a recommendation by NSW Department of Primary Industries. The management practices and products outlined in the budget are only a guide to costs and practices currently used in the field.

Tables for Northern NSW

Table 1: Blueberry establishment costs for Northern NSW (per ha)

Blueberry establishment costs	Operation	Unit	Units/ha	Unit cost	Total cost
Site establishment costs				$/unit	$/ha
Ground preparation machinery costs 77-90HP (57-66kW) tractor Fuel, oil, repairs, maintenance (FORM)	Herbicide application (FORM)	hours	2	$49.00	$98.00
	Herbicide cost	litres	4	$11.30	$45.20
	Herbicide labour	hours	2	$25.34	$50.68
	Deep ripping + plough (FORM)	hours	7	$49.00	$343.00
	Deep ripping labour	hours	7	$25.34	$177.38
	Sow green manure crop (FORM)	hours	1.5	$49.00	$73.50
	Green manure seed cost	kg	25	$1.85	$46.25
	Fertilise green manure	kg	100	$0.40	$40.00
	Labour for green manure fertiliser	hours	1.5	$25.34	$38.01
	Mark out rows	hours	4	$25.34	$101.36
	Rotary hoe roes (FORM)	hours	5	$49.00	$245.00
	Rotary hoe labour (2 people) – 125 HP (93 kW) tractor and mound/bank former	hours	5	$25.34	$126.70
Planting preparation machinery costs	Bed mounding (labour)	hours	35	$25.34	$886.90
	Weedmat laying and mounding (FORM)	hours	16	$49.00	$784.00
	Weedmat cost (1800mm wide) 50m roll and hardwood mulch around plants	metres	3300	$0.90 $1,800.00	$2,970.00 $1,800.00
Irrigation costs	Irrigation drip lines $295/500m - 2 lines/row 1.3L/hr	metres	6600	$295.00	$3,895.00
	Dosatron fertigation system (D20) filters plus supply and install				$6,500.00
Planting costs	Suscon Blue (Scarab control)	10kg	2	$174.50	$349.00
	Metalaxyl (Phytophthora control)	10kg	2	$175.00	$350.00
	Fertiliser (slow release)	25kg	1	$29.35	$29.35
	Plants (each) 3700/ha (5 Inch pot)	each	3700	$8.10	$29,970.00
	Replacement plants (5%)	each	185	$8.10	$1,498.50
	Planting labour (4 people 2 mins/plant)	hours	124	$25.34	$3,142.16
	Replacement labour (2 mins/plant)	hours	6.17	$25.34	$156.35
	Cutting and marking holes for plants (2 people)	hours	18	$25.34	$456.12
Netting costs	Poles, cables, bedlogs, bird netting	m^2	10,000.00	$5.00	$50,000.00
				Subtotal	104,171.46
New packing facilities	Packing shed (for 4 hectares of blueberries)				$100,000.00
	Coolroom				$50,000.00
	Air cond.				$4,400.00
	Scales, tables				$3,000.00
	Packing line				$50,000.00
Subtotal packing facilities	Add to total establishment cost of building a shed				$207,171.46
Total land preparation and establishment cost					**$104,171.46**

Table 2: Blueberry gross margin for 1 ha, based on a 4 ha blueberry orchard in Northern NSW with 4 year-old bushes. Yield is estimated at 4kg per plant.

Description	Operation	Number	Units	Units/ha	Unit costs$	Standard budget $/ha	Your budget $/ha
Income (A) sale of fruit		8706		trays/ ha @	$35.00	$304.706	
Machinery operation (labour)	Mowing/slashing	10	hours	2	$25.34	$506.80	
	Pesticide application	12	hours	2	$25.34	$608.16	
	Fungicide application	12	hours	2	$25.34	$608.16	
	Herbicide application	4	hours	2	$25.34	$202.72	
	Weeding plant holes	3	hours	8	$25.35	$608.16	
	Machinery pump maintenance	11	days	7	$25.34	$1,951.18	
	Mulch prunings	2	hours	2	$25.34	$101.36	
Machinery (fuel, oil, repairs and maintenance) FORM	57-66kW (77-90 HP) tractor/slasher and spray		hours	25	$49.00	$1,225.00	
Fertigation (25 kg bags)	Liquifert MAP	52	kg	5	$2.60	$676.00	
	Pinnacle (ammonium nitrate)	52	kg	2	$0.88	$91.52	
	Liquifert K spray	52	kg	2.5	1.92	$249.60	
	Solubor	52	kg	0.05	$2.75	$7.15	
	Zinc sulfate	52	kg	0.065	$1.52	$5.14	
	Iron sulfate	52	kg	0.125	$0.98	$6.37	
	Magnesium sulfate	52	kg	2	$0.56	$58.24	
	Copper sulfate	52	kg	0.075	$5.20	$20.28	
	Manganese sulfate	52	kg	0.01	$1.66	$0.86	
	Calcium nitrate	52	kg	3	$0.88	$68.64	
	Leaf test	26	Kit	1	$80.00	$80.00	
	Soil test	1	Kit	1	$125.00	$125.00	
Foliar sprays (evergreen system April to June weekly)	Mono pot. Phosphate (per 2 weeks March to May)	6	kg	5	$3.16	$94.80	
	Magnesium sulphate	6	kg	3	$0.56	$10.08	
	Boron	6	kg	0.027	$4.34	$0.70	
	Easy N	8	litres	10	$1.20	$96.00	
Insect control	Aphids (Aphidex 500)	1	kg	0.3	$51.00	$15.30	
	Light brown apple moth (Success)	2	litres	0.48	$490.00	$470.40	
	Western flower thrip (Spinosad)	1	litres	0.48	$192.50	$92.40	
	Queensland Fruit fly (Dimethoate)	12	litres	0.75	$11.75	$105.75	
	Scarab (Suscon Blue)	1	kg	11	$17.45	$191.95	
	Heliothis (Lannate)	1	litres	0.6	$11.87	$7.12	

Description	Operation	Number	Units	Units/ha	Unit costs$	Standard budget $/ha	Your budget $/ha
	Leaf roller (Lannate)	1	litres	0.6	$11.87	$7.12	
	Monolepta (Lannate)	1	litres	0.6	$11.87	$7.12	
	Plague thrip (Lannate)	1	litres	0.6	$11.87	$7.12	
	Scale (White petroleum oil)	1	litres	10.2	$3.65	$37.23	
	Red spider mite (Acramite)	1	litres	0.8	$320.00	$2.92	
	Elephant weevil (Farmoz venom)	4	litres	0.6	$9.00	$21.60	
Disease control (fungicides)	Rust fungicide (Mancozeb)	6	kg	2	$10.25	$123.00	
	Rust fungicide (Tilt 250EC)	6	litres	0.192	$23.30	$26.84	
	Rust fungicide (Pristine)	2	kg	1.5	$198.00	$594.00	
	Phytophthora (Agrifos foliar)	1	litres	1	$4.10	$4.10	
	Botrytis (Switch, Scala)	4	kg	1	$205.00	$820.00	
	Anthracnose (Captan)	4	kg	0.75	$19.70	$59.10	
Pruning costs	Detail pruning and thinning	1	hours	185	$25.34	$4,687.90	
Weed control	Glyphosate	4	litres	4	$7.00	$112.00	
	Basta	2	litres	1.5	$22.75	$68.25	
	Hardwood woodchip mulch	1	annual appl.		$1,350.00	$1,350.00	
Harvesting and packing	Picking and packing (incl.field sort)	1	tray	8,706	$14.31	$124,581.18	
	Punnets (125g)	1	punnet	104,471	$0.23	$24,028.24	
	Trays (12 punnets)	1	tray	8,706	$0.98	$8,531.76	
Irrigation costs	1 Ha		ML	3	$26.00	$78.00	
Transport costs	Freight – Sydney (140 trays/pallet)	1	tray	8706	$1.24	$10,795.29	
Commission and levies 12%	Sydney, Melbourne					$36,564.71	
Total variable costs (B)						$220,792.33	
Cost per tray (12 punnets)						$25.36	
Gross Margin (A-B)						$83,913.55	

Table 3: Cost summary/hectare/year – Northern NSW

Cost Summary	Total	Cost/tray (12)	% Cost
Irrigation	$ 78.00	$ 0.01	0.0%
Disease control fungicides	$ 1,627.04	$ 0.19	0.7%
Insect control insecticides	$ 966.04	$ 0.11	0.4%
Weed control herbicides	$ 1,530.38	$ 0.18	0.69%
Nutrition	$ 1,590.38	$ 0.18	0.7%
Pruning and thinning	$ 4687.90	$ 0.54	2.1%
Machinery	$ 5,811.54	$ 0.67	2.6%
Marketing	$ 47,360	$ 5.43	21.5%
Packing materials	$ 32,560.00	$ 3.74	14.7.1%
Picking and packing	$ 124,581.18	$ 14.31	56.4.8%
Total	$ 220,792.33	$ 25.36	100.00%

Table 4: Sensitivity analysis for blueberries in northern NSW – effect of yield and price on gross margin/ha

Yield trays/ ha	$20.00	$25.00	$30.00	$35.00	$40.00	$45.00	$50.00	$60.00
2000	-$ 180,792.33	-$ 170,792.33	-$ 160,792.33	-$ 150,792.33	-$ 140,792.33	-$ 130,792.33	-$ 120,792.33	-$ 100,792.33
3000	-$ 160,792.33	-$ 145,792.33	-$ 130,792.33	-$ 115,792.33	-$ 100,792.33	-$ 85,792.33	-$ 70,792.33	-$ 40,792.33
4000	-$ 140,792.33	-$ 120,792.33	-$ 100,792.33	-$ 80,792.33	-$ 60,792.33	-$ 40,792.33	-$ 20,792.33	$ 19,207.67
5000	-$ 120,792.33	-$ 95,792.33	-$ 70,792.33	-$ 45,792.33	-$ 20,792.33	$ 4,207.67	$ 29,207.67	$ 79,207.67
6000	-$ 100,792.33	-$ 70,792.33	-$ 40,792.33	-$ 10,792.33	$ 19,207.67	$ 49,207.67	$ 79,207.67	$ 139,207.67
7000	-$ 80,792.33	-$ 45,792.33	-$ 10,792.33	$ 24,207.67	$ 59,207.67	$ 94,207.67	$ 129,207.67	$ 199,207.67
8000	-$ 60,792.33	-$ 20,792.33	$ 19,207.67	$ 59,207.67	$ 99,207.67	$ 139,207.67	$ 179,207.67	$ 259,207.67

Tables for Southern Australia

Table 5: Blueberry establishment costs for Southern Australia (per ha)

Blueberry establishment costs	Operation	Unit	Units/ha	Unit cost	Total cost
Site establishment costs				$/unit	$/ha
Ground peparation machinery costs 77-90HP (57-66kW) tractor Fuel, oil, repairs, maintenance (FORM)	Herbicide application (FORM)	hours	2	$49.00	$98.00
	Herbicide cost	litres	4	$11.30	$45.20
	Herbicide labour	hours	2	$25.34	$50.68
	Deep ripping + plough (FORM)	hours	7	$49.00	$343.00
	Deep ripping labour	hours	7	$25.34	$177.38
	Sow green manure crop (FORM)	hours	1.5	$49.00	$73.50
	Green manure seed cost	kg	25	$1.85	$46.25
	Fertilise green manure	kg	100	$0.40	$40.00
	Labour for green manure fertiliser	hours	1.5	$25.34	$38.01
	Mark out rows	hours	4	$25.34	$101.36
	Rotary hoe roes (FORM)	hours	5	$49.00	$392.00
	Rotary hoe labour (2 people) – 125 HP (93 kW) tractor & mound/bank former	hours	5	$25.34	$405.44
Planting preparation machinery costs	pH adjust sulfur contract spread	appl.	1	$1,066.00	$1,066.00
	Rotary hoe sulfur (FORM)	hours	8	$49.00	$392.00
	Rotary hoe labour (2 people)	hours	16	$25.34	$405.44
	Bed mounding (labour)	hours	40	$25.34	$1,013.60
	Bed mounding (FORM)	hours	20	$49.00	$980.00
	Compost	m^3	60	$30.00	$1,800.00
	Labout for compost	hours	26	$25.34	$658.84
	Machinery for compost (FORM)	hours	13	$49.00	$637.00
	Hardwood mulch	m^3	60	$30.00	$1,800.00
	Vermin proof fencing	metres	500	$16.00	$8000.00
Planting costs	Suscon Blue (Scarab control)	10kg	2	$174.50	$349.00
	Metalaxyl (Phytophthora control)	10kg	2	$175.00	$350.00
	Fertiliser (slow release)	25kg	1	$29.35	$29.35
	Plants (each) 2000/ha (5 Inch pot)	each	2,000	$8.10	$16,200.00
	Replacement plants (5%)	each	100	$8.10	$810.00
	Planting labour (4 people 2 mins/plant)	hours	67	$25.34	$1697.78
	Replacement labour (2 mins/plant)	hours	3.4	$25.34	$86.16
	Cutting and marking holes for plants (2 people)	hours	18	$25.34	$456.12
Irrigation costs	Dosatron fertigation system (D20) filters plus supply and install				$6,500.00

Blueberry establishment costs	**Operation**	**Unit**	**Units/ha**	**Unit cost**	**Total cost**
	Steel posts, wire and cross members		320	$16.00	$5,120.00
	Pressure comp. drip line above bed	metres	3000	$0.70	$2,100.00
	Layout for irrigation installation (2 people)	hours	32	$25.34	$810.88
Netting costs	Poles, cables, bedlogs, birdnetting	m^2	10000	$5.00	$50,000.00
				Subtotal	$96,572.99
New packing facilities	Packing shed (for 4 hectares of blueberries)				$100,000.00
	Coolroom				$50,000.00
	Air cond.				$4,400.00
	Scales, tables				$3,000.00
	Packing line				$50,000.00
Subtotal packing facilities	Add to total establishment cost of building a shed				$207,400.00
Total land preparation and establishment cost					**$96,572.99**

Table 6: Blueberry gross margin for 1 ha, based on a 4ha blueberry orchard in southern Australia with five year-old bushes. Yield is estimated at 8kg per plant.

Description	**Operation**	**Number**	**Units**	**Units/ha**	**Unit costs$**	**Standard budget $/ha**	**Your budget $/ha**
Income (A) sale of fruit		9412		trays/ha @	$30.00	$282,353	
Machinery operation (labour)	Mowing/slashing	10	hours	2	$25.34	$506.80	
	Pesticide application	12	hours	2	$25.34	$608.16	
	Fungicide application	12	hours	2	$25.34	$608.16	
	Herbicide application	4	hours	2	$25.34	$202.72	
	Weeding plant holes	3	hours	8	$25.35	$608.16	
	Machinerary pump maintenance	11	days	7	$25.34	$1,951.18	
	Mulch prunings	2	hours	2	$25.34	$101.36	
Machinery (fuel, oil, repairs and maintenance) FORM	57-66kW (77-90 HP) tractor/slasher and spray		hours	25	$49.00	$1,225.00	
Fertigation (25 kg bags)	Liquifert MAP	52	kg	5	$2.60	$676.00	
	Pinnacle (ammonium nitrate)	52	kg	2	$0.88	$91.52	
	Liquifert K spray	52	kg	2.5	$1.92	$249.60	
	Solubor	52	kg	0.05	$2.75	$7.15	
	Zinc sulfate	52	kg	0.065	$1.52	$5.14	
	Iron sulfate	52	kg	0.125	$0.98	$6.37	
	Magnesium sulfate	52	kg	2	$0.56	$58.24	
	Copper sulfate	52	kg	0.075	$5.20	$20.28	

Description	Operation	Number	Units	Units/ha	Unit costs$	Standard budget $/ha	Your budget $/ha
	Manganese sulfate	52	kg	0.01	$1.66	$0.86	
	Calcium nitrate	26	kg	3	$0.88	$68.64	
	Leaf test	1	Kit	1	$80.00	$80.00	
	Soil test	1	Kit	1	$125.00	$125.00	
Insect control	Aphids (Aphidex 500)	1	kg	0.3	$51.00	$15.30	
	Light brown apple moth (Success)	2	litres	0.48	$490.00	$470.40	
	Light brown apple moth (Isomate pheromone ties)	1	twist ties	50	$3.25	$162.50	
	Western flower thrip (Spinosad)	1	litres	0.48	$192.50	$92.40	
	Scarab (Suscon Blue)	1	kg	11	$17.45	$191.95	
Disease control (fungicides)	Rust funcgicide (Mancozeb)	1	kg	2	$10.25	$20.50	
	Rust fungicide (Tilt 250EC)	1	litres	0.192	$23.30	$4.47	
	Phytophthora (Agrifos foliar)	1	litres	1	$4.10	$4.10	
	Botrytis (Switch, Scala)	2	kg	1	$205.00	$410.00	
Pruning costs	Detail pruning and thinning	1	hours	185	$25.34	$4,687.90	
Weed control	Glyphosate	4	litres	4	$7.00	$112.00	
	Basta	2	litres	1.5	$22.75	$68.25	
	Hardwood woodchip mulch	1	annual appl.		$1,3500.00	$1,350.00	
Harvesting and packing	Picking and packing (incl.field sort)	1	tray	9412	$14.31	$134,682.35	
	Punnets (125g)	1	punnet	112,941	$0.23	$24,028.24	
	Trays (12 punnets)	1	tray	9412	$0.98	$8,531.76	
Irrigation costs	1 Ha		ML	3	$26.00	$78.00	
Transport costs	Freight (140 trays/pallet)	1	tray	9412	$1.24	$11,670.59	
Commision and levies 12%	Sydney, Melbourne					$33,882.35	
Total variable costs (B)						**$229,966.82**	
Cost per tray (12 punnets)						$24.43	
Gross Margin (A-B)						**$52,386.12**	

Table 7: Cost summary/hectare/year – Southern Australia

Cost Summary	Total	Cost/tray (12)	% Cost
Irrigation	$ 78.00	$ 0.01	0.0%
Disease control fungicides	$ 439.07	$ 0.05	0.2%
Insect control insecticides	$ 697.35	$ 0.07	0.3%
Weed control herbicides	$ 1,530.25	$ 0.16	0.7%
Nutrition	$ 1,388.77	$ 0.15	0.6%
Pruning and thinning	$ 4687.77	$ 0.50	2.0%
Machinery	$ 5710.18	$ 0.61	2.5%
Marketing	$ 45,552.94	$ 4.84	19.8%
Packing materials	$ 35,200	$ 3.74	15.3%
Picking and packing	$ 134,682.35	$ 14.31	58.6%
Total	**$ 229,966.82**	**$ 24.43**	**100.00%**

Table 8: Sensitivity analysis for blueberries in southern Australia - effect of yield and price on gross margin/ha

Yield trays/ ha	$20.00	$25.00	$30.00	$35.00	$40.00	$45.00	$50.00	$60.00
2000	-$ 189,996.82	-$ 179,996.82	-$ 169,966.82	-$ 159,966.82	-$ 149,966.82	-$ 139,966.82	-$ 129,966.82	-$ 109,966.82
3000	-$ 169,966.82	-$ 154,966.82	-$ 139,966.82	-$ 124,966.82	-$ 109,966.82	-$ 94,996.82	-$ 79,966.82	-$ 49,966.82
4000	-$149,966.82	-$ 129,966.82	-$ 109,966.82	-$ 89,966.82	-$ 69,966.82	-$ 49,996.82	-$ 29,966.82	$ 10,003.18
5000	-$129,966.82	-$ 104,966.82	-$ 79,996.82	-$ 54,966.82	-$ 29,966.82	-$ 4,966.82	$ 20,033.18	$ 70,033.18
6000	-$109,966.82	-$ 79,966.82	-$ 49,966.82	-$ 19,966.82	$ 10,033.18	$ 40,033.18	$ 70,033.18	$ 130,033.18
7000	-$ 89,966.82	-$ 54,966.82	-$19,966.82	$ 15,033.18	$ 50,033.18	$ 85,033.18	$ 120,033.18	$ 190,033.18
8000	-$ 69,966.82	-$ 29,966.82	$10,033.18	$ 50,033.18	$ 90,033.18	$ 130,033.18	$ 170,033.18	$ 250.033.18

Acknowledgments

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For updates go to www.dpi.nsw.gov.au

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Appendix P

Plant Biosecurity *Manual Tasmania*



Edition
2018

Department of
Primary Industries, Parks, Water and Environment

Tasmanian Government

Conditions and Restrictions in Relation to the Importation of Prescribed Matter

Plant Quarantine Act 1997

Section 68

I, Lloyd Klumpp, being and as the holder of the office of General Manager, Biosecurity Tasmania, Department of Primary Industries, Parks, Water and Environment, as delegate of the Secretary of the Department of Primary Industries, Parks, Water and Environment under Section 7 of the *Plant Quarantine Act 1997* (the Act) do hereby revoke the Notice made under Section 68 of the Act on 2nd day of December 2016 and, pursuant to Section 68 of the Act do hereby impose, effective from 13th December 2017, the following revised conditions and restrictions in relation to the importation of prescribed matter as specified in Sections 2 & 3 of the Plant Biosecurity Manual Tasmania – 2018 Edition which forms part of this Notice.

Dated this 29th day of November 2017

Lloyd Klumpp
GENERAL MANAGER
BIOSECURITY TASMANIA

Explanatory Note:

Suppliers and importers of plants, plant products and other prescribed matter, and other interested parties, should note the revised conditions and restrictions to which the Notice above refers, include but are not limited to:

- Flagging the introduction of a new import requirement for Tomato Potato Psyllid (IR46);
- Removal of Appendix 2.3 which housed copy of a now expired Section 68 Notice for products which may vector Green Snail;
- Minor corrections to entries in Table 2 Import Requirement Summary Table;
- Range of changes to Biosecurity Tasmania 'Contacts' page;
- Changes in acceptance status of several Interstate Certification Assurances (ICAs) as recognised by Biosecurity Tasmania (see Section 2.18);
- Update of Tasmania's Regulated Quarantine Pest List A & B Pests and Diseases (Appendix 1.1), and Unwanted Quarantine Pests (& Diseases) (Appendix 1.2), including the declarations of *Tomato Potato Psyllid*, *Potato Spindle Tuber Viroid*, and many weed species as Regulated Quarantine pests, along with revocation of *Barley Stripe Mosaic Virus* to a pest of Non-Quarantine Pest status.

Copies of the Plant Biosecurity Manual Tasmania – 2018 Edition, may be downloaded from DPIPWE's web site at www.dpipwe.tas.gov.au

Plant Biosecurity Manual Tasmania – 2018 Edition
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About the Manual
Parts 2 and 3 of this Manual sets out conditions and restrictions for the importation of prescribed matter pursuant to s68 of the *Plant Quarantine Act 1997*, as determined by the Secretary or their designated delegates, Department of Primary Industries, Parks, Water and Environment (DPIPWE).

The *Plant Biosecurity Manual Tasmania* is prepared by DPIPWE for the use of businesses and individuals involved in importing and exporting plants, plant products and other prescribed matter

The Manual is a managed document. The Manual's subsequent revision(s) and re-issue are controlled and issued by the Plant Biosecurity & Diagnostics Branch, DPIPWE. For identification of amendments, each page contains an Edition number and a page number. Changes will only be issued as a complete replacement document. Recipients should remove superseded versions from circulation. Recipients are responsible for accurate citation when referring to this Manual.

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Cereal crop – DPIPWE Image Library; tropical orchid - courtesy of Andrew Bishop; potatoes – courtesy of John Farrow.

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For more information about this Manual, please contact:
Biosecurity Operations Branch, 13 St Johns Avenue, New Town, TAS, 7008;

Phone: + 61 (0)3 6165 3777
Fax: + 61 (0)3 6173 0225
Email: biosecurity.tasmania@dpipwe.tas.gov.au

PLANT BIOSECURITY MANUAL

TASMANIA

Conditions and restrictions prepared by Department of Primary Industries, Parks, Water and Environment for the import and export of plants, plant products and other prescribed matter for the purpose of the *Plant Quarantine Act 1997* (Tasmania)

CONTENTS

BIOSECURITY TASMANIA:

Biosecurity Operations Branch (BOB) Contacts

PRIMARY CONTACT

Phone: +61(0)3 6165 3777
Fax: +61(0)3 6173 0225

General enquiries: biosecurity.tasmania@dpipwe.tas.gov.au
For booking: biosecurity.bookings@dpipwe.tas.gov.au

REGIONAL CONTACTS

SOUTH	NORTH	NORTH WEST
13 St John's Ave New Town Research Labs New Town	165 Westbury Rd, Mt Pleasant Labs Prospect	Stony Rise Government Centre Rundle Road Devonport
Postal: 13 St John's Ave New Town 7008	**Postal:** PO Box 46 Kings Meadows 7249	**Postal:** PO Box 303 Devonport 7310
Ph. +61(0)3 6165 3777	Ph. +61(0)3 6777 2162	Ph. +61(0)3 6478 4110

PLANT BIOSECURITY & DIAGNOSTICS BRANCH

Domestic Trade & Liaison Officer

Tania Jensen*
Phone: +61(0)3 6777 2160

* Primary contact for enquiries on Import Requirements & Interstate Certification Assurance matters of concern

Part 1 - Background

1.1 Authority and Range of Powers

Section 68 of the *Plant Quarantine Act 1997* (the Act) provides the Secretary, Department of Primary Industries, Parks, Water and Environment (DPIPWE), with the power to impose conditions and restrictions on the importation of prescribed matter.

Prescribed matter is defined in the Act as any plant, plant product, package, vehicle, agricultural equipment, and soil or disease agent.

Section 73 allows an inspector under the Act to examine any prescribed matter imported into the State and moved into an approved quarantine place. If an inspector reasonably believes any prescribed matter is not free from any pest or disease, they can direct it to be treated or dealt with in some other manner. This applies to any prescribed matter, whether it is subject to an import requirement, or not.

It is an offence to import or allow to be imported any List A pest of disease or any List B pest or disease.

Please note the powers for infringement notices as a result of non-compliance (see Section 1.7).

1.2 Purpose

The purpose of the *Plant Biosecurity Manual Tasmania* (this Manual) is to give practical expression to the law, to enable timely changes to be made in response to new situations, and to assist business and the general public to comply with the Act. It specifies measures needed to fulfil the requirements of the Act.

1.3 Exemption

A person may apply to the Secretary of DPIPWE for an exemption from the application of the Act or measures in this Manual, in respect of any prescribed matter, place, person, or class of persons, in accordance with Section 99 of the Act. For information on how to do so applicants should contact the Plant Biosecurity & Diagnostics Branch at "biosecurity.planthealth@dpipwe.tas.gov.au", in the first instance.

1.4 References

- *Plant Quarantine Act 1997* (the Act) (see www.thelaw.tas.gov.au)
- *Plant Quarantine Regulations 2007* (the Regulations) (see www.thelaw.tas.gov.au)
- Tasmanian List A & B declared pests and diseases, as published annually under section 12 of the Act (see Appendix 1 of this Manual)
- Notices under sections 66 and 67 of the Act - Prohibited and Restricted Plants and Plant Products respectively (see Appendix 2 of this Manual)

1.5 Manual Publication and Updates

This Manual is available on the Department of Primary Industries, Parks, Water and Environment web site at: http://www.dpipwe.tas.gov.au.

The Manual is updated periodically. Updates between manual editions are also advised electronically to registered biosecurity stakeholders. Register for such news items at: http://www.dpipwe.tas.gov.au.

1.6 Fees and Charges

Part 2 and Schedules 1, 2 and 3 of the *Plant Quarantine Regulations 2007* (the Regulations) detail the fees and charges payable under the Act. They are calculated on a cost recovery basis in accordance with the Department's Pricing Policy. Fees and charges are payable by:

- carriers (Schedule 1 of the Regulations);
- persons requesting a certificate of release (Schedule 2 of the Regulations); and
- persons making an application under the Act (Schedule 3 of the Regulations).

1.7 Non-Compliance and Infringement Notices

Infringement notices may be served for the offences prescribed in Schedule 4 of the Regulations.

Schedule 4 distinguishes between penalties payable by a "body corporate" and a "natural person". The serving of an infringement notice effectively charges the person or company with violating one or more of the requirements of the Act.

The person or company may accept an infringement notice and pay the penalty (a fine) within 28 days. This is equivalent to pleading guilty, and avoids court proceedings. However, if they decline to pay, they will be convicted after 28 days. To go to court to dispute the fine, they must elect to do so as per advice on the infringement notice.

The Act allows for one infringement notice to include up to three offences. A penalty cannot be paid on the spot. It must be paid by one of the methods as stated on the infringement notice.

1.8 Audits

Audits of quality assurance arrangements, and of other types of arrangements between Biosecurity Tasmania and accredited businesses, are undertaken on a regular basis. The procedures for performing audits and the frequency of audits will be discussed at the time the business enters into an arrangement with Biosecurity Tasmania.

1.9 Tasmanian Plant Biosecurity Pest Categorisation System

In mid-December 2011, *Biosecurity e-Advisory 67/2011 - Plant Pests and Quarantine Requirements*, was issued to explain to registered biosecurity stakeholders, that Tasmanian plant biosecurity is now using a 'three tier' pest (& disease) categorisation system, when classifying the level of risk a given pest presents to the State.

When a potential quarantine pest is first risk assessed, a recommendation will be made whether the pest is:

1. A *Regulated Quarantine Pest (RQP)*; or
2. An *Unwanted Quarantine Pest (UQP)*; or
3. A *Non-Quarantine Pest (NQP)*.

The selection criteria for each category of pest are fully described in *Standard Operating Procedure No. 10 – Routine Import Risk Analysis (IRA) Methodology*.

The sections of the Act that each category of pest is declared is summarised as follows:

Quarantine Pest Category versus Section of the Act under which it is Declared

Quarantine Pest (QP) Category	**Section of the Act Declared**		**Regulatory Control**
	Pest	**Disease**	
Annual Section 12 List A & B Pests (& Diseases) - RQPs	s12	s12	
Regulated QP (RQP)	s8 & s10	s9 & s11	Formal IR for each pest
Unwanted QP (UQP)	s8	s9	Industry QA (no IR)
Non-QP (NQP)	None	None	Standard hygiene barrier inspection practices

Note: IR = Import Requirement; QA = Quality Assurance; s = Section (of the Act)

1.10 Publication of Pests and Diseases

The Plant Biosecurity Manual Tasmania (PBMTas) now holds published lists of both its *Regulated Quarantine Pests (RQPs)* and *Unwanted Quarantine Pests (UQPs)*. These lists are also held online as downloadable PDF documents on DPIPWE's website (under 'Biosecurity Tasmania') at: http://www.dpipwe.tas.gov.au

- Tasmanian plant biosecurity's RQPs are its List A and B Pests and Diseases, published annually as required under Section 12 of the Act (see Appendix 1.1).
- Generally, List A pests or diseases do not occur in Tasmania, whilst List B pests or diseases do occur in Tasmania, and are under some form of official control.
- Tasmanian plant biosecurity's list of UQPs is provided in Appendix 1.2.

Please note that the Lists of pests and diseases can be modified at any time. Additional declarations may be made for pests or diseases that have been either:

1. newly declared; or
2. amended in scientific name; or
3. altered in terms of their List status (List A or B); or
4. revoked from the Lists.

Any pest declaration changes are normally notified to stakeholders through its online voluntary registry of biosecurity stakeholders.

1.11 Tasmanian Biosecurity Fact Sheets

A series of 'plain English' biosecurity fact sheets have been written for the general public to explain in basic terms key issues surrounding some of the more complex IRs (such as the importation of seeds and nursery stock), along with biosecurity issues of general interest under subject fields like:

- Emergency Response;
- Imports;
- Pests and Diseases;
- Hobby Farmers & Smallholders, etc.

Please see http://www.dpipwe.tas.gov.au and search for biosecurity fact sheets.

Part 2 - Conditions and Restrictions on Prescribed Matter

EXPLANATORY NOTE: *This Manual has been produced pursuant to section 68 of the Plant Quarantine Act 1997 (the Act). Parts 2 and 3 of the Manual contain conditions and restrictions on the importation of prescribed matter, including plants and plant product, into Tasmania. Failure to comply with the conditions and restrictions in this Manual is an offence under the Act which may result in prosecution.*

2.1 Permitted Points of Entry

A person must not import or cause to be imported into Tasmania any plants or plant products except:

2.1.1 At one of the following seaports:

Hobart	Lady Barron
Risdon	Bridport
Port Huon	St Helens
Spring Bay	Devonport
Strahan	Burnie
Launceston	Port Latta
Bell Bay	Wynyard
Inspection Head	Stanley
Longreach	Smithton
Whitemark	Grassy
Naracoopa	Currie

OR

2.1.2 At one of the following airports:

Hobart Airport	Whitemark Airport
Cambridge Airport	Devonport Airport
Launceston Airport	Wynyard Airport
St Helens Aerodrome	Smithton Airport
Bridport Aerodrome	King Island Aerodrome

2.2 Provision of Notification, Certification and Clearances Notices with Imported Plants, Plant Products and/or Prescribed Matter

A person or importer must not import, or cause to be imported, into Tasmania any plants or plant products, or prescribed matter, unless:

2.2.1 The person provides, not less than 24 hours prior to the importation, the relevant biosecurity Notice of Intention* (NoI) to a Biosecurity Tasmania inspector, by means of fax, email, or in person at a Biosecurity Tasmania Operations Centre, as listed on the form for the relevant permitted point of entry in Tasmania;

AND

2.2.2 The person or importer provides all relevant imported goods certification and clearance notices that clearly demonstrate that the prescribed matter, plants and/or plant products listed on the documentation match the certification documentations accompanying each consignment of imported goods.

EXPLANATORY NOTES:

- **In the form provided as a downloadable PDF on-line, at the following web address: www.dpipwe.tas.gov.au/quarantineforms . You must fill out the correct NoI, legibly and in full, relevant to the type of plant or plant product, or prescribed matter, being proposed to be imported into Tasmania;*
- *Please note, as specified on the NoI, any plants, plant material (such as leaves for scientific analysis) or seeds for sowing imported must be identified by their scientific name (Genus and species)*
- *If the plant, plant product, or prescribed matter is of a type to which a specific import requirement(s) applies, the relevant import requirement may also require the production of additional documentation. See the import requirements for details under Section 2.21 of the Manual;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocols ICA-17 (Splitting Consignments and Reconsigning Original Consignments of Certified Produce), ICA-57 (Repacking of Fruit Fly and Phylloxera Host Produce) or ICA-58 (Certification of Composite Lots) satisfy Clause 2.2.2.*

2.3 Post Importation Inspection

2.3.1 Any person who has imported plants or plant product into Tasmania must provide the following to an Inspector* (*see definition; Section 2.19 of this Manual) immediately upon arrival:

I. The plants or plant product; **and**

II. Any documentation that is required to be produced in accordance with an applicable Import Requirement (Restriction);

and

2.3.2 A copy of the Notice of Intention (NoI) to Import referred to in Section 2.2.

2.3.3 A person must not remove any imported Plants or Plant Products from the Permitted Point of Entry into which they imported until they have complied with Section 2.3.1 above.

2.4 Soil

2.4.1 Soil is prohibited entry to Tasmania. Any prescribed matter imported into the State, including potting media, must be free of soil. The only exceptions to this prohibition are:

I. when small lots of soil may be allowed import into Tasmania for scientific analysis, in controlled and secure laboratory conditions, as specified under Import Requirement 37. On completion of analysis, the soil is destroyed in secure conditions prior to disposal; **or**

II. a maximum tolerance limit of up to 0.1% by weight of the sample submitted for testing, in the bulk import of:

(a) animal feed grain (see Import Requirement 30, Clause III); **or**

(b) seed (see Import Requirement 36 – Restricted Seeds (Soils and Stones)).

2.4.2 'Soil' is defined as the top layer of the Earth, consisting or rock and mineral particulates that may be mixed with organic matter in which plants grow or are grown.

2.5 Potting media

2.5.1 A person must not import potting media into Tasmania except in accordance with the following conditions:

I. The potting media has been commercially produced; **and**

II. The potting media is free of soil.

2.5.2 Other specific import requirements may apply to potting media such as Import Requirements 15 and 38.

2.6 Declared Weeds as Contaminants

Plants 'declared' as weeds under the Weed Management Act 1999 are prohibited entry into Tasmania (see http://dpipwe.tas.gov.au/invasive-species/weeds/weeds-index). Importers must not introduce declared weed and/or weed propagules when importing prescribed matter into the State. Particular caution must be paid in regard to high risk entry pathways, including used agricultural equipment and machinery, vehicles (new and used), bulk commodity imports such as fodder, straws such as bedding straw or pea straw, compost, shipping containers, and livestock. Machinery and equipment must be carefully washed down (see Section 2.12), and fodder/bedding should be weed seed free (see Section 2.16).

2.7 Alternative Fumigation & Treatment Standards

Biosecurity Tasmania, as a general rule, accepts a range of international fumigation and treatment standards that may be required in regulation by the Commonwealth of Australia, when it treats imports of plant product into the country from overseas, and that same product is sought to be forwarded on for import into the State. Not all of these alternative treatment options are necessarily cited within this manual of Tasmanian biosecurity regulations for import of plant and plant product into the State. Examples of such standards may include:

- Alternative heat treatment regimes of prescribed matter; **and/or**
- carbon dioxide and sulphur dioxide fumigation standards for selected lines of plant product.

Consequently, it is important to always first confirm with Biosecurity Tasmania, what alternative treatment options it may accept, further to those specified in the *Plant Biosecurity Manual Tasmania.*

2.8 Semi-processed and Processed Plant Products

Commercially prepared plant product lines have undergone a quantum expansion in both the range and extent of semi-processed and processed products being brought to retail sale. Such product lines present an equally diverse level of risk in terms of their potential to be infested with and/or carry viable quarantinable pests of biosecurity concern. Such risk is also impacted by the intended end use of the commodity, and both the nature and extent of their distribution at point of retail sale, or commercial end use.

Biosecurity Tasmania recognises *International Standards for Phytosanitary Measures (ISPM) No.32 – Categorization of Commodities According to their Pest Risk (2009).* This ISPM is an important guideline to which it refers when considering biosecurity risk posed by imported commodities like semi-processed and processed plant products. Biosecurity Tasmania investigates such matters on a case-by-case basis, against four broad categories of degree of product processing and end use:

- Category 1 – Commodities have been processed to the point where they do not remain capable of being infested with quarantine pests, thereby presenting a very low level of biosecurity risk and will not be regulated. Examples include a long list of highly processed, and/or refined, foodstuffs commonly sold;
- Category 2 – Commodities have been processed to some degree, but may be regulated because the processing method may not completely eliminate all quarantine pests. Examples include semi-processed plant products such as commercially dried fruits and pre-washed, pre-packaged sliced fresh fruit and vegetables. Consideration is also given here to the question of end use and destination;
- Category 3 – Commodities have not been processed (as in the nature of the material is not transformed), and the intended end use is for a purpose other than propagation, for example, consumption, display or processing. An example is 'cut flowers';
- Category 4 – Commodities have not been processed and the intended end use is planting, implying that there exists a high risk of the introduction and spread of quarantine pests of biosecurity concern.

Note: Category 1 plant product lines may still hold the capacity to subsequently become contaminated or infested with common pests like storage pests. Food hygiene standards for such product may also come into consideration in this respect.

2.9 Tissue Culture

Plant tissue culture can only be imported into Tasmania in fully sealed, sterile flasks produced in commercial tissue culture facilities. Flasks or jars produced by home gardeners or private individuals are not acceptable as tissue culture imports. In addition to the above, any import of plant tissue culture must also meet Tasmania's general and any other specific import requirements for plants and plant products. In short, the flask must be properly sealed, not damaged, clean and clearly labelled or branded so that the contents and the name and address of the supplier/grower and/or packer are readily identifiable. A NoI is required for tissue culture imports and subject to inspection on arrival.

Please refer to the online fact sheet held under biosecurity on DPIPWE's homepage (see http://dpipwe.tas.gov.au/).

2.10 Mail Order and On-line Purchases of Plants and Plant Products

Mail order and on-line purchases of plants and plant products, whether from interstate or overseas, must comply with all State import requirements. Packages containing prescribed matter sent by postal services or courier must be marked for the attention of Biosecurity Tasmania. All persons purchasing plants and plant products via mail order or online are considered the importer of prescribed matter and as such are accountable to ensure compliance with all import conditions (also see Section 2.2 re provision of conditions for supply of NoI).

2.11 Packages

2.11.1 Any package* (*see definition; Section 2.19 of this Manual) containing prescribed matter imported into Tasmania must be in the following condition:

I. Undamaged;

II. Free of pests and diseases;

III. The exterior must be clean, free of any soil, plants, plant material or any other thing that may harbour a disease agent;

IV. Clearly labelled with the following information:

(a) a description of the contents;

(b) the name and address of the grower;

(c) name and address of the packer of any plants or plant products that the package contains;

(d) name and address of the manufacturer and/or supplier(s) for grain, seed or other plant products that are readily identifiable; and

(e) any plants, plant material including cut flowers and seeds for sowing, must be identified by their scientific name (Genus and species);

V. Packaged to prevent any cross-contamination, including during transit; and

2.11.2 Prescribed matter that originates from Tasmania, may re-enter the State providing it meets the requirements in 2.11.1, is in unopened, original packaging and proof of origin can be supplied

2.12 Agricultural Equipment, Machinery and Vehicles (New and Used)

See Import Requirement 39.

2.13 Vehicles of any Description

A person must not import a vehicle into Tasmania unless it is clean of any soil and prescribed matter, such as plants or plant products (see definition of vehicle in many of its forms, Section 2.19 – Interpretation).

2.14 Vessels

2.14.1 A person must not import a vessel into Tasmania except in accordance the following conditions:

I. The vessel must be clean of any soil, plants, plant material or other thing that may harbour a pest or disease agent; **and**

II. The vessel must be dry.

2.14.2 Upon arrival in the State a person importing a vessel must present it to an Inspector as soon as is practicable.

2.14.3 Clauses 2.14.1 and 2.14.2 do not apply to:

I. Vessels that are sailed to the State; **or**

II. Vessels that have not at any time been used in water.

2.15 Raw Timber, Logs and Timber Products

A person must not import any raw timber, wood, firewood, log or timber products into Tasmania except in accordance with the following conditions:

I. The timber or log is bark free; **and**

II. The timber or log is clean of leaves and leaf litter; **and**

III. Any timber, log or timber product which can vector European House Borer (*Hylotrupes bajulus* (Linnaeus)) is treated in accordance with the conditions and restrictions described in Import Requirement 40.

2.16 Fodder

2.16.1 A person must not import any fodder into Tasmania except in accordance with the following conditions:

I. Under a pre-approved agreement or conditional exemption granted by DPIPWE.

II. Pelletised feed is permitted entry for livestock feed during transport to Tasmania. Feed hay, chaff or silage of a cereal or leguminous forage crop such as oats or Lucerne may be permitted in certain instances (e.g. for horses with dietary/GIT disease history).

2.16.2 Non forage or cereal crop/general paddock straw, hay, silage and chaff:

I. will not be accepted for livestock feed or bedding during transport to Tasmania due to the weed seed entry risk they present; **and**

II. should not be used for animal transit across Bass Strait from the point of embarkation in Melbourne, Victoria. If found present on arrival, such material will be destroyed at the importers expense.

2.16.3 Other specific Import Requirements, such as IR15 and 25 may also apply, depending on both the origin and nature of the product.

2.16.4 Fodder is any hay, straw, chaff or silage used for livestock feed or bedding.

2.17 False or Misleading Information

Any person who imports plants, plant products or other prescribed matter must not provide information that is false or misleading on any document or thing associated with importation. This includes but is not limited to information presented to a Biosecurity Tasmania Inspector or other relevant authorised person, in writing or by a mark, stamp or inscription on forms, labels, cartons (including trays, punnets, etc.), bags, hat bins, electronic devices or containers.

2.18 Interstate Certification Assurance (ICA) Scheme

In addition to those ICAs cited within given Import Requirements, listed in Section 2.21 of the Manual, there is also one ICA protocol accepted by Tasmania which is not aligned to any existing Tasmanian Import Requirement (IR) equivalent:

- *ICA-24: Treatment and Inspection of Aquatic Plants;*

The current status of ICAs acceptances by Tasmania are summarised as a cross-index by order of number in Section 2.18.1

2.18.1 Cross-Index of Tasmanian IRs by ICA Equivalent

PQMTas IR No.	PQMTas IR Title	ICA Equivalent Accepted by Tasmania
None	None	*ICA-24:Treatment and Inspection of Aquatic Plants*
1: Clause I(a) – MFF; & Clause I(b) & (c) - QFF	Fruit Fly Host Produce – Area Freedom	*ICA-23: Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority*
2	Fruit Fly Host Produce – Disinfestation with Methyl Bromide	*ICA-04: Fumigating with Methyl Bromide*
3	Fruit Fly Host Produce – Disinfestation by Cold Storage	*ICA-07: Cold Treatment*
4: Clause I(b)	Fruit Fly Host Produce – Disinfestation of Mango and Papaya with Heat	*ICA-10: Hot Water Treatment of Mangoes*
5	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-13: Unbroken Skin Condition of Approved Fruits*
5: Clause I	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-30: Hard Condition of Avocado*
5: Clause II	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-06: Certification of Hard Green Bananas;* *ICA-16: Certification of Mature Green Condition of Bananas*
5: Clause III*****	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-15: Mature Green Condition of Passionfruit, Tahitian Limes, Black Sapotes****** *and Tomatoes*

PQMTas IR No.	PQMTas IR Title	ICA Equivalent Accepted by Tasmania
5: Clause V*	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-15: Mature Green Condition of Passionfruit*, Tahitian Limes, Black Sapotes and Tomatoes*
5: Clause VI	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-08: Mature Green Condition and Immature Green Condition of Papaw and Babaco*
5: Clause VII*	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-15: Mature Green Condition of Passionfruit, Tahitian Limes*, Black Sapotes and Tomatoes*
5: Clause VIII*	Fruit Fly Host Produce – Hard Green or Similar Condition	*ICA-15: Mature Green Condition of Passionfruit, Tahitian Limes, Black Sapotes and Tomatoes*;* *ICA-27: Mature Green Condition of Tomatoes*
6	Fruit Fly Host Produce – Irradiation	*ICA-55: Irradiation Treatment*
7: Clause I	Fruit Fly Host Produce – Systems Approaches for Citrus and Strawberries	*ICA-28: Pre-harvest Treatment (Bait spraying) and Inspection of Citrus*
7: Clause II	Fruit Fly Host Produce – Systems Approaches for Citrus and Strawberries	*ICA-34: Pre-harvest Field Control and Inspection of Strawberries*
8A	Fruit Fly Host Produce – Post Harvest Treatment with Dimethoate	*ICA-18: Treatment and Inspection of Custard Apple and Other Annona spp.;* *ICA-19: Treatment and Inspection of Mangoes*
8A: *Clauses I & IV*	Fruit Fly Host Produce – Post Harvest Treatment with Dimethoate	*ICA-01: Dipping with Dimethoate*
8A: Clauses II, III & IV	Fruit Fly Host Produce – Post Harvest Treatment with Dimethoate	*ICA-02: Flood Spraying with Dimethoate*
8B	REVOKED (Fruit Fly Host Produce – Post Harvest Treatment with Fenthion)	*Not Applicable*
9	Potatoes – Import Conditions	*No ICA accepted or available for acceptance*
10	Grape Phylloxera – Hosts and Vectors	*ICA-22: Transfer of Grape Must and Fresh Juice from a Phylloxera Infested Zone (PIZ) or Phylloxera Risk Zone (PRZ) for Winemaking in a Phylloxera Free Zone (PEZ);* *ICA-23: Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority;* *ICA-33: Movement of Wine Grapes; and* *ICA-37: Hot Water Treatment of Grapevines*
11	Onion Smut and Iris Yellow Spot Tospovirus (IYSV) – Hosts and Vectors	*No ICA accepted and/or available for acceptance*
12	Pea Weevil – Hosts and Vectors	*No ICA accepted and/or available for acceptance*
13	REVOKED (Boil Smut – Hosts)	*No ICA accepted and/or available for acceptance*
14	REVOKED (Hosts of Chrysanthemum White Rust (*Puccinia horiana* Henn.))	*Not Applicable*
15: Clause I	Red Imported Fire Ant - Vectors	*ICA-39: Inspection and Treatment of Plants for Red Imported Fire Ant*
15: Clause II	Red Imported Fire Ant - Vectors	*ICA-40: Property Freedom of Plants for Red Imported Fire Ant*
16	REVOKED (Hosts of San Jose Scale (*Diaspidiotus perniciosus* Comstock))	*Not Applicable*
17	REVOKED (Hosts of Tobacco Blue Mould Fungus (*Peronospora hyoscyami* f.sp. *t abacina* (D.B. Adam) Skalicky))	*Not Applicable*
18	Fire Blight - Hosts	*No ICA accepted or available for acceptance*

PQMTas IR No.	PQMTas IR Title	ICA Equivalent Accepted by Tasmania
19	REVOKED (Hosts of Western Flower Thrips (*Frankliniella occidentalis* Pergande))	*Not Applicable*
20	REVOKED (Hosts of Melon Thrips (*Thrips palmi* Karny))	*Not Applicable*
21	REVOKED (Pyrethrum Seed)	*Not Applicable*
22	Lupin Anthracnose Disease - Hosts and Vectors	*No ICA accepted or available for acceptance*
23	REVOKED (Hosts of Spiralling Whitefly (*Aleurodicus dispersus* Russell))	*Not Applicable*
24	REVOKED (Hosts of Ash Whitefly (*Siphoninus phillyreae* Haliday))	*Not Applicable*
25: Clause I(b)	Green Snail - Vector Import Controls	*ICA-46:* Certification of Area/Property Freedom for Green Snail *(2-25 km)*
26	REVOKED (Argentine Ant (*Linepithema humile* Mayr))	*Not Applicable*
27	Chickpea Blight - Hosts and Vectors	*No ICA accepted or available for acceptance*
28	Blueberry Rust - Hosts and Vectors	*ICA-31: Pre-harvest Treatment and Inspection of Blueberries for Blueberry Rust*
29	Plants and Plant Products, other than Potatoes, from Potato Cyst Nematode infested areas within Victoria	*No ICA accepted or available for acceptance*
30	Grain and Grain Products Intended for Animal Feed - Import Conditions	*No ICA accepted or available for acceptance*
31	REVOKED (Hosts and Vectors of Citrus Canker (*Xanthomonas axonopodis* pv. *citri* (Hasse) Vauterin et al.))	*Not Applicable*
32	Canola Seed and Grain – Freedom from Genetically Modified (GM) Brassicaceae Seed	*No ICA accepted or available for acceptance*
33	Silverleaf Whitefly - Hosts	*No ICA accepted or available for acceptance*
34	REVOKED (Hosts of Impatiens Downy Mildew (*Plasmopara obducens* (J. Schröt.) J. Schröt. in Cohn))	*Not Applicable*
35	REVOKED (Hosts of Pepper Anthracnose (*Colletotrichum capsici* Syd.))	*Not Applicable*
36	Seeds for Sowing	*No ICA accepted or available for acceptance*
37	Plant Material and Soil for the Purpose of Laboratory Analysis or Diagnosis	***Please Note:** The guidelines provided in "CRC Plant Biosecurity (2010) How to send samples for diagnosis in Australia: Plant Disease and Insect Identification" (www.crcplantbiosecurity.com.au) also satisfy Clause III(a) of this Import Requirement, regarding sample packing and transport*
38A	Treatment of Nursery Stock	*ICA-29: Treatment of Nursery Stock and Soil-less Media*
38B	Importation of Nursery Stock by Best Practice Biosecurity	*No ICA accepted or available for acceptance*
38C	REVOKED (Importation of Nursery Stock to Approved Quarantine Place)	*Not Applicable*

PQMTas IR No.	PQMTas IR Title	ICA Equivalent Accepted by Tasmania
38D	Importation of Nursery Stock by Special Approval	*No ICA accepted or available for acceptance*
38E	Importation of Nursery Stock by a BioSecure *HACCP* Entry Condition Compliance Procedure (ECCP)	***Please Note:*** *BioSecure HACCP is the Nursery & Garden Industry Australia's (NGIA) on-farm biosecurity program for production nurseries in Australia. The program validates many of the best management practice strategies employed under the Nursery Industry Accreditation Scheme Australia (NIASA). Biosecurity Tasmania recognises this industry administered certification standard for biosecure nursery production.* *No ICA applies.*
39	Agricultural Equipment, Machinery and Vehicles (New and Used)	*No ICA accepted or available for acceptance*
40	European House Borer - Vectors	*No ICA accepted or available for acceptance*
41	Fruit Fly Host Produce – Splitting and Reconsigning	*ICA-17: Splitting Consignments and Reconsigning Original Consignments of Certified Produce*
42	Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Table Grapes	*ICA-20: Pre-harvest Treatment and Inspection of Table Grapes*
43	Fruit Fly Host Produce - Pre-harvest Treatment and Inspection of Stone Fruit, Pome Fruit, Persimmons and Blueberries	*ICA-21: Pre-harvest Treatment and Post Harvest Inspection of Approved Host Fruit;* *Blueberry fruit must also satisfy ICA-31: Pre-harvest Treatment and Inspection of Blueberries for Blueberry Rust*
44	Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Tomatoes, Capsicums, Chillies and Eggplants	*ICA-26: Pre-harvest Treatment and Inspection of Tomatoes, Capsicums, Chillies and Eggplants; and/or* *ICA-48: Pre-harvest Treatment and Post Harvest Inspection of Tomato and Capsicum in the Bowen Gumlu Region*
45	Fruit Fly & Grape Phylloxera Host Produce – Repacking and Composite Lots	*ICA-57: Repacking of Fruit Fly and Phylloxera Host Produce; and/or* *ICA-58: Certification of Composite Lots*
46	Tomato Potato Psyllid – Hosts and Vectors	*ICA-60: Inspection of Strawberry Fruit for Tomato-Potato Psyllid; and/or* *ICA-61: Pack-House Washing and Inspection of Tomato-Potato Psyllid Carrier Produce; and/or* *ICA-62: Treatment and Inspection of Carrier Nursery Stock for Tomato-Potato Psyllid; and/or*

Section 2.18.1 (cont.)

ICA No. & Title	Tas Acceptance Status	Tas IR to which it appllies
ICA-01: Dipping with Dimethoate	Accepted	8A: Clauses I & IV
ICA-02: Flood Spraying with Dimethoate	Accepted	8A (Clauses II, III & IV)
ICA-03: Low Volume Non-Recirculated Spraying with Fenthion	Not Applicable (Archived ICA)	Not Applicable
ICA-04: Fumigating with Methyl Bromide	Accepted	2
ICA-05: Vapour Heat Treatment of Mangoes Under AQIS Supervision	Not Applicable (Archived ICA)	Not Applicable
ICA-06: Certification of Hard Green Condition of Bananas	Accepted	5: Clause II
ICA-07: Cold Treatment	Accepted	3
ICA-08: Mature Green Condition and Immature Green Condition of Papaw and Babaco	Accepted	5: Clause VI
ICA-09: Certification of Pumpkin Condition for Exotic Fruit Fly	Not Applicable (Archived ICA)	Not Applicable
ICA-10: Hot Water Treatment of Mangoes	Accepted	4: Clause I(b)
ICA-11: Pre-harvest Treatment and Inspection of Strawberries	Not Applicable (Archived ICA)	Not Applicable
ICA-12: Certification of Watermelon Condition for Exotic Fruit Fly	Not Applicable (Archived ICA)	Not Applicable
ICA-13: Unbroken Skin Condition of Approved Fruits	Accepted	5
ICA-14: Pre-harvest Treatment and Inspection of Lychees	Not Applicable (Archived ICA)	Not Applicable
ICA-15: Mature Green Condition of Passionfruit, Tahitian Limes, Black Sapotes and Tomatoes	Accepted	5: Clauses III, V & VII
ICA-16: Certification of Mature Green Condition of Bananas	Accepted	5: Clause II
ICA-17: Splitting Consignments and Reconsigning Original Consignments of Certified Produce	Accepted	41; & Schedule 1B - Clause III(c)
ICA-18: Treatment and Inspection of Custard Apple and Other *Annona* spp.	Accepted	8A
ICA-19: Treatment and Inspection of Mangoes	Accepted	8A
ICA-20: Pre-harvest Treatment and Inspection of Table Grapes	Accepted	42
ICA-21: Pre-harvest Treatment and Post Harvest Inspection of Approved Host Fruit	Accepted	43
ICA-22: Transfer of Grape Must and Fresh Juice from a Phylloxera Infested Zone (PIZ) or Phylloxera Risk Zone (PRZ) for Winemaking in a Phylloxera Free Zone (PEZ)	Accepted	10
ICA-23: Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority	Accepted	1: Clause I(a) – MFF; 1: Clause I(b) & I(c) - QFF; & 10
ICA-24: Treatment and Inspection of Aquatic Plants	Accepted	No equivalent
ICA-25: Cover spraying of Nursery Stock	Not Accepted	
ICA-26: Pre-harvest Treatment and Post-harvest Inspection of Tomatoes, Capsicums, Chillies and Eggplant	Accepted	44
ICA-27: Mature Green Condition of Tomatoes	Accepted	5: Clause VIII
ICA-28: Pre-harvest Treatment (Bait spraying) and Inspection of Citrus	Accepted	7: Clause I
ICA-29: Treatment of Nursery Stock and Soil-less Media	Accepted	38A

ICA No. & Title	Tas Acceptance Status	Tas IR to which it appllies
ICA-30: Hard Condition of Avocado	Accepted	5: Clause I
ICA-31: Pre-harvest Treatment and Inspection of Blueberries for Blueberry Rust	Accepted	28 & 43 (for blueberry fruit)
ICA-32: Movement of Apricots from South Australia to Western Australia	Not Accepted	
ICA-33: Movement of Wine Grapes	Accepted	10
ICA-34: Pre-harvest Field Control and Inspection of Strawberries	Accepted	7: Clause II
ICA-35: Inspection and Treatment of Plants for Spiralling Whitefly	Not Applicable	23 - Revoked
ICA-36: Property Freedom of Plants for Spiralling Whitefly	Not Applicable	23 - Revoked
ICA-37: Hot Water Treatment of Grapevines	Accepted	10
ICA-38: Inspection of Fresh Fruits and Vegetables (Post Harvest), Live Plants, Cut Flowers & Foliage for Melon Thrips	Not Applicable	20 - Revoked
ICA-39: Inspection and Treatment of Plants for Red Imported Fire Ant	Accepted	15: Clause I
ICA-40: Property Freedom of Plants for Red Imported Fire Ant	Accepted	15: Clause II
ICA-41: Vapour Heat Treatment of Mangoes	Not Applicable (Archived ICA)	Not Applicable
ICA-42: Nursery Freedom, Treatment and Inspection for Myrtle Rust	Not Accepted	Section 67 Notice under PQA1997
ICA-43: Movement of Ware Potatoes from Within 20km of the Thorpdale Potato Cyst Nematode Detection	Not Applicable (Archived ICA)	Not Applicable
ICA-44: Potatoes for Processing	Not Accepted	
ICA-45: Cover Spraying of Plants - Treatment for Olive Lace Bug	Not Applicable (Archived ICA)	Not Applicable
ICA-46: Certification of Area/Property Freedom for Green Snail (2-25 km)	Accepted	25: Clause I(b)
ICA-47: Inspection of Fresh Fruit and Vegetables for Freedom from Fruit Fly	Not Applicable (Archived ICA)	Not Applicable
ICA-48: Pre-harvest Treatment and Post Harvest Inspection of Tomato and Capsicum in the Bowen Gumlu Region	Accepted	44
ICA-49: Treatment and Inspection of Citrus Canker Hosts Plants	Not Applicable (Archived ICA)	Not Applicable
ICA-50: Movement of Cherries from South Australia to Western Australia	Not Applicable (Archived ICA)	Not Applicable
ICA-51: Treatment and Inspection of Loose Leaf Host Produce	Not Applicable (Archived ICA)	Not Applicable
ICA-52: Inspection and Cover Spraying Nursery Plants for Currant Lettuce Aphid	Not Applicable (Archived ICA)	Not Applicable
ICA-53: Treatment and Inspection of Whole Lettuce for Lettuce Aphid	Not Applicable (Archived ICA)	Not Applicable
ICA-54: Inspection of Used Vehicles and Associated Equipment	In Review	
ICA-55: Irradiation Treatment	Accepted	6
ICA-56: Emergency Pre-harvest Baiting and Inspection Protocol for Pest Free Areas	In Review	
ICA-57: Repacking of Fruit Fly and Phylloxera Host Produce	Accepted	45; & Schedule 1B - Clause III(c)
ICA-58: Certification of Composite Lots	Accepted	45; & Schedule 1B - Clause III(c)
ICA-59: Property Freedom of Potatoes for Potato Cyst Nematode	Not Accepted	
ICA-60: Inspection of Strawberry Fruit for Tomato-Potato Psyllid	Accepted	Forthcoming IR46

ICA No. & Title	Tas Acceptance Status	Tas IR to which it appllies
ICA-61: Pack-House Washing and Inspection of Tomato-Potato Psyllid Carrier Produce	Accepted	Forthcoming IR46
ICA-62: Treatment and Inspection of Carrier Nursery Stock for Tomato-Potato Psyllid	Accepted	Forthcoming IR46

2.19 Interpretation

In this Manual, unless the contrary intention appears, expressions used have the same meaning as in the *Plant Quarantine Act 1997*.

The following interpretations cover some of the commonly used expressions in this Manual. Most are sourced from the Act and some are specific to this Manual.

"accompanied" includes information transmitted in an electronic format approved by the Secretary.

"agricultural equipment" means any equipment or vehicle used for the culture, harvesting, packing or processing of any plant or plant product.

"approved" means approved by the Secretary.

"approved person" means:

a) An officer employed by the Department of Primary Industries, Parks, Water and Environment or any Commonwealth, State or Territory agency responsible for the regulation of agriculture; or

b) A person employed by a business or other body that is operating under a current agreement, protocol or other arrangement with an agency identified in (a) above for the control of pests and diseases in plants and plant material.

"approved quarantine place" means any place approved by the Secretary for the purpose of examining any prescribed matter imported into, or to be exported out of, the State.

"blackberry or blackberries as a declared weed" means *Rubus fruticosus* L. aggregate and includes the whole plant or plant parts. Included in this species aggregate are *R. anglocandicans*, *R. erythrops*, *R.echinatus, R. laciniatus, R. laudatus*, *R. leucostachys*, *R. polyanthemos*, *R.vestitus*, and R. species (Tasman). It does not include commercial varieties of blackberry (e.g. thornless varieties) or fruit for human consumption, or any product containing non-viable extracts of this plant or other dead, non-reproductive *Rubus fruticosus* materials

"certificate" includes a certificate or information provided in an electronic format approved by the Secretary.

"disease" means: any disease of plant or plant product declared by the Secretary to be a disease; and any disease agent that may cause such disease.

"inspector" means an inspector appointed under the *Plant Quarantine Act 1997*.

"machinery" means any type of machinery or equipment, agricultural or non-agricultural, that may be contaminated with prescribed matter of any form.

“package” includes anything: in, or by, which a plant or plant product may be contained, wrapped or packed; and on which a plant or plant product may be located.

“pest” means any organism declared by the Secretary to be a pest.

“pesticide” means a chemical specifically developed and produced for use in the control of an agricultural and/or public health pest. They are usually classified according to the type of pest, i.e. fungicide, algacide, herbacide, insecticide, nematicide and molluscicide. The term ‘pesticide’ is now largely subsumed into the broader generic classification of “Agricultural and Veterinary Chemicals”, under *The Agricultural and Veterinary Chemicals Code of Australia*.

“place” includes any land, road, premises, river, lake or other body of water.

“plant” means any organism other than an organism within the animal kingdom.

“plant product” includes: the whole or part of any flower, fruit, nut, seed, leaf, bulb, corm, tuber or stem that has been separated from a plant; and any dried plant material and timber that has been sawn or dressed.

“premises” includes any building or structure.

“prescribed matter” means: any plant; any plant product; any new or used package; a vehicle; any new or used agricultural equipment; any soil; and any disease agent.

“Secretary” means the Secretary of the Department of Primary Industries, Parks, Water and Environment.

“signed” includes information in an electronic format approved by the Secretary as being sufficient to identify an approved person.

“soil” is defined as the top layer of the Earth, consisting of rock and mineral particulates that may be mixed with organic matter in which plants grow or are grown.

“vehicle” means any form of transport equipment, whether it be private or commercial vehicle, dirt bikes, motorcycle, truck, towable trailer including horse floats, off-road 4-wheel drive vehicles, removal van, etc.

“vessel” means any form of water borne equipment, such as boats, jet skis, canoes, kayaks, dinghies, rafts, or any other form of water borne craft.

“weed” means any plant declared as a pest.

2.20 Import Requirement Summary Tables

The following index Tables, Tables 2, 3 and 4, summarise the Import Requirements (Conditions and Restrictions) that apply to a wide range of selected plants, plant products and other prescribed matter.

The tables specify some of the main disease and/or pest risks of biosecurity concern for Tasmania that are associated with each of these selected plants, plant products and other prescribed matter.

A full listing of List A & B Pests and Diseases of biosecurity concern to Tasmania, under Section 12 of the *Plant Quarantine Act 1997*, is provided in Appendix 1 of this Manual.

Table No.	Content
1	Pest and Disease Name Key
2	Index of Import Requirements (IR) for Fruit, Vegetables, Plants and/or Flowers
3	Index of Import Requirements (IR) for Seeds and Grains
4	Index of Import Requirements (IR) for Other Plant Products and Prescribed Matter

EXPLANATORY NOTES:

Table 2*: The plants, plant products or other prescribed matter listed in the first column of Table 2, must not be imported without being treated in accordance with the corresponding import restriction(s) listed in either the second column for 'fruits and vegetables', or the fourth column for 'plants and flowers'.*

Table 3*: The plants, plant products or other prescribed matter listed in the first column of Table 3, must not be imported without being treated in accordance with the corresponding import restriction(s) listed in the second column of the table.*

Table 4*: The plants, plant products or other prescribed matter listed in the first column of Table 4, must not be imported without being treated in accordance with the corresponding import restriction(s) listed in the second column of the table.*

ALL PRESCRIBED MATTER IS SUBJECT TO INSPECTION ON ARRIVAL AND IF NECESSARY SUBJECT TO TREATMENT, RE-EXPORT OR DESTRUCTION AS APPROPRIATE.

ANY IMPORTED ITEM THAT IS INSPECTED AND FOUND TO BE CONTAMINATED WITH SOIL OR PRESCRIBED MATTER WILL BE HELD AND DIRECTED EITHER FOR CLEANING, RE-EXPORT OR DESTRUCTION.

The tables are not an exhaustive reference list. Rather, they focus on those commodities and materials that are imported on a regular basis that are considered to represent a potential biosecurity risk to the State.

Table 1: Pest and Disease Name Key for Tables 2-4

BR	Blueberry Rust
BW	Bacterial Wilt
CB	Chickpea Blight
DW	Declared Weeds
EHB	European House Borer
FB	Fire Blight
GMP	Genetically Modified Plants
GP	Grape Phylloxera
GS	Green Snail
IYSV	Iris Yellow Spot Virus
LA	Lupin Anthracnose
MFF	Mediterranean Fruit Fly
(NS	Nursery Stock)
OS	Onion Smut
PCN	Potato Cyst Nematode
PW	Pea Weevil
QFF	Queensland Fruit Fly
RIFA	Red Imported Fire Ant
RN	Ryegrass Nematode
SLWF	Silverleaf Whitefly

Table 2 Index of Import Requirements for Selected Fruit, Vegetables, Plants and/or Flowers

EXPLANATORY NOTE:

- # or ^ Refers to those Import Requirement treatment options specific to the Fruit Fly species in question, that are not suited for application against any other fruit fly pest cited as an IR pest of concern. IRs without these captions are applicable to both Fruit Fly species.
- N/A = Not Applicable
- Declared Weeds are prohibited (see Section 2.6)

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
ABALONE MUSHROOM	N/A	N/A		INSECTS, SOIL
ABIU	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#		
ACEROLA	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#		
Acmena spp. (see Myrtaceae)				
AIR PLANTS			38	
AKEE APPLE	1, 2, 3, 6, 41, and 45	MFF		
AKIA	1, 2, 3, 6, 41, and 45	MFF		
ALDERS	N/A	N/A	15, 25, 29, 36 and 38	RIFA, GS, PCN
ALMOND (WITH HUSK)	1, 2, 3, 6, 41, 43, and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
AMARANTH			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
AMBARELLA (see JEW PLUM)				
AMELANCHIER spp. (see JUNEBERRY)				
AMERICAN AGAVE			15, 25, 29, 36 and 38	RIFA, GS, PCN
AMOMYRTUS LUMA (see LUMA)	Prohibited		Prohibited	
ANDROMEDA (see *PIERIS* spp.)				
ANISEED (FRESH HERB)	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
APPLE	1, 2, 3, 6, 8A#, 18, 41, 43, and 45	MFF, QFF#, FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
APPLE (TOFFEE)	1, 2, 3, 6, 8A#, 18, 41, 43, and 45	MFF, QFF#, FB		
APPLE CUCUMBER			15, 25, 29, 36 and 38	RIFA, GS, PCN
APPLE OF PERU			15, 25, 29, 36 and 38	RIFA, GS, PCN
APRICOT	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
ARABIAN COFFEE (see COFFEE CHERRY)				
ARROWHEAD			15, 25, 29, 36 and 38	RIFA, GS, PCN
ARROWROOT (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
ARTICHOKE (CHINESE)			15, 25, 29, 36 and 38	RIFA, GS, PCN
ARTICHOKE (GLOBE)	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
ARTICHOKE (JERUSALEM)			15, 25, 29, 36 and 38	RIFA, GS, PCN
ASIAN GREENS (see LEAFY VEG)				
ASIAN PEAR (see NASHI PEAR)				
ASH (*Fraxinus* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
ASPARAGUS	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
AUBERGINE (see EGGPLANT)				
AVOCADO	1, 2, 3, 5(I) ^, 6, 8A#, 41, and 45	MFF^, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
AZALEA			15, 25, 29, 36 and 38	RIFA, GS, PCN,
BABACO	1, 2, 3, 5(VI)#, 6, 8A#, 41, and 45	MFF, QFF#	15, 25	RIFA, GS
BAMBOO			15, 25, 29, 36 and 38	RIFA, GS, PCN
BANANA (includes Plantain Bananas)	1, 2, 3, 5(II), 6, 8A#, 41, and 45	MFF, QFF#	15, 25	RIFA, GS
BARBADOS CHERRY (see ACEROLA)				
BEAN			15, 25, 29, 36 and 38	RIFA, GS, PCN
BEECH (*Fagus* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
BEETROOT (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
BEETS (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
BELLADONNA			15, 25, 29, 36 and 38	RIFA, GS, PCN
BELL PEPPER (see CAPSICUM)				
BERRY (NOT OTHERWISE SPECIFIED, includes ✶*Vaccinium spp* (blueberry◆, huckleberry, cranberry, bilberry, lingonberry)*;* and *Gaylussacia* (huckleberry))	1, 2, 3, 6, 8A#, ✶28, 41, 43◆, and 45	MFF, QFF#, ✶BR	15, 25, ✶28, 29, 36 and 38	RIFA, GS, ✶BR, PCN
BERRY (*Rubus* spp) (✶commercial blackberry varieties including thornless varieties, and raspberry)	1, 2, 3, 6, 8A#, ✶18, 41 and 45	MFF, QFF#,✶FB	15, ✶18, 25, 29, 36 and 38	RIFA, ✶FB, GS, PCN
BETEL PEPPER			15, 25, 29, 36 and 38	RIFA, GS, PCN
BILBERRY (see BERRY (NOT OTHERWISE SPECIFIED))				
BIRCHES (*Betula* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
BLACK HENBANE (see HENBANE)				

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
BLACK MYROBALAN (see CHEBULIC MYROBALAN)				
BLACK NIGHTSHADE			15, 25, 29, 36 and 38	RIFA, GS, PCN
BLACK SAPOTE	1, 2, 3, 5(III)#, 6, 8A#, 41, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
BLACK WALNUT (see WALNUT)				
BLACKBERRY (see BERRY, (*Rubus* spp.))				
BLACKCURRANT[1] (see BERRY (NOT OTHERWISE SPECIFIED))				
BLUEBERRY – FRESH (see BERRY (NOT OTHERWISE SPECIFIED))				
BOK CHOY (see LEAFY VEG)				
BOURBON ORANGE	1, 2, 3, 6, 41, and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
BOYSENBERRY (see BERRY, (*Rubus* spp.))				
BRAZIL CHERRY (see GRUMICHAMA)				
BRAZILIAN GUAVA (see GUAVA)	Prohibited		Prohibited	
BREADFRUIT	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#		
BROCCOLI	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
BRUSSELS SPROUTS	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
BUCKTHORN			15, 25, 29, 36 and 38	RIFA, GS, PCN
BULBS (see TABLE 4)				
BUNIUM			15, 25, 29, 36 and 38	RIFA, GS, PCN
BUTTERFLY FLOWER			15, 25, 29, 36 and 38	RIFA, GS, PCN
BUTTONBUSH			15, 25, 29, 36 and 38	RIFA, GS, PCN
CABBAGE	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
CACTUS (see SUCCULENTS)				
CAIMITO (see STAR APPLE)				
CALIFORNIAN CHRISTMAS BERRY			15, 25, 29, 36 and 38	RIFA, GS, PCN
CATALPA HYBRID			15, 25, 29, 36 and 38	RIFA, GS, PCN
CAMPHOR LAUREL			15, 25, 29, 36 and 38	RIFA, GS, PCN
CANOLA (*see* Table 3)				
CANNA			15, 25, 29, 36 and 38	RIFA, GS, PCN
CAPE GOOSEBERRY	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
CAPSICUM (see also CHILLI and CHERRY PEPPER, and TABASCO)	1, 2, 3, 6, 8A#, 41, 44, 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
CARAMBOLA (see STARFRUIT)			15, 25, 29, 36 and 38	RIFA, GS, PCN
CARROT (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
CASHEW APPLE	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#		
CASIMIROA (see WHITE SAPOTE)				
CASSAVA			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
CASTOR BEAN			15, 25, 29, 36 and 38	RIFA, GS, PCN
CAULIFLOWER	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
CEDARS			15, 25, 29, 36 and 38	RIFA, GS, PCN
CELERIAC (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
CELERY	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
Chamelaucium spp. (see Myrtaceae)	Prohibited		Prohibited	
CHEBULIC MYROBALAN	1, 2, 3, 6, 41, and 45	MFF		
CHERIMOYA	1, 2, 3, 6, 8A#, 41, and 45	MFF, QFF#		
CHERRY (SOUR and SWEET CHERRY)	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
CHERRY PEPPER	1, 2, 3, 6, 8A#, 41, 44, and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
CHERRY TOMATO (see also TOMATO)	1, 2, 3, 6, 8A#, 41, 44, and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
CHESNUTS			15, 25, 29, 36 and 38	RIFA, GS, PCN
CHICK PEA			15, 25, 27, 29, 36 and 38	RIFA, GS, CB, PCN
CHILLI (see CHILLI PEPPER)				
CHILLI PEPPER (see also TABASCO)	1, 2, 3, 6, 8A#, 41, 44, and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
CHINESE DATE (see JUJUBE)				
CHINESE ARTICHOKE (see ARTICHOKE)				
CHINESE LANTERN			15, 25, 29, 36 and 38	RIFA, GS, PCN
CHINESE POTATO (see ARROWHEAD)				
CHIVES (for plants - see ONION; for cut chives - see HERBS (FRESH))				
CHOKEBERRY			15, 25, 29, 36 and 38	RIFA, GS, PCN
CHOKO			15, 25, 29, 36 and 38	RIFA, GS, PCN
CHOY SUM (see LEAFY VEG)				

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
CHRYSANTHEMUM (CUT FLOWERS, SEEDLINGS & PLANTS)			15, 25, 29, 36 and 38	RIFA, GS, PCN
CITRON (see TANGOR)				
COCONUT			15, 25, 29, 36 and 38	RIFA, GS, PCN
COFFEE CHERRY (ARABIAN)	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
COFFEE CHERRY (including EXCELSA, LIBERIAN, and ROBUSTA VARIETIES) ✶ Fresh fruit only; excludes coffee beans	1, 2, 3, 6, 41 and 45	✶MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
COMFREY			15, 25, 29, 36 and 38	RIFA, GS, PCN
CORN - Including: MAIZE, SWEET CORN (✶fresh husks)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
COSTA RICAN GUAVA (see GUAVA)				
COTONEASTER spp.			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
COTTON			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
COWPEA			15, 25, 29, 36 and 38	RIFA, GS, PCN
CRAB APPLE (see APPLE)				
CRANBERRY (*see* BERRY – NOT OTHERWISE SPECIFIED)				
CRAPE MYRTLE			15, 25, 29, 36 and 38	RIFA, GS, PCN
CROWN OF THORNS			15, 25, 29, 36 and 38	RIFA, GS, PCN
CUCUMBER			15, 25, 29, 36 and 38	RIFA, GS, PCN
CUMQUAT (see KUMQUAT)				
CURRANT TOMATO (see TOMATO)				
CURRANT[1] (see BERRY (NOT OTHERWISE SPECIFIED))				
CUSTARD APPLE	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
CUT FLOWERS NOT OTHERWISE SPECIFIED (any Myrtaceous plant species are prohibited)			25; Myrtaceae prohibited	GS
DAHLIA			15, 25, 29, 36 and 38	RIFA, GS, PCN
DAIKON (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
DAMSON PLUM (see PLUM)				
DAPHNE			15, 25, 29, 36 and 38	RIFA, GS, PCN
DATE (fresh, excluding dried fruit)	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
DEADLY NIGHTSHADE (see BELLADONNA)				
DOGBERRY (see ROWAN)				
DORMANT CUTTINGS (any Myrtaceous plant species are prohibited)			38; Myrtaceae prohibited	NS
DRAGON FRUIT			15, 25, 29, 36 and 38	RIFA, GS, PCN
DURANTIA spp.			33, 36 and 38	SLWF
DURIAN	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#		
DUTCH MICE			15, 25, 29, 36 and 38	RIFA, GS, PCN
EGGPLANT (AUBERGINE)	1, 2, 3, 6, 8A#, 41, 44, 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
EGYPTIAN ONION (see ONION)				
ELDERBERRY spp.			15, 25, 29, 36 and 38	RIFA, GS, PCN
ELMS (*Ulmus* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
ENDIVE	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
EUCALYPTUS (see Myrtaceae)	Prohibited		Prohibited	
EUPHORBIAS (also see POINSETTIA & SNOWFLAKE)			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
EXCELSA COFFEE (see COFFEE CHERRY)				
FALSE AZALEA			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
FEIJOA (PINEAPPLE GUAVA) (see Myrtaceae)	Prohibited		Prohibited	
FENNEL (bulb with no tops or seed for human consumption)	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
FETTERBUSH (see *LYONIA* spp.)				
FIG	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
FINGER LIMES (see LIMES)				
FIRETHORN			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
FIVE CORNER FRUIT (see STAR FRUIT)				
FOX GRAPE (see ISABELLA GRAPE)				
GALANGAL			15, 25, 29, 36 and 38	RIFA, GS, PCN
GARLIC (see ONION)				
GAYLUSSACIA spp.(see HUCKLEBERRY)			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
GERALDTON WAX (see *Chamelaucium* spp.)	Prohibited		Prohibited	
GERALDTON WAX FLOWER (see *Chamelaucium* spp.)	Prohibited		Prohibited	

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
GERBERA spp.			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN , SLWF
GINGER			15, 25, 29, 36 and 38	RIFA, GS, PCN
GOLD NUGGET (see PUMPKIN)				
GOLDEN APPLE (see JEW PLUM)				
GOLDEN LOQUAT			15, 19, 25, 29, 36 and 38	RIFA, GS, PCN
GOLDENBERRY (see CAPE GOOSEBERRY)				
GOOSEBERRY TOMATO (see TOMATO)				
GOOSEBERRY (*see* BERRY (NOT OTHERWISE SPECIFIED))				
GOURD (hairy squash) (see PUMPKIN)				
GRANADILLA	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
GRAPE (TABLE & WINE; see also ISABELLA GRAPE)	1, 2, 3, 6, 8A#, 10, 41, 42, and 45	MFF, QFF#, GP	10, 15, 25, 29, 36 and 38	GP, RIFA, GS, PCN
GRAPEFRUIT	1, 2, 3, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
GROUNDCHERRY (see CAPE GOOSEBERRY)				
GROUNDNUT			15, 25, 29, 36 and 38	RIFA, GS, PCN
GRUMICHAMA	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
GUAVA (see Myrtaceae)	Prohibited		Prohibited	
HAWTHORN (*Crataegus* spp.)	1, 2, 3, 6, 41, 43 and 45	MFF	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
HEMLOCKS (HEMLOCK SPRUCE; *Tsuga* spp.)			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
HENBANE (see BELLADONNA)				
HERBS (FRESH) (any Myrtaceous plant species are prohibited)	25; Myrtaceae prohibited	GS	25; Myrtaceae prohibited	GS
HIBISCUS spp.			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
HICKORY (*Carya* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
HOG PLUM (see JEW PLUM)				
HOLLY			15, 25, 29, 36 and 38	RIFA, GS, PCN
HOLLYHOCKS			15, 25, 29, 36 and 38	RIFA, GS, PCN
HONEYDEW MELON			15, 25, 29, 36 and 38	RIFA, GS, PCN
HORSERADISH (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
HUCKLEBERRY (*see* BERRY (NOT OTHERWISE SPECIFIED))				

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
HUGERIA spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
HYDRANGEAS			15, 25, 29, 36 and 38	RIFA, GS, PCN
IMPATIENS spp.			15, 25, 29, 36 and 38	RIFA, GS, PCN
INDIAN POTATO			15, 25, 29, 36 and 38	RIFA, GS, PCN
IRONWOOD	1, 2, 3, 6, 41 and 45	MFF		
ISABELLA GRAPE	1, 2, 3, 6, 8A#, 10, 41, 42, and 45	MFF, QFF#, GP	10, 15, 25, 29, 36 and 38	GP, RIFA, GS, PCN
JABOTICABA	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#		
JACKFRUIT	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#		
JAMBOS (see ROSE APPLE)	Prohibited		Prohibited	
JAMBU	1, 2, 3, 6, 41 and 45	MFF		
JAPANESE PERSIMMON (see PERSIMMON)				
JAPANESE PLUM (see PLUM)				
JAPONICA (*Chaenomeles* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
JAVA APPLE (see WAX APPLE)				
JERUSALEM ARTICHOKE (see ARTICHOKE)				
JERUSALEM CHERRY	1, 2, 3, 6, 41 and 45	MFF		
JEW PLUM	1, 2, 3, 6, 41 and 45	MFF	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
JEW'S APPLE (see EGGPLANT)				
JUJUBE (Chinese date)	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
JUNEBERRY			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
KALE	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
KIWI FRUIT	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
KOHL RABI	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
KUMQUAT (CUMQUAT)	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
LARCHES			15, 25, 29, 36 and 38	RIFA, GS, PCN
LEAFY VEG. (not otherwise specified)	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
LEEK (see ONION)				
LEMON (see also MEYER LEMON re IR7)	1, 2, 3, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
LETTUCE	25	GS	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
LEUCOTHOE spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
LIBERIAN COFFEE (see COFFEE CHERRY)				
LILACS			15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
LILIUMS			15, 25, 29, 36 and 38	RIFA, GS, PCN
LILLY PILLY) (see Myrtaceae)	Prohibited		Prohibited	
LIME (✶Tahitian lime only) NB: NOT including Finger Limes	1, 2, 3, ✶5(VII)#, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
LINGONBERRY (see BERRY (NOT OTHERWISE SPECIFIED))				
LIQUIDAMBER			15, 25, 29, 36 and 38	RIFA, GS, PCN
LOGANBERRY (see BERRY, *Rubus* spp.)				
LONGAN	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
LOQUAT	1, 2, 3, 6, 8A#, 18, 41, 43 and 45	MFF, QFF#, FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
LOTUS ROOTS			15, 25, 29, 36 and 38	RIFA, GS, PCN
LUMA (see Myrtaceae)	Prohibited		Prohibited	
LUMA APICULATA (see LUMA)	Prohibited		Prohibited	
LUPIN			15, 22, 25, 29, 36 and 38	RIFA, LA, GS, PCN
LYCHEE	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
LYONIA spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
MACADAMIA			15, 25, 29, 36 and 38	RIFA, GS, PCN
MADAGASCAR OLIVE	1, 2, 3, 6, 41 and 45	MFF		
MADEIRA VINE			15, 25, 29, 36 and 38	RIFA, GS, PCN
MAGNOLIAS			15, 25, 29, 36 and 38	RIFA, GS, PCN
MAIZE (see CORN)				
MALABAR PLUM (see ROSE APPLE)	Prohibited		Prohibited	
MALANGA			15, 25, 29, 36 and 38	RIFA, GS, PCN
MALAY APPLE (see MOUNTAIN APPLE)	Prohibited		Prohibited	
MALE BLUEBERRY (see *LYONIA* spp.)				
MAMEY SAPOTE	1, 2, 3, 6, 41 and 45	MFF		
MANDARIN	1, 2, 3, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MANGO	1, 2, 3, 4(I)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MANGOSTEEN	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MAPLES			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
MARROW			15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
MASCALAR (see *PERNETTYA* spp.)				
MASHUA			15, 25, 29, 36 and 38	RIFA, GS, PCN
MEDLAR	18	FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
MEIWA KUMQUAT	1, 2, 3, 6, 8A, 41 and 45	QFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
MELON			15, 25, 29, 36 and 38	RIFA, GS, PCN
MEXICAN APPLE (see WHITE SAPOTE)				
MEYER LEMON (Note: IR 7 does not apply)	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MILLETS			15, 25, 29, 36 and 38	RIFA, GS, PCN
MINT (FRESH HERB)	25, 33	GS, SLWF		
MOCK AZALEA (*Menziesia* spp.)			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
MOCK ORANGE	1, 2, 3, 6, 41 and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
MOMBIN	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MONSTERA	1, 2, 3, 6, 41 and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
MOUNTAIN APPLE (note the term 'rose apple' is commonly used for two different species of *Syzygium*) (see Myrtaceae)	Prohibited		Prohibited	
MOUNTAIN ASH (see ROWAN)				
MULBERRY	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
MUNG BEAN			15, 25, 29, 36 and 38	RIFA, GS, PCN
MUSHROOM				INSECTS, SOIL
Myrica lechleriana	Prohibited		Prohibited	
MYRTACEAE – PROHIBITED (see APPENDIX 2.2)[1]	Prohibited		Prohibited	
MYRTUS LUMA (see LUMA)	Prohibited		Prohibited	
NASHI PEAR	1, 2, 3, 6, 8A#, 18, 41, 43, and 45	MFF, QFF#, FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
NATAL PLUM	1, 2, 3, 6, 41, 43, and 45	MFF		
NECTARINE	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
NIGHTSHADE (see BELLADONNA or BLACK NIGHTSHADE)				
NURSERY STOCK (any Myrtaceous plant species are prohibited)			10, 15, 25, 29, 38; Myrtaceae prohibited	GP, RIFA, GS, PCN, NS
NUTS		INSECTS, SOIL		INSECTS, SOIL

[1] Bark free logs and commercially dried culinary plant products (e.g. milled lemon myrtle) are exempt from prohibition

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
OAK (*Quercus* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
OCA			15, 25, 29, 36 and 38	RIFA, GS, PCN
OKRA			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
OLIVE (see also MADAGASCAR OLIVE)	1, 2, 3, 6, 41 and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
ONION (ALL *Allium* spp., including SPRING ONION, SHALLOT, CHIVES, LEEK, GARLIC, TREE ONION, POTATO ONION (✶additional requirements with top))	11, ✶25	OS, IYSV, ✶GS	11, 15, 25, 29, 36 and 38	OS, IYSV, RIFA, GS, PCN
ORANGE (see also BOURBON, MOCK & SEVILLE ORANGE)	1, 2, 3, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
ORCHIDS			15, 36, and 38, SOIL FREE	RIFA, SOIL
ORNAMENTAL *Malus*, *Prunus*, *Pyrus* & *Ribes* spp.			15, 25, 29, 36 and 38	RIFA, GS, PCN
OTAHEITE APPLE[2] (see JEW PLUM or MOUNTAIN APPLE)				
OXYCOCCUS spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
OYSTER PLANT (see SALSIFY)				
PAK CHOY (see LEAFY VEG)				
PAPAW (see PAPAYA)				
PAPAYA (PAPAW, PAWPAW) (✶Non-defective flowering type only)	1, 2, 3, 4(II), ✶5(VI)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
PARSLEY (FRESH HERB)	25	GS		
PARSNIP (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
PASSIONFRUIT	1, 2, 3, 5(V)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
PAWPAW (see PAPAYA)				
PEA			12, 15, 25, 29, 36 and 38	PW, RIFA, GS, PCN
PEACH	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
PEACHARINE	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
PEAR (see also NASHI PEAR)	1, 2, 3, 6, 8A#, 18, 41, 43 and 45	MFF, QFF#, FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
PEONIES			15, 25, 29, 36 and 38	RIFA, GS, PCN
PEPEROMIA			15, 25, 29, 36 and 38	RIFA, GS, PCN
PEPINO	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN

[2] This common name, if often used interchangeably between two completely different species of *Syzygium*; *S. malaccense* and *S. cytherea*.

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
PEPPER (see CHILLI)				
PERNETTYA spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
PERSIMMON	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
PERUVIAN CHERRY (see CAPE GOOSEBERRY)				
PERUVIAN GROUND APPLE (see YACON)				
PETUNIAS			15, 25, 29, 36 and 38	RIFA, GS, PCN
PHOTINIA			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
PHYILLYREA			15, 25, 29, 36 and 38	RIFA, GS, PCN
PHYSALIS spp. (see GROUNDCHERRY)				
PIERIS spp.			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
PINEAPPLE (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
PINES			15, 25, 29, 36 and 38	RIFA, GS, PCN
PLANTAIN			15, 25, 29, 36 and 38	RIFA, GS, PCN
PLANTAIN BANANA (see BANANA)				
PLANT MATERIALS and PLANT PRODUCTS NOT OTHERWISE SPECIFIED (see also Myrtaceae)			15, 25, 29, 36, and 38; Myrtaceae prohibited	RIFA, GS, PCN
PLUM (including DAMSON PLUM)	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
PLUMCOT	1, 2, 3, 6, 8A#, 41, 43, and 45	MFF, QFF#	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
POD MAHOGANY			15, 25, 29, 36 and 38	RIFA, GS, PCN
POINSETTIAS (EUPHORBIAS)			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
POLYNESIAN PLUM (see JEW PLUM)				
POMEGRANATE	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
POND APPLE	1, 2, 3, 6, 41 and 45	MFF		
POOR MAN'S ORCHID (see BUTTERFLY FLOWER)				
POPLARS			15, 25, 29, 36 and 38	RIFA, GS, PCN
POTATO	9, and SOIL FREE	BW, PCN	9, 15, 25, 36 and 38	BW, RIFA, GS, PCN, SOIL
POTATO ONION (see ONION)				
PRICKLY PEAR	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
PRIVET			15, 25, 29, 36 and 38	RIFA, GS, PCN
PUMMELO (see SHADDOCK)				
PUMPKIN (All Types)			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
PYRETHRUM			15, 25, 29, 30, 36 and 38	RIFA, PCN, SOIL
QUINCE	1, 2, 3, 6, 8A#, 18, 41, 43, and 45	MFF, QFF#, FB	15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
RADISH (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
RAMBUTAN	1, 2, 3, 5(IV)#, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
RANGPUR LIME (see LIME)				
RASPBERRY (see BERRY, *Rubus* spp.)				
REDBUDS			15, 25, 29, 36 and 38	RIFA, GS, PCN
RED COONDOO (see SPANISH CHERRY)				
REDCURRANT[1] (see BERRY (NOT OTHERWISE SPECIFIED))				
RHODODENDRONS			15, 25, 28, 29, 36 and 38	RIFA, GS, BR, PCN
RHUBARB (✶additional requirements with leaves)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
RIBES spp. (see BERRY; NOT OTHERWISE SPECIFIED)				
RICE			15, 25, 29, 36 and 38	RIFA, GS, PCN
ROBUSTA COFFEE (see COFFEE CHERRY)				
ROCKMELON (see MELON)			15, 25, 29, 36 and 38	RIFA, GS, PCN
ROLLINIA	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
ROSE APPLE (see also MOUNTAIN APPLE)	Prohibited		Prohibited	
ROSEMALLOWS (see HIBISCUS)				
ROSES			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
ROWAN			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
RUBUS spp. (see BERRY)				
RUTABAGA (see SWEDE)				
SALSIFY			15, 25, 29, 36 and 38	RIFA, GS, PCN
SANTOL	1, 2, 3, 6, 8A, 41 and 45	QFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
SAPODILLA	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
SAPOTE (see BLACK and WHITE SAPOTE)				
SCALLION (see ONION)				
SEMARANG ROSE-APPLE (see WAX APPLE)	Prohibited		Prohibited	
SERVICEBERRY (see JUNEBERRY)				
SESAME			15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
SEVILLE ORANGE (see ORANGE)				
SHADDOCK	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
SHALLOT (see ONION)				
SHOO-FLY PLANT (see APPLE OF PERU)				
SILVER BEET	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
SMALL CRANBERRY (see *OXYCOCCUS* spp.)				
SNAPDRAGONS			15, 25, 29, 36 and 38	RIFA, GS, PCN
SNOW PEA (see PEA)				
SNOWFLAKE (EUPHORBIAS)			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN , SLWF
SORGHUM			15, 25, 29, 36 and 38	RIFA, GS, PCN
SOUR CHERRY (see CHERRY)				
SOURSOP	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
SOYABEAN			15, 25, 29, 36 and 38	RIFA, GS, PCN
SPANISH CHERRY	1, 2, 3, 6, 41 and 45	MFF		
SPINACH	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
SPRING ONION (see ONION)				
SPRUCE (*Picea* spp.)			15, 25, 29, 36 and 38	RIFA, GS, PCN
SQUASH (including scallopini etc.) - (see PUMPKIN)				
STAR APPLE	1, 2, 3, 6, 8A, 41 and 45	QFF		
STAR FRUIT	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
STINKING NIGHTSHADE (see HENBANE/ BELLADONNA)				
STRANVAESIA spp.			15, 18, 25, 29, 36 and 38	RIFA, FB, GS, PCN
STRAWBERRY	1, 2, 3, 6, 7(II)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
STRAWBERRY GUAVA (see GUAVA)	Prohibited		Prohibited	
STRAWBERRY TOMATO (see TOMATO)				
STRELITZIAS			15, 25, 29, 36 and 38	RIFA, GS, PCN
SUCCULENTS			15, 25, 29, 36 and 38	RIFA, GS, PCN
SUGAR APPLE (see CUSTARD APPLE)				
SUNFLOWER			15, 25, 29, 36 and 38	RIFA, GS, PCN
SURINAM CHERRY	1, 2, 3, 6, 41 and 45	MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
SWEDE (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
SWEET CHERRY (see CHERRY)				
SWEET CORN (see CORN)				
SWEET ORANGE (see ORANGE)				
SWEET POTATO			15, 25, 29, 36 and 38	RIFA, GS, PCN
SWEETSOP (see CUSTARD APPLE)				
TABASCO PEPPER	1, 2, 3, 6, 8A#, 41, 44, and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
TAHITIAN LIME (see LIME)				
TAHITIAN QUINCE (see JEW PLUM)				
TAMARILLO	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
TANGELO	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
TANGERINE	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
TANGOR	1, 2, 3, 6, 7(I)#, 8A#, 41 and 45	MFF, QFF#	15, 25, 29, 36 and 38	RIFA, GS, PCN
TARO			15, 25, 29, 36 and 38	RIFA, GS, PCN
THORNLESS BLACKBERRY (see BERRY)				
TOBACCO (including ORNAMENTAL spp.)			15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
TOMATO (PINK & RED TYPES ONLY FOR FFLY; ✶Mature Green Condition)	1, 2, 3, ✶5(VIII)#, 6, 8A#, 41, 44, and 45	MFF, QFF#	15, 25, 29, 33, 36 and 38	RIFA, GS, PCN, SLWF
TREE ONION (see ONION)				
TREE TOMATO (see TAMARILLO)				
TROPICAL ALMOND	1, 2, 3, 6, 41 and 45	MFF		
TULIP TREE			15, 25, 29, 36 and 38	RIFA, GS, PCN
TURMERIC			15, 25, 29, 36 and 38	RIFA, GS, PCN
TURNIP (✶additional requirements with top)	✶25	✶GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
ULLUCO			15, 25, 29, 36 and 38	RIFA, GS, PCN
VACCINIUM spp [1](see BERRY (NOT OTHERWISE SPECIFIED))				
WALNUT (*Juglans* spp.) (✶green walnut fruit only)	1, 2, 3, 6, 41 and 45	✶MFF	15, 25, 29, 36 and 38	RIFA, GS, PCN
WATERMELON (see MELON)				
WATTLES			15, 25, 29, 36 and 38	RIFA, GS, PCN
WAX APPLE (see Myrtaceae)	Prohibited		Prohibited	
WAX FLOWER (see *Chamelaucium* spp.)	Prohibited		Prohibited	

TABLE 2	FRUIT &VEGETABLES		PLANTS	
COMMODITY	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**	**IMPORT REQUIREMENTS**	**DISEASE/ PEST RISK**
WAX JAMBU (see WAX APPLE)	Prohibited		Prohibited	
WELSH ONION (see SPRING ONION)				
WEST INDIAN CHERRY (see ACEROLA)				
WHITE SAPOTE	1, 2, 3, 6, 8A#, 41 and 45	MFF, QFF#		
WHITECURRANT[1] (see BERRY (NOT OTHERWISE SPECIFIED))				
WILD GINGER (see also GINGER)			15, 25, 29, 36 and 38	RIFA, GS, PCN
WITLOF	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
WOMBOC	25	GS	15, 25, 29, 36 and 38	RIFA, GS, PCN
YACON			15, 25, 29, 36 and 38	RIFA, GS, PCN
YAM			15, 25, 29, 36 and 38	RIFA, GS, PCN
YAM (CINNAMON)			15, 25, 29, 36 and 38	RIFA, GS, PCN
YELLOW APPLE (see JEW PLUM)				
YELLOW CATTLEY GUAVA (see GUAVA)	Prohibited		Prohibited	
YEW			15, 25, 29, 36 and 38	RIFA, GS, PCN
YOUNGBERRY (see BERRY, (*Rubus* spp.))				
YUCA (see CASSAVA)				
ZUCCHINI			15, 25, 29, 36 and 38	RIFA, GS, PCN

Table 3 Index of Import Requirements for Seeds and Grains*

COMMODITY	IMPORT REQUIREMENTS	DISEASE/PEST RISK
GRAIN or SEED (not otherwise specified)	•12(II), ▲22, 27, 30, 32	•PW, ▲LA, CB, DW, GMP
SEED FOR SOWING (All)	36	DW, GMP, RN
BARLEY	•12(II) ▲22, 30, 36	•PW, ▲LA, DW
CANOLA	12, 22, 27, 30, 32, 36	•PW, ▲LA, CB, DW, GMP
CHICK PEA	•12(II), ▲22, 27, 30, 36	•PW, ▲LA, CPB, DW
CORN - Including: MAIZE, SWEET CORN	•12(II), ▲22, 30, 36	•PW, ▲LA, DW
LUPIN	•12(II), 22, 30, 36	•PW, ▲LA, DW
OATS	•12(II), ▲22, 30, 36	•PW, ▲LA, DW
PEA	12, ▲22, 30, 36	PW, ▲LA, DW
RYEGRASS	30, 36	DW, GMP, RN
TRITICALE	•12(II), ▲22, 30, 36	•PW, ▲LA, DW
WHEAT	•12(II), ▲22, 30, 36	•PW, ▲LA, DW

▲ Applies to seed or grain that may contain lupins as a contaminant

• Applies to seed or grain that may contain peas as a contaminant

****EXPLANATORY NOTE:** Declared weed seeds are prohibited. If found as contaminants in seed or grain imports, such imports will be either denied entry into Tasmania if tested off-shore, or re-exported, destroyed or cleaned if screened at the biosecurity barrier.*

Table 4 Index of Import Requirements for Other Plant Products and Prescribed Matter*

COMMODITY	IMPORT REQUIREMENTS	DISEASE/PEST RISK
AGRICULTURAL EQUIPMENT (NEW & USED)	10, 11, 15, 22, 27, 28, 29, 39	PCN, GP, OS, IYSV, RIFA, LA, CB, BR, DW, RN
BARK (Untreated, as contaminant of logs)	Prohibited	
BEDDING STRAW (used)	15, 25, 29 See Section 2.16	DW, RIFA, GS, PCN
BULBS (DORMANT) NOT OTHERWISE SPECIFIED (If imported with potting media*)	15*, 29, 38	DW, RIFA*, PCN, NS
CHAFF (see FODDER)		
COMPOST	15, 25 See Section 2.16	DW, RIFA, GS
CONTAINERS – USED (CARTONS, BOXES, BINS ETC.)	15	BW, PCN, GP, OS, IYSV, PW, RIFA, LA, GS, CB, BR, DW, RN
CONTAINERS - SHIPPING	15	BW, PCN, GP, OS, IYSV, PW, RIFA, LA, GS, CB, BR, DW, RN
FODDER (CHAFF, HAY, STRAW & SILAGE)	15, 25 See Section 2.16	DW, GS, RIFA
LABORATORY SAMPLES	37	ALL PESTS & DISEASES, SOIL
MACHINERY	10, 11, 15, 22, 27, 28, 29, 39	PCN, GP, OS, IYSV, RIFA, LA, CB, BR, DW, RN
MULCH	15, 25 See Section 2.16	DW, RIFA, GS
MUSHROOM SPAWN & COMPOST	15	DW, RIFA
PEA STRAW	12, 15, 25 See Section 2.16	DW, RIFA, GS
PLANT MATERIALS and PLANT PRODUCTS NOT OTHERWISE SPECIFIED	15, 38	DW, RIFA
POTTING MEDIA, POTTING MIXES	15	DW, RIFA
SILAGE (see FODDER)		
SOIL	Prohibited	
STRAW (see FODDER)		
TIMBER & LOGS (BARK FREE)	40	EHB
TURF	Prohibited	
VEHICLES	15, 25	BW, PCN, GP, OS, IYSV, PW, RIFA, LA, GS, CB, BR, DW, RN
VESSELS	15, 25	BW, PCN, GP, OS, IYSV, PW, RIFA, LA, GS, CB, BR, DW, RN

EXPLANATORY NOTE: *Declared weed seeds are prohibited. If found as contaminants in association with any of the Table 4 listed commodities, the prescribed matter will be either denied entry into Tasmania if tested off-shore, or re-exported, destroyed or cleaned if screened at the biosecurity barrier.*

2.21 Import Requirement Details

EXPLANATORY NOTE: *This Manual has been produced pursuant to section 68 of the Plant Quarantine Act 1997 and contains a number of conditions and restrictions on the importation of plants and plant material, as well as other prescribed matter, into Tasmania. Failure to comply with the conditions and restrictions in this Manual is an offence under the Act which may result in prosecution.*

A person may apply to the Secretary of the Department of Primary Industries, Parks, Water and Environment for an exemption to the operation of this Manual. For more information on how to do so, applicants should contact Biosecurity Tasmania's Biosecurity Operations Branch in the first instance. Contact details are provided in this Manual on pg. 4 and the Manual's back cover.

Most plants, plant products or other prescribed matter imported into the State must meet one or more of the following Import Requirements.

Schedules & Notes: Import Requirements for Fruit Fly Host Produce

Import Requirements (IRs) 1 – 8A & IRs 41 -45 apply to the importation of fruit that are hosts of Queensland Fruit Fly (Bactrocera tryoni (Froggatt)) and/or Mediterranean Fruit Fly (Ceratitis capitata (Wiedemann)).

Main host fruit for each fly are listed in ***Schedule 1A****. Unspecified fruit is regarded as susceptible to both flies unless an importer provides evidence to the contrary.*

The Import Requirements are equivalent options. Importers need only meet one Import Requirement for any consignment of host produce.

All host produce that is certified as meeting any Import Requirement for Queensland fruit fly and/or Mediterranean fruit fly must be handled, stored and transported under secure conditions in accord with ***Schedule 1B****.*

Biosecurity Tasmania and interstate biosecurity authorities maintain the right to inspect certified produce at any time, and to refuse to accept a certificate if it does not clearly indicate the produce meets all relevant conditions and restrictions.

Importers should note that the efficacy of any treatment specified in an Import Requirement is not guaranteed if applied to host fruit known to be infested with Queensland fruit fly or Mediterranean fruit fly. In addition, the onus is on produce suppliers to undertake any chemical treatment specified in an Import Requirement in accord with relevant federal and state legislation for chemical registration and safe use. The DPIPWE accepts no liability for any loss or damage resulting from any treatment specified in an Import Requirement.

SCHEDULES & NOTES: IMPORT REQUIREMENTS FOR FRUIT FLY HOST PRODUCE (Cont.)

SCHEDULE 1A: FRUIT FLY HOST FRUIT

- Hosts of Queensland fruit fly and Mediterranean fruit fly include, but are not limited to:

HOST BOTANICAL NAME	HOST COMMON NAME	*B. tryoni* (QFF)	*C. capitata* (MFF)
Acca sellowiana (Myrtaceae) – prohibited entry*	Feijoa	QFF	MFF
Actinidia deliciosa (Actinidiaceae)	Kiwifruit	QFF	MFF
Anacardium occidentale (Anacardiaceae)	Cashew apple	QFF	MFF
Annona cherimolia (Annonaceae)	Cherimoya	QFF	MFF
Annona glabra (Annonaceae)	Pond apple		MFF
Annona muricata (Annonaceae)	Soursop	QFF	MFF
Annona squamosa (Annonaceae); *A.squamosa x A. cherimolia*	Custard apple	QFF	MFF
Artocarpus altilis (Moraceae)	Breadfruit	QFF	MFF
Artocarpus heterophyllus (Moraceae)	Jackfruit	QFF	MFF
Averrhoa carambola (Oxalidaceae)	Star fruit, Carambola	QFF	MFF
Blighia sapida (Sapindaceae)	Akee apple		MFF
Capsicum annuum (Solanaceae)	Capsicum, Bell pepper	QFF	MFF
Capsicum annuum var *acuminatum* (Solanaceae)	Chilli (*see also* Cherry pepper, and Tabasco)	QFF	MFF
Capsicum annuum var *cerasiforme* (Solanaceae)	Cherry pepper	QFF	MFF
Capsicum annuum var *conoides* (Solanaceae)	Tabasco	QFF	MFF
Carica papaya (Caricaceae)	Papaya, Paw Paw, Papaw	QFF	MFF
Carica pentagona (Caricaceae)	Babaco (ripe)	QFF	MFF
Carissa macrocarpa (Apocynaceae)	Natal Plum		MFF
Casimiroa edulis (Rutaceae)	White sapote	QFF	MFF
Chrysophyllum cainito (Sapotaceae)	Star apple, Caimito	QFF	
Citrus aurantiifolia (Rutaceae) (West Indian lime)	Lime (*see also* Rangpur lime)	QFF	MFF
Citrus aurantium (Rutaceae)	Seville orange	QFF	MFF
Citrus grandis (= *maxima*) (Rutaceae)	Pummelo	QFF	MFF
Citrus latifolia (Rutaceae)	Tahitian lime	QFF	MFF
Citrus limon (Rutaceae); *Citrus limon x C. chinense*	Lemon (*see also* Meyer lemon)	QFF	MFF
Citrus medica (Rutaceae)	Citron, Tangor	QFF	MFF
Citrus meyeri (Rutaceae)	Meyer Lemon	QFF	MFF
Citrus paradisi (Rutaceae)	Grapefruit	QFF	MFF
Citrus reticulata (Rutaceae)	Mandarin, Tangelo, Tangerine	QFF	MFF
Citrus reticulata var. *austera* (Rutaceae)	Rangpur lime	QFF	MFF

HOST BOTANICAL NAME	HOST COMMON NAME	*B. tryoni* (QFF)	*C. capitata* (MFF)
Citrus sinensis (Rutaceae)	Sweet orange	QFF	MFF
Citrus x *tangelo* (syn. *C. reticulata* x *C. paradisi*) (Rutaceae)	Tangelo	QFF	MFF
Coffea arabica (Arabian coffee) (Rubiaceae)	Coffee cherry (Fresh fruit only; *see also* Excelsa, Liberian and Robusta coffee)	QFF	MFF
Coffea canephora (Rubiaceae)	Coffee cherry (Fresh fruit only)		MFF
Coffea excelsa (Rubiaceae)	Excelsa coffee (Fresh fruit only)		MFF
Coffea liberica (Rubiaceae)	Liberian coffee (Fresh fruit only)		MFF
Coffea robusta (Rubiaceae)	Robusta coffee (Fresh fruit only)		MFF
Crataegus spp. (Rosaceae)	Hawthorn		MFF
Cydonia oblonga (Rosaceae)	Quince	QFF	MFF
Cyphomandra betacea (Solanaceae)	Tamarillo, Tree tomato	QFF	MFF
Diospyros decandra (Ebenaceae)	Persimmon (see also Japanese persimmon)	QFF	MFF
Diospyros ebenum (Ebenaceae)	Black sapote	QFF	MFF
Diospyros kaki (Ebenaceae)	Japanese persimmon	QFF	MFF
Durio zibethinus (Bombacaceae)	Durian	QFF	MFF
Eriobotrya japonica (Rosaceae)	Loquat	QFF	MFF
Eugenia brasiliensis (Myrtaceae) – prohibited entry*	Grumichama	QFF	MFF
Eugenia uniflora (Myrtaceae) – prohibited entry*	Surinam cherry		MFF
Euphoria longan (Sapindaceae)	Longan	QFF	MFF
Ficus carica (Moraceae)	Fig	QFF	MFF
Fortunella crassifolia (Rutaceae)	Meiwa kumquat	QFF	
Fortunella japonica (Rutaceae)	Kumquat	QFF	MFF
Fortunella margarita (Rutaceae)	Kumquat	QFF	MFF
Fragaria x ananassa (Rosaceae)	Strawberry	QFF	MFF
Garcinia mangostana (Clusiaceae)	Mangosteen	QFF	MFF
Juglans regia (Juglandaceae)	Walnut (green walnut fruit only)		MFF
Litchi chinensis (Sapindaceae)	Lychee	QFF	MFF
Lycopersicon esculentum (syn. *Lycocersicon lycopersicum*) (Solanaceae)	Tomato **Note:** Pink and red types only	QFF	MFF
Malpighia glabra (syn. *M. punicifolia*) (Malpighiaceae)	Acerola	QFF	MFF
Malus domestica (Rosaceae)	Apple	QFF	MFF
Malus sylvestris (Rosaceae)	Crab apple	QFF	MFF
Mangifera indica (Anacardiaceae)	Mango	QFF	MFF
Manilkara zapota (Sapotaceae)	Sapodilla	QFF	MFF
Mimusops elengi (Sapotaceae)	Spanish cherry, Red coondoo		MFF
Monstera deliciosa (Araceae)	Monstera		MFF

HOST BOTANICAL NAME	HOST COMMON NAME	*B. tryoni* (QFF)	*C. capitata* (MFF)
Morus nigra (Moraceae)	Mulberry	QFF	MFF
Murraya exotica (Rutaceae)	Mock orange		MFF
Musa spp. (Musaceae)	Banana, Plantain banana	QFF	MFF
Myrciaria cauliflora (Myrtaceae) – prohibited entry*	Jaboticaba	QFF	MFF
Nephelium lappaceum (Sapindaceae)	Rambutan	QFF	MFF
Noronhia emarginata (Oleaceae)	Madagascar olive		MFF
Ochrosia elliptica (Apocynaceae)	Bourbon orange		MFF
Olea europaea (Oleaceae)	Olive (*see also* Madagascar olive)		MFF
Opuntia ficus-indica (Cactaceae)	Prickly pear	QFF	MFF
Opuntia stricta (Cactaceae)	Prickly pear	QFF	MFF
Passiflora edulis f. *edulis* (Passifloraceae) (Purple passionfruit) *Passiflora edulis* f. *flavicarpa* (Yellow passionfruit)	Passionfruit	QFF	MFF
Passiflora quadrangularis (Passifloraceae)	Granadilla	QFF	MFF
Persea americana (Lauraceae)	Avocado	QFF	MFF
Phoenix dactylifera (Arecaceae)	Date	QFF	MFF
Physalis peruviana (Solanaceae)	Cape gooseberry	QFF	MFF
Pouteria caimito (Sapotaceae)	Abiu	QFF	MFF
Pouteria sapota (Sapotaceae)	Mamey sapote		MFF
Prunus amygdalus (*P. dulcis*) (Rosaceae)	Almond (with husk)		MFF
Prunus armeniaca (Rosaceae)	Apricot	QFF	MFF
Prunus avium (Rosaceae)	Sweet cherry	QFF	MFF
Prunus cerasus (Rosaceae)	Sour cherry	QFF	MFF
Prunus domestica (Rosaceae)	Plum (*see also* Damson, and Japanese plum)	QFF	MFF
Prunus domestica x *P. armeniaca*	Plumcot	QFF	MFF
Prunus insitita (Rosaceae)	Damson plum	QFF	
Prunus persica (Rosaceae)	Peach	QFF	MFF
Prunus persica var. *nectarina* (Rosaceae)	Nectarine	QFF	MFF
Prunus persica var. *nucipersica*. (Rosaceae)	Peacharine	QFF	MFF
Prunus salicina (Rosaceae)	Japanese plum	QFF	
Psidium cattleianum var. *guineense* (Myrtaceae) – prohibited entry*	Brazilian guava	QFF	MFF
Psidium cattleianum var. *lucidum* (Myrtaceae) – prohibited entry*	Yellow cattley guava	QFF	MFF
Psidium friedrichsthalianum (Myrtaceae) – prohibited entry*	Costa Rican guava	QFF	MFF
Psidium guajava (Myrtaceae) – prohibited entry*	Guava (*see also* Brazilian, Costa Rican, strawberry, and yellow cattley guava)	QFF	MFF
Psidium littorale (syn. *P. cattleianum*) (Myrtaceae) – prohibited entry*	Strawberry guava	QFF	MFF
Punica granatum (Punicaceae)	Pomegranate	QFF	MFF

HOST BOTANICAL NAME	HOST COMMON NAME	***B. tryoni* (QFF)**	***C. capitata* (MFF)**
Pyrus betulaefolia (Rosaceae)	Nashi	QFF	MFF
Pyrus communis (Rosaceae)	Pear	QFF	MFF
Pyrus pyrifolia (Rosaceae)	Nashi pear	QFF	MFF
Rollinia deliciosa (Annonaceae)	Rollinia	QFF	MFF
Rollinia mucosa (Annonaceae)	Rollinia	QFF	MFF
Rubus fruticosus (Rosaceae)	Blackberry	QFF	MFF
Rubus idaeus (Rosaceae)	Raspberry	QFF	MFF
Rubus loganobaccus (Rosaceae)	Loganberry	QFF	MFF
Rubus ursinus var. *loganobaccus*	Boysenberry	QFF	MFF
Rubus ursinus x *R. loganobaccus*	Youngberry	QFF	
Sandoricum indicum (Meliaceae)	Santol	QFF	
Sideroxylon inerme (Sapotaceae)	Ironwood		MFF
Solanum lycopersicum (Solanaceae)	Tomato	QFF	MFF
Solanum melongena (Solanaceae)	Eggplant	QFF	MFF
Solanum muricatum (Solanaceae)	Pepino	QFF	MFF
Solanum pseudocapsicum (Solanaceae)	Jerusalem cherry		MFF
Spondias cytherea (Anacardiaceae)	Jew plum		MFF
Spondias spp. (Anacardiaceae)	Mombin	QFF	MFF
Syzygium cumini (Myrtaceae) – prohibited entry*	Jambu		MFF
Syzygium jambos (syn. *Eugenia jambos*) (Myrtaceae) – prohibited entry*	Rose apple	QFF	MFF
Syzygium malaccense (syn. *Eugenia malaccensis*) (Myrtaceae) – prohibited entry*	Mountain apple (note the term 'rose apple' is commonly used for two different species of *Syzygium*)		MFF
Szyzgium samarangense (Myrtaceae) – prohibited entry*	Wax apple		MFF
Szyzgium spp. (Myrtaceae) – prohibited entry*	Lilly pilly		MFF
Terminalia catappa (Combretaceae)	Tropical almond		MFF
Terminalia chebula (Combretaceae)	Chebulic myrobalan		MFF
Vaccinium corymbosum, V. ashei (Ericaceae)	Blueberry	QFF	MFF
Vitis labrusca (Vitaceae)	Isabella grape, Fox grape	QFF	MFF
Vitis vinifera (Vitaceae) (table grape)	Grape (table)	QFF	MFF
Vitis vinifera L. [Vitaceae] (wine grape)	Grape (wine) (*see also* Isabella grape)	QFF	MFF
Wikstroemia phillyreifolia (Thymelaeaceae)	Akia		MFF
Ziziphus jujube (Rhamnaceae)	Jujube, Chinese date	QFF	MFF

- **Please Note:** *Myrtaceae plants and plant parts are currently prohibited entry into Tasmania due to the risk presented by the fungal pathogen – Myrtle Rust.

SCHEDULES & NOTES: IMPORT REQUIREMENTS FOR FRUIT FLY HOST PRODUCE (Cont.)

SCHEDULE 1B: FRUIT FLY HOST SECURE FRUIT HANDLING, STORAGE & TRANSPORT

Produce certified under any Import Requirement or Interstate Certification Assurance (ICA) protocol for Queensland Fruit Fly (QFF) or Mediterranean Fruit Fly (MFF) must be handled, stored and transported in secure conditions when not in a Pest Free Area as follows *(with one exception for QFF when a specific set of import conditions are satisfied as defined in Explanatory Note 3)*:

I. For packaged produce, it must be handled, stored and transported continuously and securely for the duration of the produces transit to end destination from its point of origin certification for freedom from Fruit Fly infestation, in either:

(a) Unvented packages; **or**

(b) Vented packages with the vents secured with mesh with a maximum aperture of 1.6mm; **or**

(c) Vented packages enclosing a liner bag or liner sheets that obscure vent holes; **or**

(d) Packages, bins or palletized units fully enclosed under plastic wrap, tarpaulins, hessian, mesh or other coverings which provide a maximum aperture of 1.6mm.

OR

II. For unpackaged produce, it must be handled, stored and transported in secure conditions in commercial cool storage, typically at less than 10ºC;

OR

III. For any produce that is handled in transit, thereby not fulfilling either Clauses I or II of Schedule 1B, for the duration of this period of activity the produce:

(a) Must be handled, stored and transported in an environment in which the air temperature is less than:

(i) 13ºC if at risk of re-infestation by MFF; **or**

(ii) 16ºC if at risk of re-infestation by QFF;

or

(b) if handled in a warmer environment, must not be exposed to air temperature greater than:

(i) 13ºC for longer than 60 minutes if at risk of re-infestation by MFF; **or**

(ii) 16ºC if at risk of re-infestation by QFF;

and

(c) have the original certifications linked by an approved process to the deconsolidated or reconsigned produce.

AND

IV. For produce that has been handled in transit according to Clause III of Schedule 1B, it must also be handled, stored and transported for the remainder of its transit according to one of the consignment import requirements offered in Clauses I or II of Schedule 1B.

EXPLANATORY NOTES:

1) *Handling includes deconsolidating, consolidating, repacking, composing lots, splitting and reconsigning produce and is typically of short duration between phases of commercial cool storage and cool transport that follow the initial harvest packing and certification procedure;*

2) *Air temperature is measured in a meteorological screen or approved equivalent location (shaded and sheltered from breeze);*

3) *Security is influenced by locality, season, temperature and physical barriers so that requirements may vary with these circumstances. Between 1 May and 31 October each year, a cool-season window is recognised, whereby any handling of produce that is a host to QFF in the state of Victoria south of 37ºsouth latitude (near Seymour) and west of 147º 30' east longitude (near Seacombe) is deemed to satisfy Clauses I-IV of Schedule 1B;*

4) *Interstate Certification Assurance (ICA) protocols ICA-17 (Splitting Consignments and Reconsigning Original Consignments of Certified Produce), ICA-57 (Repacking of Fruit Fly and Phylloxera Host Produce) or ICA-58 (Certification of Composite Lots) satisfy Clause III(c) of Schedule 1B for certification history;*

5) *Direct consignments that fulfil Clause I or II and do not incur the requirements of Clause III must have their point of origin certification endorsed as meeting Schedule 1B.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 1

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

1 Fruit Fly Host Produce – Area Freedom

A person must not import, or cause to be imported, any fruit of a plant listed in Schedule 1A except in accordance with the following:

I. The fruit was grown in an area of the Australian mainland maintained as fruit fly free[1]; **and**

(a) The fruit was grown more than 7.5km from the discovery point or epicentre of any outbreak of Mediterranean fruit fly; **or**

(b) The fruit was grown more than 15km from the discovery point or epicentre of any Queensland fruit fly outbreak; **or**

(c) If the trapping rate for Queensland fruit fly exceeds 35 male flies within two weeks in permanent plus 16 supplementary Lynfield male-lure traps deployed within 200m of an discovery point or outbreak epicentre, the fruit was grown more than 80km from that outbreak discovery point or epicentre;

AND

II. If the fruit meets Clause I, but does not meet I(a), I(b) or I(c), it must have been harvested not less than one generation[2] and twenty-eight days, or 12 weeks, whichever is the longer, after the last wild fly was detected in traps or in fruit in the outbreak area.

EXPLANATORY NOTES:

- *[1] Denotes any area on the Australian mainland managed in accord with "Australia's Fruit Fly Code of Practice";*
- *[2] Generation time is as calculated under the Codes of Practice;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host fruit handling, storage and transport;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-23 (Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority), with an endorsement that produce was grown on a property at least 7.5km from a known outbreak of Mediterranean Fruit Fly, satisfy IR1, Clause I(a);*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-23 (Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority), with an endorsement that produce was grown on a property at least either 15 or 80km from a known outbreak of Queensland Fruit Fly, satisfy IR1, Clauses I(b) or I(c) respectively.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 2

Prior to import, a “Notice of Intention to Import Produce into Tasmania” must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

2 Fruit Fly Host Produce - Disinfestation with Methyl Bromide

A person must not import, or cause to be imported, any fruit of a plant listed in Schedule 1A unless:

I. It has been fumigated with methyl bromide for two hours at one of the following rates:

Methyl Bromide (g/m^3)	Fruit Core Temperature (°C)
32	21+
40	16-20.9
48	11-15.9
56	10-10.9

and

II. Fumigant loading rates for fruits and vegetables are not less than 30%, nor more than 50%, of the volume of the chamber when empty;

and

III. The fumigator ensures produce packaged or covered with impervious materials (such as plastic bags, stacked plastic punnets or waxed paper), are opened, cut or removed to allow adequate penetration of the gas unless impervious materials contain:

(a) not less than four unobstructed perforations of 6mm diameter per $100cm^2$; or

(b) five unobstructed perforations of 5mm diameter per $100cm^2$; or

(c) numerous pinholes (at least 6 holes per square centimetre).

EXPLANATORY NOTES:

- *This Import Requirement applies in respect of Queensland fruit fly and Mediterranean fruit fly;*
- *All methyl bromide fumigation must be carried out by a licensed fumigator in an approved chamber;*
- *Treated fruit may be allowed to ventilate adequately for the minimum practical period (as per label use requirements) after fumigation prior to securing as per Schedule 1B;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-04 (Fumigating with Methyl Bromide) satisfy this Import Requirement;*
- *The provisions of Schedule 1B for secure handling, storage and transport override the provisions in ICA-04 (eg Section 7.1 of Victorian ICA-04) for post treatment security for Tasmania.*
- *Alternative fumigant treatment options may also exist, as referred in Section 2.7 of the Manual*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 3

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

3 Fruit Fly Host Produce - Disinfestation by Cold Storage

A person must not import, or cause to be imported, any fruit of a plant listed in Schedule 1A unless it has been cold treated according to the following:

Fruit core temperature at treatment start	Treatment duration (days)
Queensland Fruit Fly	
0°C ± 0.5 °C	14
1.0°C ± 0.5 °C	16 (lemons 14)
2.0°C ± 0.5 °C	16 (lemons 14)
3.0°C ± 0.5 °C	16 (lemons 14)
Mediterranean Fruit Fly	
0°C ± 0.5 °C	14
1°C ± 0.5 °C	16 (lemons 14)
2°C ± 0.5 °C	18 (lemons 16)
3°C ± 0.5 °C	20 (lemons 18)

EXPLANATORY NOTE:

- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-07 (Cold Treatment) satisfy this Import Requirement;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 4

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

4 Fruit Fly Host Produce – Disinfestation of Mango and Papaya with Heat

A person must not import, or cause to be imported, any fruit of the species *Mangifera indica* (mango) or *Carica papaya* (papaya/papaw/pawpaw) unless it has been treated according to the following as relevant:

I. Mango must be treated:

(a) under Commonwealth Department of Agriculture supervision in an approved vapour heat treatment facility at 47°C for a minimum period of 15 minutes; **or**

(b) by immersion in hot water at an approved facility such that the temperature of the flesh adjacent to the seed is at 46°C for at least 10 minutes.

II. Papaya/papaw/pawpaw must be treated in an approved high temperature forced air chamber for at least 3.5 hours and until the seed cavity in the heaviest fruit in each batch reaches a temperature of 47.2°C. The flesh of the fruit must be firm and not distort when packed into the chamber.

EXPLANATORY NOTES:

- *An Approved Vapour Heat Treatment Facility means a facility that has:*
  - *a. current registration as a Registered Export Establishment (REE) under the Commonwealth Export Control Act 1982;* ***and***
  - *b. current approval from the Commonwealth Department of Agriculture for vapour heat treatment of mangoes for export;*
- *Clause I of this Import Requirement applies in respect of Queensland fruit fly only;*
- *Clause II of this Import Requirement applies in respect of Queensland fruit fly and Mediterranean fruit fly;*
- *Consignments of mangoes that meet ICA-10 (Hot Water Treatment of Mangoes) satisfy Clause I(b) of this Import Requirement;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 5

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

5 Fruit Fly Host Produce – Hard Green or Similar Condition

A person must not import, or cause to be imported, any fruit of a plant listed below unless it has unbroken skin and complies with the following:

I. Avocado (selected varieties):

(a) Fruit of Hass, Sharwill, Fuerte and Reed cultivars must have been harvested in a hard condition (Mediterranean fruit fly only); **or**

(b) Fruit of Hass and Lamb Haas cultivars must have been harvested in a hard condition (Queensland fruit fly only).

Hard means not soft or softening, or having any isolated soft areas or broken skin on any part of the fruit;

II. Banana (all varieties) - must be mature and green on arrival, or mature and green immediately before being artificially ripened in a properly constructed and operated ripening chamber, immediately before shipment to Tasmania. Mature means the flesh is hard and not flexible. Green means the skin is green and shows no yellow colouration except for areas towards the flower end provided the flesh beneath is still hard;

III. Black Sapote – must be green with skin free of black colouring;

IV. Durians, Jackfruit, Longans, Lychees, Mangosteens, Rambutans, Jaboticaba and Pomegranate – must be firm fleshed;

V. Passionfruit (purple types only) – must be unwrinkled;

VI. Papayas (non-defective flowering type only) **and Babaco** – must be hard and green. Hard means fruit is not soft or softening on any part. Green means the skin is green and shows no more than 25% of its ripening colour over its whole surface;

VII. Tahitian limes – must be mature and green. Mature means the flesh is hard. Green means the skin is green and shows no yellow colouration;

VIII. Tomatoes – must be mature and green. Mature and green means fruit has no more than a two centimetre diameter area of pink to red colour at the stylar end at the time of sorting after harvest

EXPLANATORY NOTES:

- *Unbroken skin means the skin has no pre-harvest cracks, punctures, pulled stem or other breaks that penetrate to the flesh, including breaks that have healed with callus tissue;*
- *Clause I of this Import Requirement applies in respect of Mediterranean fruit fly only;*
- *Clause II of this Import Requirement applies in respect of Queensland fruit fly and Mediterranean fruit fly;*
- *Clauses III - VIII of this Import Requirement apply in respect of Queensland fruit fly only;*
- *Consignments of any of the above fruit that meet Interstate Certification Assurance (ICA) protocols ICA 06 (Certification of Hard Green Bananas), ICA 08 (Mature Green Condition and Immature Green Condition of Papaw and Babaco), ICA 13 (Unbroken Skin Condition of Approved Fruits), ICA 15 (Mature Green Condition of Passionfruit, Tahitian Limes, Black Sapotes and Tomatoes), ICA 16 (Certification of Mature Green*

Condition of Bananas), ICA-27 (Mature Green Condition of Tomatoes) and ICA 30 (Hard Condition of Avocados) , satisfy this Import Requirement for each relevant Clause; e.g. ICA 30 satisfies Clause I;

- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 6

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

6 Fruit Fly Host Produce – Irradiation

A person must not import, or cause to be imported, any fruit of a plant listed in Schedule 1A unless it has been:

I. approved for irradiation by Food Standards Australia and New Zealand; **and**

II. irradiated by a business approved to do so to a minimum absorbed dose of 150 Gy.

EXPLANATORY NOTES:

- *This Import Requirement applies in respect of Queensland fruit fly and Mediterranean fruit fly;*
- *A business approved to irradiate fruit fly host produce is any business accredited under Interstate Certification Assurance (ICA) protocol ICA-55 (Irradiation Treatment). Consignments that meet ICA-55 satisfy this Import Requirement;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 7

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

7 Fruit Fly Host Produce – Systems Approaches for Citrus and Strawberries

A person must not import, or cause to be imported, fruit of any:

I. cultivar of mandarin, tangor, orange, lime, grapefruit or lemon unless that fruit has been grown and packed in accord with an approved systems approach; **or**

II. strawberry fruit unless that fruit has been grown and packed in accord with an approved systems approach.

EXPLANATORY NOTES:

CITRUS

- *This Import Requirement applies in respect of Queensland fruit fly only;*
- *Meyer lemons are not covered by this Import Requirement. An alternative import option must be met;*
- *An approved systems approach is that described in the Interstate Certification Assurance (ICA) protocol ICA-28 (Pre-harvest Treatment (Bait spraying) and Inspection of Citrus). Consignments of citrus that meet ICA-28 satisfy Clause I of this Import Requirement.*

STRAWBERRIES

- *This Import Requirement applies in respect of Queensland fruit fly only;*
- *An approved systems approach is that described in the Interstate Certification Assurance (ICA) protocol ICA-34 (Pre-harvest Field Control and Inspection of Strawberries). Consignments of strawberries that meet ICA-34 satisfy Clause II of this Import Requirement;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 8A

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

8A Fruit Fly Host Produce – Post-harvest Treatment with Dimethoate

SUSPENSION OF DIMETHOATE

The Australian Pesticides and Veterinary Medicines Authority (APVMA) has suspended certain use patterns for dimethoate. Post harvest treatment of some host fruits previously eligible for treatment is no longer permitted. Check the APVMA website at www.apvma.gov.au for further details.

A person must not import, or cause to be imported, any fruit unless it has been treated after harvest with dimethoate according to one of the following methods:

I. full immersion in a mixture containing 400 mg/L dimethoate for at least 60 seconds. Carambola, longan, lychee, passionfruit, star apple and rambutan may be dipped for 10 seconds but must remain wet for a further 60 seconds; **or**

II. flood spraying in a single layer with a mixture containing 400 mg/L dimethoate at a rate of 16 L per minute per square metre of the area being flood-sprayed, for at least 10 seconds, with fruit remaining wet with the mixture for not less than 60 seconds; **or**

III. flood spraying in a single layer with a mixture containing 400 mg/L dimethoate at a rate of 32 L per minute per square metre of the area being flood-sprayed, for at least 12 seconds, with fruit remaining wet with the mixture for not less than 60 seconds; **or**

IV. Treatment according to Clause I, II or III must be the final treatment before packing except in the case of citrus which may:

(a) have a non-recovery gloss coating (wax) applied not less than 60 seconds after treatment; **or**

(b) be washed, treated with a fungicide and/or a gloss coating applied not less than 24 hours after treatment with dimethoate.

EXPLANATORY NOTES:

- *This Import Requirement applies in respect of Queensland fruit fly only;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-01 (Dipping with Dimethoate) satisfy Clauses I and IV of this Import Requirement;*
- *Consignments that meet ICA-02 (Flood Spraying with Dimethoate) satisfy Clauses II, III and IV of this Import Requirement;*
- *Consignments that meet ICA-18 (Treatment and Inspection of Custard Apple and Other Annona spp.), and ICA-19 (Treatment and Inspection of Mangoes) satisfy this Import Requirement, for the fruit fly host fruit to which they apply;*
- *Consignments must also satisfy the import requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: **Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 8B

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

8B REVOKED (Fruit Fly Host Produce – Post-harvest Treatment with Fenthion)

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 23rd JUNE 2016, BECAUSE ALL LABELS AND PERMITS FOR THE USE OF FENTHION HAVE BEEN WITHDRAWN BY THE AUSTRALIAN PESTICIDES AND VETERINARY MEDICINES AUTHORITY (APVMA).*

IMPORT REQUIREMENT 9

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

9 Potatoes – Import Conditions

A person must not import, or cause to be imported, any potatoes, except in accordance with the following:

I. Imported potatoes or parts of potatoes intended for propagation must be in the form of tissue culture plantlets or minitubers and meet the requirements detailed in Explanatory Note 1.

II. Potato tubers intended for processing or consumption must be free of all other potato plant parts and washed completely free from soil and other extraneous matter. The potato tubers will be subject to a barrier inspection by Biosecurity Tasmania at the port of entry and must be accompanied by a Plant Health Certificate or Plant Health Assurance Certificate signed by an approved person stating that:

(a) The potato tubers were grown in a State or Territory that can demonstrate freedom from Potato Cyst Nematode (PCN) (*Globodera rostochiensis* (Wollenweber) Behrens). [*Validation of State or Territory freedom will be on provision of survey data, the requirements of which are outlined in Explanatory Note 2. Where such freedom cannot be demonstrated, potatoes may be imported under the Area Freedom conditions outlined in Clause IV (a) and (b)*; **and**

(b) The potato tubers were grown in a State or Territory that can demonstrate freedom from Bacterial Wilt (*Ralstonia solanacearum* (Smith) Yabuuchi et al. (syn. *Pseudomonas solanacearum* (Smith)). [*Validation of State or Territory freedom will be on the provision of survey data, the requirements of which are outlined in Explanatory Note 3. Where such freedom cannot be demonstrated, potatoes can be imported under the Area Freedom conditions outlined in Clause V (a) and (b)*]; **and**

(c) The potatoes were produced from certified seed (*to be accompanied by a Red Certification Label and PCN Soil Test Certificate if grown in Victoria*) which was grown in a region where PCN and Bacterial Wilt have not been recorded; **and**

(d) The potatoes were produced on a property that does not share agricultural equipment with any properties in another State, Territory or area unless that State, Territory or area meets all the conditions of this Import Requirement for freedom from PCN and Bacterial Wilt; **and**

(e) The potatoes have been packed in clean (free from soil, extraneous matter or other residues) containers (bags, bins etc).

III. The consignment must be accompanied by a statutory declaration signed by the grower stating that he/she complies with Clause II (d) above.

IV. Where State or Territory freedom from PCN cannot be demonstrated as outlined in Explanatory Note 2, in addition to complying with Clauses II (b) to (e) the following documentation must be supplied to validate Area Freedom from PCN:

(a) Complete survey data for PCN from all the potato crops within a defined growing Area plus a 20 km buffer zone surrounding the Area, covering the 3 years prior to the proposed potato tuber importation. Survey requirements are outlined in Explanatory Note 2; **and**

(b) A PCN soil test from the paddock in which the potatoes were grown, conducted either pre-planting, during the growing season, or post-harvest (Explanatory Note 2).

V. Where State or Territory freedom from Bacterial Wilt cannot be demonstrated as outlined in Explanatory Note 3, in addition to complying with Clauses II (a) and (c) to (e), the following documentation must be supplied to validate Area Freedom from Bacterial Wilt:

(a) Complete survey data for Bacterial Wilt from all the solanaceous crops within a defined growing Area plus a 20 km buffer zone surrounding the Area, covering the 3 years prior to the proposed potato tuber importation. Survey requirements are outlined in Explanatory Note 3; **and**

(b) A soil test for Bacterial Wilt from the paddock in which the potatoes were grown, conducted either pre-planting, during the growing season, or post-harvest.

EXPLANATORY NOTE 1: Importation of potatoes for propagation

- **Tissue culture:** Sterile potato plantlets produced at a ViCSPA accredited tissue culture laboratory and accompanied by a copy of the Certificate of Accreditation; or as released from a Post-entry Quarantine facility.

- **Minitubers:** 'Generation 0' material (minitubers, microtubers etc) produced at a ViCSPA accredited facility and accompanied by a Black Certification Label indicating material variety and generation and a copy of the Certificate of Accreditation of the minituber facility that produced it; or as released from a Post-entry Quarantine facility.

EXPLANATORY NOTE 2: Survey requirements for PCN.

In order to demonstrate State or Territory Area Freedom from PCN, the following information is required:

(a) A survey of all of the potato crops in the defined Area for which freedom from PCN is being claimed must have been completed over the 3-year period prior to the proposed importation. The survey should also encompass a 20km buffer surrounding the Area. One third or greater of the crops in the Area must be surveyed each year. Survey information must be accompanied by a map detailing the Area for which freedom from PCN is being claimed. If freedom from PCN is to be claimed, survey data must indicate no cases of PCN within the Area or the buffer zone over the 3-year period.

(b) The National protocol for soil sampling and testing for PCN must be followed (Hinch, 1991. National sampling strategies and standards for detection of potato cyst nematode. In: Potato Cyst Nematode- Impact on Australian Horticulture and a Proposed National Strategy). Horticultural Policy Council Industry Report No 6, 1993, pp 127-131).

The minimum acceptable sampling intensity under this protocol is deemed to be the collection of 200 x 10cm^3 samples on a 10 x 10m grid pattern for every 2 hectares, providing a combined 2kg field sample from which a 500g sub sample of dried soil is processed.

In order to declare freedom from PCN, no cysts will have been found in any of the samples over the entire three-year period of testing.

EXPLANATORY NOTE 3: Survey requirements for Bacterial Wilt.

In order to demonstrate State or Territory Area Freedom from Bacterial Wilt, the following information is required:

(a) A visual survey of all solanaceous crops within the defined Area for which freedom from Bacterial Wilt is being claimed will have been completed over the 3-year period prior to the proposed importation. The visual survey should also encompass a 20km buffer surrounding the Area. One third or greater of the crops in the Area must be surveyed each year. Any suspect plants will have been serologically tested for Bacterial Wilt. Survey information must be accompanied by a map detailing the Area for which freedom from Bacterial Wilt is being claimed. If freedom from Bacterial Wilt is to be claimed, survey data must indicate no cases of Bacterial Wilt within the Area or the buffer zone over the 3-year period. Specimens suspected of infection with *R. solanacearum* must be laboratory tested for the presence of the bacterium.

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 10

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

10 Grape Phylloxera – Hosts and Vectors

NOTE: *THIS IMPORT REQUIREMENT IS ONE OF SEVERAL THAT MUST BE MET WHEN MANAGING THE RISK PRESENTED BY HOSTS AND VECTORS OF GRAPE PHYLLOXERA, SUCH AS IMPORT REQUIREMENTS 38 & 39.*

A person must not import, or cause to be imported, any vector of grape phylloxera (*Daktulosphaira vitifoliae* (Fitch)), except in accordance with the following:

I. Grapevine planting material:

		Phylloxera Management Zone vector originates from:		
		Phylloxera Exclusion Zone (PEZ)[1]	**Phylloxera Risk Zone (PRZ)[2]**	**Phylloxera Infested Zone (PIZ)[3]**
Grapevine planting material	**Cuttings (callused or un-callused) and rootlings[4]**	Must have originated from a property free from grape phylloxera	Must be: a) cleaned free of soil; **and** b) disinfested by hot water treatment at either: i. 54ºC ± 1ºC for 5 minutes; **or** ii. 50ºC ± 1ºC for 30 minutes; **or** c) Cutting or rootlings that meet ICA-37[5] satisfy Clause I of this Import Requirement.	Not permitted entry
	Tissue-cultures	Must be from an approved source.[6]	Must be from an approved source	Must be from an approved source
	Potted vines	Not permitted entry	Not permitted entry	Not permitted entry

II. Grape fruit (grapes - loose or bunched):

		Phylloxera Management Zone vector originates from:		
		PEZ	**PRZ**	**PIZ**
Grape fruit	**Wine grapes**	a) Must have originated from a property free of grape phylloxera; **or** b) Wine grapes that meet ICA-33[7] satisfy Clause II of this Import Requirement.	a) Must have originated from a property free of grape phylloxera; **or** b) Wine grapes that meet ICA-33 satisfy Clause II of this Import Requirement.	Not permitted entry
	Table grapes	Must have originated from a property free of grape phylloxera	Must have originated from a property free of grape phylloxera	Must be disinfested by: a) Packaging with sulphur pads containing a minimum of 970g/kg sodium metabisulphite at the labelled rate and in accordance with manufacturer's instructions; **or** b) Methyl bromide fumigation. [8]

III. Wine grape products:

		Phylloxera Management Zone vector originates from:		
		PEZ	**PRZ**	**PIZ**
Wine grape products	***Must*[9] and juice[10]**	Must have originated from a property free of grape phylloxera	a) Must be loaded into containers/tanks free of soil and plant material over a hard stand[11] surface. **or** b) '*Must*'/juice that meets ICA-22[12] satisfies Clause III of this Import Requirement	a) Must be loaded into containers/tanks free of soil and plant material over a hard stand surface. **or** b) '*Must*'/juice that meets ICA-22 satisfies Clause III of this Import Requirement
	Marc[13]	Must have originated from a property free of grape phylloxera	Must be disinfested by composting according to Australian Standard AS4454	Must be disinfested by composting according to Australian Standard AS4454

IV. Agricultural equipment and machinery[14]:

	Phylloxera Management Zone vector originates from:		
	PEZ	**PRZ**	**PIZ**
Agricultural equipment and machinery	Must have been used in a PEZ for at least the last two weeks	Must be: a) Thoroughly cleaned free of any prescribed matter, including soil, plants, seeds or other plant material or debris by steam[15]; **OR** b) Thoroughly cleaned free of any prescribed matter, including soil, plants, seeds or other plant material or debris by some other method; **and** c) Disinfested by dry heat treatment at: i. 45ºC for 75 minutes; **or** ii. 40ºC for two hours	Must be: a) Thoroughly cleaned free of any prescribed matter, including soil, plants, seeds or other plant material or debris by steam[15]; **OR** b) Thoroughly cleaned free of any prescribed matter, including soil, plants, seeds or other plant material or debris by some other method; **and** c) Disinfested by dry heat treatment at: i. 45ºC for 75 minutes; **or** ii. 40ºC for two hours

EXPLANATORY NOTES:

1 ***"Phylloxera Exclusion Zone (PEZ)"*** *means an area recognised as being free of grape phylloxera, demonstrated by scientific evidence.*

2 ***"Phylloxera Risk Zone (PRZ)"*** *means an area not defined as a PEZ or PIZ, where the grape phylloxera status is unknown.*

3 ***"Phylloxera Infested Zone (PIZ)"*** *means an area containing grape vines known to be infested with grape phylloxera or have been infested with grape phylloxera.*

4 ***"Rootlings"*** *mean cuttings grown on to develop roots*

5 ***"ICA-37"*** *means 'Interstate Certification Assurance Scheme document number 37 – Hot Water Treatment of Grapevines'*

6 ***"Approved Source"*** *means a source approved by DPIPWE*

7 ***"ICA-33"*** *means 'Interstate Certification Assurance Scheme document number 33 – Movement of Wine Grapes'*

8 *Methyl bromide fumigation must be applied according to one of the following treatments:*

Fruit pulp temperature (ºC)	Dosage Rate (g/m³)	Duration (hours)	Dosage at 30 minutes (75%)	Dosage at 2 hours (60%)
21ºC or greater	32	2	24g/m³	20g/m³
Between 15.5ºC and 21ºC	40	2	30g/m³	24g/m³
Between 10ºC and 15.5ºC	48	2	36g/m³	29g/m³

[9] ***"Must"*** *is the total product of crushing grape fruit, including juice, skins, seeds, pulp and possibly some stems and leaves*

[10] ***"Juice"*** *is the liquid fraction from must, excluding skins, seeds and other large solids.*

[11] ***"Hard stand"*** *means a hard surface such as consolidated gravel or rubble surface or bitumen. Excludes earth surfaces.*

[12] ***"ICA-22"*** *means 'Interstate Certification Assurance Scheme document number 22 – Transfer of Grape Must and Unfiltered Juice from a Phylloxera Infested Zone (PIZ) or Phylloxera Risk Zone (PRZ) for Winemaking in a Phylloxera Exclusion Zone (PEZ)'*

[13] ***"Marc"*** *is the solids residue from crushing or pressing of must or wine, containing skins, seeds and possibly some stems.*

[14] ***"Agricultural equipment and machinery"*** *includes any machinery, hand-operated equipment, tools, bins, containers, used fencing and posts or farmyard vehicles used for the production and processing of grapes and grapevines in an area where grape vines are grown (Please note this definition is specific to Import Requirement 10 and differs to that which normally applies in the Manual.)*

[15] ***"Steam"*** *must be above 100ºC and be applied to all surfaces*

- *Consignments that meet ICA-23 (Certification of Area or Property Freedom Based on Monitoring by the Accrediting Authority), satisfy any condition of this Import Requirement where area or property freedom from grape phylloxera is required.*

- ***Please Note:*** *In selected circumstances, alternative fumigation treatments may exist in relation to the use of carbon dioxide or sulphur dioxide as referred to in Section 2.7.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 11

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

11 Onion Smut and Iris Yellow Spot Tospovirus (IYSV) - Hosts and Vectors

A person must not import, or cause to be imported, any type of *Allium* spp.[1] bulbs, except in accordance with the following:

I. *Allium spp*. bulbs for human consumption[2] may be imported into Tasmania:

(a) from any region where Onion Smut (*Urocystis cepulae* Frost) is not known to occur;

or

(b) provided that the bulbs are accompanied by a certificate to verify that the crop was inspected by an approved person (Qualified Government Officer with plant pathogen expertise) prior to bulb formation, and again prior to the bulbs being harvested (roots cut), and found free of *U. cepulae* and that no plants are known to be infected by *U. cepulae* within a 10km radius of the crop, and that:

(i) the bulbs are free from storage mould; **and**

(ii) they are packed in sound, clean packages with the grower's name and address on the package, or on a tag inside the packages. This regulation applies to bulbs harvested after December 2008.

II. *Allium spp.* bulbs for mother plants (bulbs for propagation) and transplants[3] cannot be imported into Tasmania unless:

(a) they have been certified free of *Urocystis cepulae* and Iris Yellow Spot Tospovirus (IYSV) by an approved seed production program;

or

(b) they are accompanied by a certificate to verify that the crop was inspected by an approved person (Qualified Government Officer with plant pathogen expertise) prior to bulb formation and again prior to being harvested and found free of *U. cepulae* and IYSV; **and**

(c) that no plants are known to be infected by *U. cepulae* or IYSV within a 10km radius of the site where the crop was produced.

III. Agricultural equipment and other prescribed matter from any region where *U. cepulae* is known to occur must be accompanied by a certificate signed by an approved person stating that the equipment or other prescribed matter has not been used within 3km of the location of any outbreak of *U. cepulae*.

EXPLANATORY NOTE:

- *[1] Allium spp. includes, but is not limited to, all edible cultivars (or species) of onion, leek, spring onion, shallot, chive and garlic;*
- *[2] Peeled/processed garlic is exempt from IR11, as are Allium spp. grown within Australia for human consumption;*
- *[3] Transplants (such as seedling plant trays) of all edible Alliums must comply with the same requirements as that required for 'bulbs for mother plants', as specified in Section II of IR11.*

PROOF: Consignments must be accompanied by a Plant Health Certificate

IMPORT REQUIREMENT 12

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

12 Pea Weevil - Hosts and Vectors

NOTE: *THIS IMPORT REQUIREMENT IS ONE OF SEVERAL THAT MUST BE SATISFIED, AS RELEVANT, WHEN IMPORTING GRAIN OR SEED INTO TASMANIA FOR USE AS ANIMAL FEED, AS WELL AS SEED FOR SOWING.*

A person must not import, or cause to be imported, any type of dry pea seed except in accordance with the following:

I. Dried peas[1] that are intended for sowing or animal feed, including grain or seed mixes must be accompanied by a certificate signed by an approved person stating that:

(a) the State or Territory of Australia or of any other country in which the peas are grown are free of Pea Weevil (*Bruchus pisorum* L.); **or**

(b) the peas have been fumigated with methyl bromide for 24 hours at atmospheric pressure according to one of the following rates:

(i) 32 – 40 grams per m^3 at 10° - 14°C;
(ii) 24 – 32 grams per m^3 at 15° - 20°C;
(iii) 16 – 24 grams per m^3 at 21°C or higher; **or**

(c) the peas have been fumigated with phosphine in a gas-tight[2] structure or enclosure at the rate of at least 1.5 grams per cubic metre of sealed storage volume at a temperature of at least 15°C for at least 10 days; **or**

(d) The peas have been gamma irradiated at 25 k Gray at an approved facility using an approved process (applies to peas intended for animal feed only); **or**

(e) the peas must be consigned to an approved Level 3 premise within Tasmania for processing if conditions I (a) or (b) or (c) or (d) are not met (applies to peas intended for animal feed only).

II. Other Grains and Seeds that May Contain Peas must:

(a) contain zero pea seeds per kilogram of grain or seed as indicated by a Seed Analysis Certificate issued by an accredited laboratory which has examined a representative sample from the grain or seed lot (Refer IR30 for sampling protocol detail); **or**

(b) if the representative sample of grain or seed contains one or more pea seeds per kilogram, the lot from which the sample was drawn must be:

(i) accompanied by a certificate signed by an approved person stating that the State or Territory of Australia or of the other country in which the peas were grown is free of Pea Weevil; **or**

(ii) fumigated with methyl bromide according to requirement I(b) above; **or**

(iii) fumigated with phosphine according to requirement I(c) above ; **or**

(iv) Gamma irradiated at 25 k Gray according to requirement I(d) above; **or**

(c) the grain or seed must be consigned to an approved Level 3 premise within Tasmania for processing if conditions II(a) or (b) are not met.

III. Conditions I and II do not apply where there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person, stating that the whole or that part of the State or Territory of Australia or of another country is free of Pea Weevil.

EXPLANATORY NOTES:

- *[1] **"Peas"** means all varieties of the plants Pisum sativum and Pisum arvense;*
- *[2] 'Gas-tight' means that the storage must meet at least the minimum standard required, that is a pressure decay from 250 Pa to 125 Pa in five minutes, as measured by an accepted pressure test.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 13

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

13 REVOKED (Boil Smut – Hosts)

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 18th DECEMBER 2013, AS DECLARED BY PUBLIC NOTICE ON 28th NOVEMBER 2013, BECAUSE BOIL SMUT IS REVOKED AS A LIST A PEST OF BIOSECURITY CONCERN TO TASMANIA EFFECTIVE FROM THE 18th DECEMBER 2013.*

BOIL SMUT HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 14

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

14 REVOKED (Hosts of Chrysanthemum White Rust (*Puccinia horiana* Henn.))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 17th DECEMBER 2010, BECAUSE CHRYSANTHEMUM WHITE RUST HAS BEEN REVOKED AS A LIST B DISEASE OF BIOSECURITY CONCERN TO TASMANIA.*

IMPORT REQUIREMENT 15

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

15 Red Imported Fire Ant - Vectors

NOTE: *THIS IMPORT REQUIREMENT CURRENTLY APPLIES TO PLANTS, PLANT PRODUCTS AND OTHER PRESCRIBED MATTER IMPORTED FROM THE STATE OF QUEENSLAND.*

A person must not import, or cause to be imported, any vector[1] of red imported fire ant (*Solenopsis invicta* Buren), except in accordance with the following:

I. Vectors from within 5 kilometres of a known infestation of red imported fires ant (RIFA):

(a) must be accompanied by a Plant Health Certificate or Plant Health Assurance Certificate from the State or Territory of origin stating that the vector material:

(i) originates from a property that has been inspected and accredited by an authorised officer of the Queensland Department of Primary Industries (QDPI) as being free of RIFA; **and**

(ii) the property has been inspected within the past four weeks by an authorised officer of the QDPI or a person accredited by the QDPI under an approved ICA arrangement and no RIFA detected; **and**

(iii) the property does not share vector material with another property known to be infested with RIFA unless that vector material has been given an approved treatment.

or

(b) must be accompanied by a Plant Health Certificate or Plant Health Assurance Certificate from the State or Territory of origin stating that the vector material has been given one of the following approved treatments:

(i) for containerised plants in potting medium or with potting medium attached:

- the plants and container have been inspected and found free of RIFA; **and**
- the potting medium has been treated:

a. with Bifenthrin 2g/kg granules at 16 to 61g/10L potting medium (permit 9796), or in accordance with APVMA permits 13916 or 13959, within 60 days of export; **or**

b. with Chlorpyrifos 100g/kg granules at 750 g/m^3 potting mix (SuSCon Green® label), or in accordance with APVMA permit 14256, within 180 days of export; **or**

c. within 10 days of export to Tasmania, with:

i. full immersion or drenching of the container and root ball in a solution of bifenthrin 80g/L at 25ml/100L potting medium (permit 10043), with a commercial wetting agent; **or**

ii. full immersion or drenching of container and root ball in a solution of chlorpyrifos 500g/L at 40ml/100L potting medium (permit 13504) with a commercial wetting agent; **or**

iii. drenching with cyfluthrin in accordance with APVMA permit 12073;

and

- once treated, the plants have been isolated in a secure area (that is greater than 5 metres from plants that have not been treated), prior to consignment.

(ii) for agricultural equipment and used containers:

- the equipment or containers have been inspected and found free of RIFA; **and**
- the equipment or containers have been cleaned free of organic matter and soil by brushing, use of a high-pressure air/water hose or steam cleaning.

(iii) for potting media and organic mulch, the material has been:

- fumigated with Methyl Bromide at the rate of 48 grams per cubic metre at 21° C for 24 hours; **and**
- stored, handled and consigned after treatment so as to prevent infestation with fire ant;

or

- heat treated so as to bring the entire mass to a minimum temperature of 65.5°C; **and**
- stored, handled and consigned after treatment so as to prevent infestation with fire ant.

or

- produced, stored, handled and consigned in such a manner that would prevent infestation or destroy all life stages of the RIFA; **and**
- packed in the original sealed bag or other container in which it was commercially packed.

(iv) for hay and straw:

- the hay or straw has been fumigated with Methyl Bromide at the rate of 48 grams per cubic metre at 21°C for 24 hours; **and**
- stored, handled and consigned after treatment so as to prevent infestation with fire ant.

II. Vectors from places more than 5 kilometres from a known infestation of RIFA must be accompanied by:

(a) a Plant Health Certificate stating that the material originates from a property that is more than 5 kilometres from any known infestation of fire ant; **or**

(b) a Plant Health Assurance Certificate stating that the material originates from a property that has been accredited by an authorised officer of the QDPI as being located more than 5 kilometres from any known infestation of fire ant.

EXPLANATORY NOTES:

- *[1] **Vectors of Red Imported Fire Ant** include: plants with attached potting media, potting media, organic mulch, soil and turf[2], hay, straw, agricultural equipment[3] and used containers[4];*

- [2] ***Soil and Turf*** *are not permitted entry into Tasmania as freedom from soil is a condition of entry for any item;*
- [3] ***Agricultural Equipment*** *includes: machinery, vehicles or any equipment used for the culture, harvesting, packing or processing of any plant or plant product, or in cultivation, spraying, harvesting, earth moving, packing and transport of* vector *material;*
- [4] ***Used Container*** *includes**:** pots, bins, crates and pallets used in growing, harvesting, packing or transport of* vector *material;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-39 (Inspection and Treatment of Plants for Red Imported Fire Ant), satisfy Clause I of this Import Requirement;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-40 (Property Freedom of Plants for Red Imported Fire Ant), satisfy Clause II of this Import Requirement.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 16

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

16 REVOKED (Hosts of San Jose Scale (*Diaspidiotus perniciosus* Comstock))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 3RD APRIL 2009, BECAUSE SAN JOSE SCALE IS NO LONGER A PEST OF BIOSECURITY CONCERN TO TASMANIA.*

IMPORT REQUIREMENT 17

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

17 REVOKED (Hosts of Tobacco Blue Mould Fungus (*Peronospora hyoscyami* f.sp. *tabacina* (D.B. Adam) Skalicky))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 17th DECEMBER 2010, BECAUSE TOBACCO BLUE MOULD HAS BEEN REVOKED AS A LIST A DISEASE OF BIOSECURITY CONCERN TO TASMANIA.*

TOBACCO BLUE MOULD HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 18

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

18 Fire Blight - Hosts

Other countries:
A plant or plant product other than the fruit* of a plant listed below may be imported into Tasmania from any country in which the disease Fire Blight (*Erwinia amylovora)* exists or has been known to exist under conditions approved by the Secretary and subject to the provisions of the (Australian) *Biosecurity Act 2014*.

*Fruit of fire blight hosts is prohibited from countries or places where the disease exists (refer to "Notice under Section 66 of the *Plant Quarantine Act 1997*", Tasmanian Government Gazette, p 1931, 20 December 2000 or Appendix 2 of this document).

Schedule 1: Hosts of Fire Blight*

Host Botanical Name#	Host Common Name
Amelanchier spp.	Serviceberry, Juneberry
Cotoneaster spp*.*	Cotoneaster
Crataegus spp.	Hawthorns
Cydonia	Quince
Eriobotrya spp.	Loquat
Malus spp.	Apple varieties and species
Mespilus spp.	Medlar
Photinia spp.	Photinia
Prunus spp.	Plum, apricot and cherry varieties/crosses
Pyracantha spp.	Firethorn
Pyrus spp.	Pear varieties and species
Rosa spp.	Rose varieties
Rubus spp. (including *R. idaeus**)	Thornless Blackberry (derived from crosses among a range of *Rubus* cultivars), and Raspberry*
Sorbus spp.	Mountain Ash, Dogberry, Rowan

* The host schedule represents a shortlist of hosts, with this bacterial pathogen being described as going to over 130 species across 40 plant genera
\# 'spp.' means all species of plants in the genus

Other States and Territories of Australia:
Host plants of Fire Blight *(E. amylovora*) listed in Schedule 1 may be imported into Tasmania from another State of Australia in which the disease Fire Blight exists or has been known to exist under the following conditions:

I. Plants and plant products, other than fruit, of a genus of plants in the host list that have been grown in or consigned from a location within twenty (20) kilometres of the site of a confirmed detection of *E. amylovora* that is under active quarantine control are permitted entry to Tasmania under the following conditions:

(a) they have been grown in a nursery that has been certified by the Department of Agriculture or equivalent organisation in the State or Territory in which the nursery is located, as being:

(i) located more than ten (10) kilometres from the infected site(s); **and**

(ii) inspected by an approved person in the previous spring and autumn and no evidence of *E. amylovora* was found;

and

(b) they are accompanied by a Plant Health Assurance Certificate that the plants were grown on that nursery for the previous twelve (12) months.

II. Fruit of a genus of plants in the list below that were grown within five (5) kilometres of the infected site(s) is not permitted entry to Tasmania.

III. The acceptance of these conditions by Tasmania is conditional on the establishment and policing of a quarantine area, by any State/Territory where Fire Blight has been detected, which prevents the movement of host plants or plant products (other than fruit) out of the 0 to 10 kilometre zone and fruit of host plants out of the 0 to 5 kilometre zone to other parts of that State.

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 19

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

19 REVOKED (Hosts of Western Flower Thrips (*Frankliniella occidentalis* Pergande))

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 21ST DECEMBER 2011, AS DECLARED BY PUBLIC NOTICE ON 28th NOVEMBER 2011, BECAUSE WESTERN FLOWER THRIPS IS REVOKED AS A LIST A PEST OF BIOSECURITY CONCERN TO TASMANIA EFFECTIVE FROM THE 21ST DECEMBER 2011.*

WESTERN FLOWER THRIPS HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 20

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

20 REVOKED (Hosts of Melon Thrips (*Thrips palmi* Karny))

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 21ST DECEMBER 2011, AS DECLARED BY PUBLIC NOTICE ON 28th NOVEMBER 2011, BECAUSE MELON THRIPS IS REVOKED AS A LIST A PEST OF BIOSECURITY CONCERN TO TASMANIA EFFECTIVE FROM THE 21ST DECEMBER 2011.*

MELON THRIPS HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 21

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

21 REVOKED (Pyrethrum Seed)

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 19th DECEMBER 2012, AS DECLARED BY PUBLIC NOTICE ON 7th DECEMBER 2012.*

IMPORT REQUIREMENT 22

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

22 Lupin Anthracnose Disease - Hosts and Vectors

NOTE: *THIS IMPORT REQUIREMENT IS ONE OF SEVERAL THAT MUST BE SATISFIED, AS RELEVANT, WHEN IMPORTING GRAIN OR SEED INTO TASMANIA FOR USE AS ANIMAL FEED, AS WELL AS SEED FOR SOWING.*

A person must not import, or cause to be imported, any hosts and vectors of lupin anthracnose disease (*Colletotrichum lupini* (Bondar) Nirenberg et al.), except in accordance with the following:

I. Lupin seed for sowing must be accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and packed stating that:

(a) the seed is from a crop examined during the growing season when the crop was mature, but the pods and stems were still green, by an inspector of the Department responsible for Agriculture in the State or Territory where the plants were grown and found to be free of Lupin Anthracnose; **and**

(b) the seed is from a lot that has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose. A Seed Analysis Certificate issued by an accredited laboratory, stating no *Colletotrichum lupini* was found in the submitted sample, must be provided. The submitted sample must be representative of the whole seed lot and drawn according to current International Rules for Seed Testing published by the International Seed Testing Association, or equivalent; **and**

(c) the seed has been treated with an approved pesticide[1] under the supervision of the approved person; **and**

(d) the seed must be accompanied by a statutory declaration issued by the grower of the crop stating that the plants or plant products:

(i) Originate from mother stock not known to have been infected with Lupin Anthracnose; **and**

(ii) the property has not received any plants or plant products of *Lupinus* species or shared agricultural equipment, used packages or containers with any property on which Lupin Anthracnose has been detected unless that plant material or equipment has, or those used packages or containers have been given an approved treatment;

OR

II. Lupin seed for sowing must originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person certifying that the whole of the State or Territory or that part of it where the seed was grown is free of Lupin Anthracnose.

III. Lupin grain intended for processing or use as stock feed:

(a) must be accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose; **or**

(b)

(i) must have been subjected to an approved process in an approved premise in the exporting State or Territory such that it is unlikely for any spores of the disease to have survived; **or**

(ii) must be consigned to an approved Level 3 premise in Tasmania for processing prior to release; **or**

(c) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Lupin Anthracnose.

IV. Other Grains and Seeds that may contain lupins must:

(a) contain zero lupin seeds per kilogram of grain or seed as indicated by a Seed Analysis Certificate issued by an accredited laboratory which has examined a representative sample from the grain or seed lot. (Refer IR30 for sampling protocol detail); **or**

(b) if the representative sample of grain or seed contains one or more lupin seeds per kilogram, the lot from which the sample was drawn must be:

(i) accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Lupin Anthracnose; **or**

(ii) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Lupin Anthracnose; **or**

(c) the grain or seed must be consigned for processing to an approved Level 3 premise within Tasmania if conditions IV (a) or (b) are not met.

V. Lupin plants and plant products (other than seed or grain) may only be imported with the written permission of the Secretary.

VI. Agricultural equipment, used packages and/or containers that have been used in the harvesting, handling or processing of any plant or plant product of the *Lupinus* species in a State or Territory where Lupin Anthracnose occurs, must be accompanied by a certificate signed by an approved person of that State or Territory stating that the agricultural equipment or other prescribed matter has been cleaned under their supervision and is free of lupin plants, plant products, lupin trash and soil.

EXPLANATORY NOTES:

- *[1] An approved pesticide is a mixture of Rovral (iprodione, 0.25 g per kg seed) and Thiram (1 g per kg seed) or an equivalent formulation applied at the specified rates of active ingredients.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 23

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

23 REVOKED (Hosts of Spiralling Whitefly (*Aleurodicus dispersus* Russell))

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 21ST DECEMBER 2011, AS DECLARED BY PUBLIC NOTICE ON 28th NOVEMBER 2011, BECAUSE SPIRALLING WHITEFLY IS REVOKED AS A LIST A PEST OF BIOSECURITY CONCERN TO TASMANIA EFFECTIVE FROM THE 21ST DECEMBER 2011.*

IMPORT REQUIREMENT 24

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

24 REVOKED (Hosts of Ash Whitefly (*Siphoninus phillyreae* Haliday))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 28TH APRIL 2009, BECAUSE ASH WHITEFLY IS NO LONGER A PEST OF BIOSECURITY CONCERN TO TASMANIA.*

IMPORT REQUIREMENT 25

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

25 Green Snail - Vector Import Controls

A person must not import, or cause to be imported from Western Australia, any vector of green snail (*Cornu apertus* (Born) (syn. *Cantareus apertus* (Born), *Helix aperta* (Born)), except in accordance with the following:

I. Cut flowers, leafy vegetables, cuttings, nursery stock, hay and straw imported from Western Australia must be accompanied by a Plant Health Certificate signed by an approved person stating those plants or plant products have been grown and packed in accordance with one of the following property accreditation codes, held under the "National Protocol For the Movement of Green Snail, *Cantareus apertus*, Host Material to Other States and Territories of Australia" (as published by the Western Australian Department of Agriculture)*****:

(a) GSL03 - Grown and packed on a property greater than 25km of a known green snail outbreak; **or**

(b) GSL02 - Grown and packed on a property greater than 2km but less than 25km of a known green snail outbreak which has been bait surveyed as per National Green Snail Protocol; **or**

(c) GSL01 - Grown and packed on a property within 2km of a green snail outbreak which has been bait surveyed as per National Green Snail Protocol

II. Cut flowers, cuttings, bare-rooted stock, hay and straw do not require a declaration or certificate for Green Snail if grown and packed during the period December to March inclusive.

EXPLANATORY NOTES:

- *This requirement does not apply to plants imported as tissue culture;*
- *Consignments with a Plant Health Assurance Certificate that meets Interstate Certification Assurance protocol ICA-46 (Certification of Area/Property Freedom for Green Snail (2-25 km)), also satisfy Clause I(b) of this Import Requirement.*
- ****Please Note:** Though the "National Protocol For the Movement of Green Snail, Cantareus apertus, Host Material to Other States and Territories of Australia" covers a range of host materials including fodder (hay and straw), all forms of fodder as a commodity class, are also regulated under Section 2.16 of the Manual*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 26

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

26 REVOKED (Argentine Ant (*Linepithema humile* Mayr))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE IN JUNE 2008, BECAUSE ARGENTINE ANT IS NO LONGER A PEST OF BIOSECURITY CONCERN TO TASMANIA.*

IMPORT REQUIREMENT 27

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

27 Chickpea Blight - Hosts and Vectors

NOTE: *THIS IMPORT REQUIREMENT IS ONE OF SEVERAL THAT MUST BE SATISFIED, AS RELEVANT, WHEN IMPORTING GRAIN OR SEED INTO TASMANIA FOR USE AS ANIMAL FEED, AS WELL AS SEED FOR SOWING.*

A person must not import, or cause to be imported, any host or vector of chickpea blight (*Didymella rabiei* (Kovatsch.) Arx (syn. *Ascochyta rabiei* (Pass.) Labr.) anamorph), except in accordance with the following:

I. Chickpea (*Cicer arietinum* L.) plants and plant products, and any other prescribed matter that is a potential vector of chickpea blight, must be accompanied by a certificate signed by an approved person of the State or Territory in which the chickpeas were grown and packed or used stating that:

(a) *Didymella rabiei* is not known to occur on the property on which the prescribed matter has been grown and packed or used; **and**

(b) the property is at least 50 km from any place in which the fungus is known to occur; **and**

(c) the property has not received any chickpea plants or plant products or shared agricultural equipment with a property on which chickpea blight has been detected unless that plant material or equipment has been given an approved treatment.

II. Chickpea Seed intended for sowing must:

(a) have a representative sample of seed tested for *D. rabiei* by an approved method and found free of *Didymella* pathogens. The submitted sample must be representative of the whole seed lot and drawn prior to fungicide treatment according to current International Rules for Seed Testing published by the International Seed Testing Association, or equivalent; **and**

(b) be certified that the seed consignment has been treated with an approved fungicide.

III. Other Grains and Seeds that may Contain Chickpea Seeds must:

(a) contain zero chickpea seeds per kilogram of grain or seed as indicated by a Seed Analysis Certificate issued by an accredited laboratory which has examined a representative sample from the grain or seed lot (refer IR30 for sampling protocol detail); **or**

(b) if the representative sample of grain or seed contains one or more chickpea seeds per kilogram, the grain or seed lot from which it was drawn must be:

(i) accompanied by a certificate signed by an approved person of the State or Territory in which it was grown and/or packed stating that it has been sampled in an approved manner, tested by an approved method and found free of Chickpea Blight; **or**

(ii) originate from a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person certifying that the whole of the State or Territory or that part of it where the grain was grown is free of Chickpea Blight; **or**

(c) the grain or seed must be gamma irradiated at 25 k Gray at an approved facility using an approved process; **or**

(d) the grain or seed must be consigned for processing to an approved Level 3 premise within Tasmania if conditions II (a) or (b) or (c) are not met.

IV. Agricultural equipment and other prescribed matter that has been used or stored on properties within 50 km of any occurrence of the Chickpea Blight fungus may be imported if it is accompanied by a certificate signed by an approved person stating that the prescribed matter has been cleaned under that person's supervision and is free of chickpea plants, plant products, chickpea trash and soil.

PROOF: Consignments must be accompanied by a Plant Health Certificate

IMPORT REQUIREMENT 28

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

28 Blueberry Rust - Hosts and Vectors

A person must not import, or cause to be imported, any plant or plant product of hosts (as specified in Schedule 1), and vectors, of Blueberry Rust (*Thekopsora minima* (P. Syd & Syd)), except in accordance with the following:

Schedule 1: Hosts of Blueberry Rust (BBR)

Host Botanical Name	Host Common Name
Gaylussacia spp.	Huckleberry
Hugeria spp.	
Leucothoe spp.	Includes dog-laurel
Lyonia spp.	Includes male-blueberry, and fetterbush
Menziesia spp.	False azalea
Oxycoccus spp.	Small cranberry
Pernettya spp.	Mascala
Pieris spp.	Includes fetterbush or andromeda
Rhododendron spp.	Rhododendrons, including azalea
Tsuga spp.	Hemlock, hemlock spruce
Vaccinium spp.	Includes blueberry, cranberry and huckleberry

I. Fruit of *Vaccinium* spp. must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown and packed stating that the crop:

(a) has been inspected within 14 days of harvest and no blueberry rust detected; **and**

(b) has been sprayed within 14 days of harvest with a pre-harvest application of a pesticide registered for the treatment of blueberry rust as per the label recommendations, and rotated from previous pesticides applied that season for blueberry rust.

II. Plants of *Vaccinium* spp. must:

(a) be approved for growing in pre- or post-entry quarantine under approved conditions; **or**

(b) have been grown on a property in a State or Territory or in a part of a State or Territory for which there is a current area freedom certificate for Blueberry Rust.

III. Host plants other than *Vaccinium* spp., must be accompanied by a certificate signed by an approved person of the State or Territory in which they were grown stating that those plants have been inspected within 14 days of dispatch and no blueberry rust detected.

IV. Vectors, including agricultural equipment and used packages or containers, that have been in contact with or have been used in any process involving any host plant or plant product must be accompanied by a certificate signed by an approved person of the State or Territory in which they were last used stating that they have been cleaned free of soil and organic matter; **and**:

(a) Steam cleaned; **or**

(b) Treated with a solution containing not less than 100 ppm available Chlorine as a spray rinse or dump treatment; **or**

(c) Treated in a manner approved by the Secretary.

V. Conditions I, III and IV do not apply if:

(a) there is an accompanying certificate signed by an approved person stating that the host plants or plant products were grown, or the agricultural equipment, used packages or containers were last used on a property that is located more than 200 kilometres from any detection of blueberry rust that occurred at any time; **or**

(b) the host plants or plant products were grown, or the agricultural equipment, used packages or containers were last used on a property that is in a State or Territory for which there exists a current area freedom certificate issued by the Chief Plant Health Manager or equivalent person certifying that the whole of the State or Territory or that part of it is free of Blueberry Rust.

EXPLANATORY NOTES:

- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-31 (Pre-harvest Treatment and Inspection of Blueberries for Blueberry Rust) satisfy this Import Requirement.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 29

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

29 Plants and Plant Products, other than Potatoes, from Potato Cyst Nematode infested areas within Victoria

PCN Protocol Developed with Victoria

This protocol refers to additional requirements for movement to Tasmania of plants and bulbs that have been grown in the PCN restricted areas in Victoria.

I. GENERAL CONDITIONS FOR ALL PROPERTIES

(a) The property does not share agricultural equipment with a potato grower, or with other nurseries within 20 km of an infestation that are not accredited under this protocol.

(b) The property is not exposed to the same irrigation source as the infested property or to run-off from PCN-infested properties.

(c) Cropping records will be inspected to demonstrate that solanaceous crops have not been grown on the property for a period of 10 years immediately prior to the commencement of accreditation or where solanaceous crops have been grown within the last 5 to 10 years the soil has been fumigated with a registered soil fumigant at the recommended rate since the last Solanaceous crop (Nurseries with potted Plants excepted).

(d) Accreditation may be given following an annual inspection by the Victorian Department of Agriculture to assess the relevant criteria detailed below. An up-to-date list of accredited properties will be provided to Tasmania by the Victorian Department of Primary Industries as required.

II. SPECIFIC CONDITIONS FOR PARTICULAR PROPERTY TYPES

(a) NURSERIES WITH POTTED PLANTS

- (i) Plants are grown in containers using a soil-less mix
- (ii) Containers are not in contact with the soil

(b) TREE NURSERIES

- (i) Trees are to be bare-rooted and visibly free of soil.

(c) BULB GROWERS

- (i) The bulbs are to be cleaned and graded prior to sale.

PROOF: Consignments must be accompanied by a Plant Health Certificate

Import Requirement 30

Prior to import, a *"Notice of Intention to Import Grain/Seed"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

30 Grain and Grain Products Intended for Animal Feed - Import Conditions

NOTE: *THIS IMPORT REQUIREMENT IS ONE OF SEVERAL THAT MUST BE SATISFIED WHEN IMPORTING GRAIN OR SEED INTO TASMANIA FOR USE AS ANIMAL FEED[1]. IMPORTERS SHOULD ALSO REFER TO RELEVANT PARTS OF IMPORT REQUIREMENTS 12, 22 AND 27.* ***CERTIFICATION MUST BE PRESENTED 24 HOURS PRIOR TO CONSIGNMENTS ARRIVING, OTHERWISE THE CONSIGNMENT WILL NOT BE PROCESSED WITHIN 24 HOURS OF CERTIFICATION RECEIVAL.***

Entry to Tasmania of grain or grain products including or derived from cereals, oilseeds and other seeds and, intended for use as livestock, bird, pet or other animal feed is regulated under this Import Requirement.

Tasmania's system for managing weed, pest and disease risks in grain imported for use as animal feed is based upon matching the risk status of that grain with the ability of Tasmanian premises to manage it. Imported grain is graded by Biosecurity Tasmania inspectors, prior to or on its arrival in Tasmania. The grain grade reflects the level of weed, pest and disease risk, as indicated by relevant documents provided by the supplier prior to import or, validation testing that may be conducted by the DPIPWE. Tasmanian feed grain grades are at ANNEX 1. Biosecurity Tasmania inspectors will only release imported grain to receiving premises in Tasmania that are approved to receive that particular grade of grain. Approved premise classifications and requirements are at ANNEX 2.

Imported feed grain suppliers and users should read ANNEX 1 and ANNEX 2 to determine how the import requirements listed below apply.

I. Certification

The following documents must be provided to Biosecurity Tasmania prior to import and are required for each lot of grain in a consignment. A lot is a quantity of a single type of grain, identifiable by reference to a line of bags, sacks, storage bins, or silo, container or hold number.

(a) Tasmanian Feed Grain Grade 1 (TF1) destined for Level 1 Premises:

(i) A Notice of Intention to Import Grain/Seed (see forms online at: http://www.dpiw.tas.gov.au/quarantine forms); **and**

(ii) A declaration or certificate stating the lot of grain to which it applies was:

- packed in new, clean, empty bags; **or**
- loaded into containers that were inspected and found to be clean and free of soil, contaminants and residues of previous cargo; **or**

[1] The current list of declared weeds, pests and diseases is in Appendix 1 of this *Plant Boisecurity Manual*.

- loaded into ships' holds that were inspected and found to be clean and free of soil, other contaminants and residues of previous cargo; **and**

(iii) Documents relevant to sampling and testing[2]:

- a Seed Analysis Certificate or a Seed Analysis Statement issued by a laboratory that has International Seed Testing Association (ISTA) or National Association of Testing Authorities (NATA) accreditation, for each lot of grain in the consignment; **and**

- If multiple consignments of seed belonging to a lot that has been certified free of Declared weed seeds are proposed for import, copies of the Statement of Seed Analysis may be submitted for up to 24 months from the date of issue.

- a Statutory Declaration completed by the supplier that adequately identifies the lot to which the Seed Analysis Certificate or Statement relates and, states that the sample submitted for analysis was drawn only from that lot; **or**

- a Plant Health Certificate or Plant Health Assurance Certificate issued by an appropriate authority which states the lot or lots of grain that form the consignment have been sampled and tested as per this Import Requirement and packed into clean bags, containers or ships' holds, will be accepted in place of Clause I (a)(ii) and, a Seed Analysis Certificate or Statement and, associated Statutory Declaration. Clause I (a)(i) must still be met; **or**

- certificates issued by an appropriate authority or other documents showing the grain has been treated or processed such that all declared weeds, pests and diseases are rendered non-viable will be considered by the DPIPWE in place of other documents listed in Clause I (a)(iii). Clauses I (a)(i) and I (a)(ii) must still be met. Except in the case of documents indicating the lot has been treated according to Clause III of this Import Requirement, DPIPWE cannot guarantee documents relating to treatment or processing will be considered in time to facilitate a particular import if the supplier does not provide them well ahead of the import.

(b) Tasmanian Feed Grain Grade 2 (TF2) destined for Level 2 Premises:

(i) As for Clauses I (a)(i) and I (a)(ii); **and**

(ii) As for Clause I(a)(iii) except that the Seed Analysis Certificate or Statement or Plant Health Certificate or Plant Health Assurance certificate need not cover declared weed seeds but must cover other relevant declared pests and diseases.

(c) Tasmanian Feed Grain Grade 3 (TF3) destined for Level 3 Premises:

(i) As for Clause I (a)(i);

(d) Tasmanian Feed Grain Grade 4 (TF4) destined for Level 1, 2 or 3 Premises:

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[2] **PLEASE NOTE:** GRAIN THAT ARRIVES AT THE BARRIER WITHOUT THE REQUIRED DOCUMENTS WILL BE HELD. THE GRAIN MAY, AT THE SUPPLIER'S COST, BE SENT FOR PROCESSING AT A LEVEL 3 PREMISE OR, DEEP BURIED OR, RETURNED TO THE EXPORTER. BIOSECURITY TASMANIA WILL DETERMINE WHICH OF THESE OPTIONS APPLY, IN CONSULTATION WITH THE SUPPLIER AND/OR IMPORTER.

(i) As for Clauses I (a)(i) and I (a)(ii);

II. Sampling and Testing

TF3 or TF4 grain is not required to be sampled and tested for declared weeds, pests and diseases prior to entry to Tasmania. However, TF1 and TF2 grain destined for Level 1 or Level 2 premises respectively must be sampled and tested, as appropriate.

A representative sample of each lot of TF1 or TF2 grain must be obtained according to:

(a) Primary samples from bulk grain:

Primary samples from bulk grain transported in shipping containers or ships' hold must be taken at a minimum rate of 2.25L per 33.3 tonnes in one of the following ways:

(i) By manually drawing grain from the conveyer belt at loading into containers or ships' holds, as close to the valve of the cell as practicable using, at random intervals, a 0.25L dipper until the whole lot has been sampled; **or**

(ii) Using an approved in-line automatic sampler to sample the whole lot at loading into containers or ships' holds; **or**

(iii) Using a DPIPWE-approved sampler to draw samples from holding bins or silos immediately prior to loading for transport to Tasmania; **or**

(iv) By any other DPIPWE-approved sampling method.

(b) Primary samples from bagged grain:

Primary samples from bagged grain must be drawn using a suitable trier and ensuring samples are taken from the top, middle and lower parts of each sampled bag. The sampling rate for bagged grain is:

(i) 1 primary sample from each bag for lots of 1 to 5 bags

(ii) 1 primary sample from at least every third bag and not less than 5 bags for lots of 6 to 30 bags

(iii) 1 primary sample from at least every fifth bag and not less than 10 bags for lots of 31 bags or more

(c) Composite samples:

Primary samples obtained according to Clauses II (a) or II (b) must be transferred to clean containers and thoroughly mixed to ensure the resulting composite sample is homogenous.

(d) Submitted samples:

The composite sample for a lot of grain must be sub-sampled to obtain a sample for testing. The sample submitted for testing must:

(i) weigh at least 2 kg for lots up to 100 tonnes; **or**

(ii) weigh at least 5 kg for lots greater than 100 tonnes; **or**

(iii) be of another weight approved by the DPIPWE.

(e) Testing Specifications:

The submitted sample must be searched according to ISTA rules for the following and, depending on whether the grain is destined for Level 1 or Level 2 premises:

(i) seeds of weeds declared under the *Plant Quarantine Act 1997*–- applies to TF1 only; **and**

(ii) seeds of lupin (*Lupinus* spp.), chickpea (*Cicer* spp.), pea (*Pisum* spp.), maize (*Zea mays*) – applies to TF1 and TF2; **and**

(iii) seeds of ryegrass (*Lolium* spp.), which must be inspected for ryegrass nematode (*Anguina* spp) galls –applies to TF1 and TF2.

(iv) The Seed Analysis Certificate or statement issued by the laboratory is to adequately describe the sample and must state, as appropriate:

- the presence or absence of all declared weed seeds
- the presence or absence of lupin, chickpea, and pea seeds
- the presence or absence of ryegrass nematode galls

(f) Validation Sampling and Testing:

Biosecurity Tasmania inspectors or approved persons under biosecurity authorisation undertake random sampling of imported TF1 and TF2 grain consignments. Samples are analysed at the DPIPWE Seed Laboratory and if there are discrepancies between results obtained by that laboratory and test certificates provided by the supplier, the grain will be classified according to the findings of the DPIPWE laboratory. Charges will be raised for this validation sampling, testing and, any other subsequent actions deemed necessary by Biosecurity Tasmania including increased targeted intervention of subsequent imports. TF3 or TF4 is not subject to validation sampling and testing but is subject to verification inspection at the discretion of Biosecurity Tasmania inspectors. Suppliers seeking further detail about these procedures should contact Biosecurity Tasmania.

III. Treatment

(a) Suppliers of grain lots which have been gamma irradiated to 25 k Gray or treated by any other method of treatment approved by DPIPWE (this relates to treatments that do not change the form of raw product) need not comply with Clause I (a)(iii) or Clause II. This grain will be graded as TF1 once a copy of a treatment certificate is presented to Biosecurity Tasmania (as detailed in Clause I (a)(iii) point 4).

OR

(b) Ethylene oxide fumigation is an approved method of treatment for bird seed under an initial minimum vacuum of 50 kilopascals at:
(i) 1500g/m^3 for 4 hours at 50°C; **or**
(ii) 1500g/m^3 for 24 hours at 21°C.

AND

(c) The 'Inert Matter' section of the Statement of Seed Analysis must indicate soil content is not more than 0.1% by weight of the sample submitted for testing.

IV. Transport to Tasmania

Bulk TF1 or TF2 grain that is not covered by a Plant Health Certificate or Plant Health Assurance Certificate must be transported to Tasmania in ships' holds or containers with top-hatch access to facilitate validation sampling on arrival by Biosecurity Tasmania, as required. Bulk TF3 or TF4 grain is not required to be transported in containers with top-hatch access.

V. Transport within Tasmania

All imported grain must be transported from the place of landing in Tasmania in a manner that provides load security and prevents spillage in transit to the receiving premises, all containers, bags or units of import and transport must be cleaned at the intended discharge point or at an approved location prior to leaving the site or being re-used. Any vehicles, trailers or augers must be cleaned prior to and after each use at intended discharge point or approved premise and all spillages must be reported as soon as reasonably possible and cleaned up straight away.

ANNEX 1 Feed Grain Classifications

Tasmanian Feed Grain Grade 1 (TF1)
TF1 is grain that is free of soil, has been sampled and tested and found free of all declared weeds, pests and diseases. This grain may be stored and used at any premises including private households (eg. for "backyard" laying hens).

Tasmanian Feed Grain Grade 2 (TF2)
TF2 is grain that is free of soil and contains declared weeds but no restricted seeds (ie peas, chickpeas, lupins, maize, rye grass) or if containing restricted seeds has certification that these seeds are free of declared pests or diseases, as applicable. The grain must be milled or processed in such a way that risks posed by any of these contaminants are reduced to levels equivalent to TF1 feed grain. This grain may only be stored and used at Level 2 and 3 premises.

Tasmanian Feed Grain Grade 3 (TF3)
TF3 is grain that contains or may contain declared weed seeds, soil and/or rye grass nematode and/or pea weevil and/or uncertified maize and/or uncertified lupins and/or uncertified chickpeas. This grain must be consigned to an approved premise that has been approved to receive this category of product. The grain must be processed such that risks posed by any of these contaminants are reduced to levels equivalent to TF1 before it is released to end-users. This grain may only be stored and used at Level 3 premises prior to processing. After processing it can be used at any premises including private households (e.g. for "backyard" laying hens).

Tasmanian Feed Grain Grade 4 (TF4)
TF4 is grain containing or that may contain declared weeds, soil, rye grass nematode, pea weevil, uncertified maize, uncertified lupins or uncertified chickpeas that has been processed in a manner that renders the risk of viable declared weed seeds negligible and pea weevil, rye grass nematode, lupin anthracnose, and chickpea blight negligible. This grade of grain must have been processed at a facility applying a treatment approved by DPIPWE as having the procedures and processes in place to produce TF4-grade grain but excludes devitalisation treatments such as gamma irradiation or other treatments that do not change raw product form (TF3 standard or better performed offshore of Tasmania). This grain may be stored and used at any premises including private households (eg. for "backyard" laying hens).

ANNEX 2 (IR30) Imported Feed Grain – Code of Practice – Approved Premises Classifications

Premises	Use	Grain Type	Management Requirements *		
			Feeding	**Manure**	**Grain Transport, Handling and Storage**
Level 1	**Farm users** Including commercial, hobby and part-time)	TF1, TF4	Monitoring of feed usage areas Controlling of weeds and treatment recorded Reporting of Declared Weed seed presence and/or establishment		Recording of grain receival and usage for 5 years
Level 2	**Intensive Feeding Systems, Feedlots and or Housed** Eg dairy, piggery, poultry	TF1, TF2 TF4	Feeding systems (including troughs in parlours or sheds) in situations where feed may enter the effluent system, to be designed and maintained to minimise feed spillage Monitoring of feed usage areas Controlling of weeds established and treatment recorded Reporting of declared weed seed presence and/or establishment	Solid manures to be composted to required standard before spreading or sale Monitoring of effluent disposal areas, feeding areas, laneways and shed surrounds	Grain receival and usage records to be maintained and retained for 5 years Loads to be secured to prevent spillage Hard stand under loading/unloading facilities Concrete or asphalt under processing equipment. Surrounds tidy and free of grain and mixed feed Well maintained augers with minimum leakage or dispersal Wind sheltered unloading/handling facilities eg auguring into silo Segregation of TF1 and TF4 from TF2 must occur at all times Silos and other storage facilities to be well maintained, including thorough cleaning between storage of TF1and/or TF4 and storage of TF2 If mixing of feed grades occurs, management as for TF2 Any spilled or surplus grain to be collected and re-entered to system or disposed of in such a way that weed seeds are destroyed Processing equipment such as mills to be maintained to required standards Any milling waste to be disposed of in an approved manner to ensure risks are mitigated
Level 3	**Commercial millers and processors**	TF1, TF2, TF3 , TF4	Not applicable	Not Applicable	As for Level 2**plus all TF3 grain including the offal must enter the process** to minimise the possibility of any declared pest or disease escaping into the environment. Where any grade of grain has had contact or may have had contact with TF3 grade or any residues of TF3 grade the whole lot of grain must be treated as TF3 grade.

*** Management Requirements**

- The management requirements (and grain grade allocations) form the basis of a system designed to improve post entry weed risk management of imported feed grain. The system also has a premise approval procedure that is linked to the *Plant Quarantine Act 1997*.
- Level 2 and Level 3 premises will be approved and audited by Biosecurity Tasmania, or its approved representative. The management requirements outlined above will form the basis of conditions of accreditation for Level 2 and Level 3 premises. Biosecurity Tasmania may also authorise or require practices and procedures in addition to those listed, as appropriate. Surveillance checks on these premises may occur at any time.
- Level 1 premises are not required to be approved or audited for their capacity to manage weed risk. Adherence to the listed management requirements for Level 1 is the responsibility of the premise owner and will not be monitored by any external party. Level 1 premises found to have received unprocessed TF2 or TF3 will be in breach of the Act.

DEFINITIONS:

1. Grain Types: TF1, TF2, TF3 + TF4.

See Import Requirement 30 "Declared Weeds, Pests and Diseases in Feed Grain", Annex 2 for a description of these classifications.

2. Premises:

Level 1 Premises: Any premise, large or small, that uses or handles imported feed grain in an open environment (paddocks, yards etc). These will typically be farms (including commercial, hobby and part-time).

Level 2 Intensive feeding systems, Feedlots and or Housed facilities: Premises in which animals are fed in and restricted to a confined and designated area (e.g. permanent feedlot, pig and poultry sheds), but excludes pre-live shipment feeding facilities.

Level 3: Premises concerned with the milling or processing of imported feed grain and that can meet the conditions for approval to handle and process TF3 grade imported grain.

3. Transport: Refers to all forms of transport (road, rail, sea and air) and includes onto and within premises/properties

DISCLAIMER: ***Through the application of Import Requirement 30, DPIPWE - does not intend nor claim to certify the quality for animal feeding purposes of any consignment or lot of feed grain imported into Tasmania. Ensuring that any consignment or lot of feed grain is of the necessary quality for their animals is the responsibility of the grower/owner or their agents.***

IMPORT REQUIREMENT 31

Prior to import, a *"Notice of Intention to Import Produce into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

31 REVOKED (Hosts and Vectors of Citrus Canker (*Xanthomonas axonopodis* pv. *citri* (Hasse) Vauterin et al.))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED.*

IMPORT REQUIREMENT 32

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

32 Canola Seed and Grain – Freedom from Genetically Modified (GM) Brassicaceae Seed

A person must not import, or cause to be imported, any canola (*Brassica napus*) seed and grain, except in accordance with the following:

I. Canola seed and grain must be accompanied by a certificate or statement of analysis from an approved laboratory that adequately identifies the lot[1] from which the tested sample was drawn and states that the lot has been sampled and tested in a manner approved by the DPIPWE such that a level of contamination by GM material of 0.01% would be detected with a probability of 95% and the test has returned a negative result for GM events known to have been inserted into Canola.

EXPLANATORY NOTE:

- *[1] A "lot" is a quantity of a single type of grain, physically identifiable by reference to a line of sacks, storage bin or silo number(s), container number(s) or hold number(s) of a ship, and for which a Seed Analysis Certificate/Statement can be issued.*
- *Forage brassica varieties are exempt. Varietal names must be cited in NOI's and/or Certificates.*

PROOF: Consignments must be accompanied by a Plant Health Certificate

IMPORT REQUIREMENT 33

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

33 Silverleaf Whitefly - Hosts

A person must not import, or cause to be imported, any plant or plant product of hosts[1] (as specified in Schedule 1), of silverleaf whitefly (*Bemisia tabaci* (Gennadius), except in accordance with the following:

Schedule 1: Host plants of silverleaf whitefly

Host Botanical Name	Host Common Name
Abelmoshchus esculentus	Okra
Acer spp.	Maple
Amaranthus	Amaranth
Brassica oleracea var. *botrytis**	Cauliflower
Capsicum spp.*	Capsicum, chilli pepper
*Carica papaya**	Pawpaw
Cucurbita spp.*	Pumpkin
Duranta spp.	
Euphorbia leucocephala	Snowflake
*Euphorbia pulcherrima**	Poinsettia
Gerbera spp.	Gerbera
*Gossypium hirsutum**	Cotton (bourbon)
Hibiscus spp.	Hibiscus
*Lactuca sativa**	Lettuce
*Lycopersicon esculentum**	Tomato
Manihot esculenta	Cassava
Mentha spp.	Mint
Nicotiana tabacum	Tobacco
*Solanum melongena**	Eggplant

* Signifies major hosts for Silverleaf Whitefly according to CABI Crop Protection Compendium

I. Plants listed in Schedule 1, IR 33, (excluding cut flowers, fruit and trussed fruit and seed), must be accompanied by a certificate signed by an approved person of the place in which they were grown, stating that:

(a) the plants were grown and packed on a property certified by a State, Territory or Commonwealth Government Agency responsible for the regulation of agricultural industries to be at least 50km from an infestation of silverleaf whitefly (*Bemisia tabaci* Gennadius);

or

(b) the plants must be fumigated with methyl bromide gas for 2 hours at atmospheric pressure according to the following dose temperature schedule:

Methyl Bromide (g/m^3)	Temperature (°C)
32	21+
40	16-20.9
48	11-15.9
56	10-10.9

and

(c) packaged in insect proof packaging immediately after treatment, for storage, handling and transport that prevents infestation with silverleaf whitefly during transport.

EXPLANATORY NOTE:

- *[1] Host plants means those plants listed in Schedule 1 (excluding cut flowers, fruit, trussed fruit, triple washed loose leaf lettuce, whole cut lettuce for human consumption, and seed)*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 34

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

34 REVOKED (Hosts of Impatiens Downy Mildew (*Plasmopara obducens* (J. Schröt.) J. Schröt. in Cohn))

NOTE: *THIS IMPORT REQUIREMENT HAS BEEN REVOKED, AS DECLARED BY PUBLIC NOTICE ON 17th December 2010, BECAUSE IMPATIENS DOWNY MILDEW HAS BEEN REVOKED AS A LIST A DISEASE OF BIOSECURITY CONCERN TO TASMANIA.*

IMPATIENS DOWNY MILDEW HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 35

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

35 REVOKED (Hosts of Pepper Anthracnose (*Colletotrichum capsici* Syd.))

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 21ST DECEMBER 2011, AS DECLARED BY PUBLIC NOTICE ON 28th November 2011, BECAUSE PEPPER ANTHRACNOSE IS REVOKED AS A LIST A DISEASE OF BIOSECURITY CONCERN TO TASMANIA EFFECTIVE FROM THE 21ST DECEMBER 2011.*

PEPPER ANTHRACNOSE HAS BEEN RE-CATEGORISED AS AN 'UNWANTED QUARANTINE PEST (UQP)', AS DETAILED IN APPENDIX 1.2. REGULATORY ACTION MAY BE TAKEN AGAINST THE PEST IF INTERCEPTED IN CONSIGNED GOODS OR PRESCRIBED MATTER AT THE TASMANIAN BIOSECURITY BARRIER.

IMPORT REQUIREMENT 36

Prior to import, a *"Notice of Intention to Import Grain/Seed"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

36 Seeds for Sowing

A person must not import, or cause to be imported, any viable seed, except in accordance with the following:

EXPLANATORY NOTE:
This Import Requirement does not apply to viable seed intended for use as animal feed (eg. livestock feed grain, birdseed). Refer to Import Requirement 30 of this Manual for relevant conditions and restrictions.

CONDITIONS AND RESTRICTIONS

I. NOTIFICATION

(a) A completed *Notice of Intention (NoI) to Import Grain/Seed* (for Sowing) (available at www.dpipwe.tas.gov.au) must be submitted to the Regional Biosecurity Tasmania Operations Centre nearest the proposed permitted point of entry not less than 24 hours before importation.

(b) NoIs for all seed imported by postal services or courier must be submitted to the northern Biosecurity Operations Centre of Biosecurity Tasmania.

II. CERTIFICATES

The following certificates must be provided with the NoI, as relevant.

(a) STATEMENT OF SEED ANALYSIS

A Statement of Seed Analysis is required for seed lots[1] of more than 1kg, and must refer to the following:

Declared Weed Seeds

(i) A representative sample of the seed lot must be tested by a laboratory accredited by the International Seed Testing Association (ISTA) or another accrediting body approved by the DPIPWE, for Declared weed species (*Declared weed species are listed in Appendix 1 of this Manual*).

(ii) The Statement of Seed Analysis issued by an ISTA accredited laboratory or equivalent must indicate zero Declared weed seeds in a sample drawn from the seed lot.

(iii) If a lot of seed consists of mixed species or varieties, a Statement of Seed Analysis that relates to a sample drawn from the mixed lot, or separate Statements of Seed Analysis for each sub-lot of species or varieties that comprise the lot, must be supplied.

Restricted Seeds

EXPLANATORY NOTE:
If the Statement of Seed Analysis pertains to a type of seed that is subject to other pest or disease Import Requirements set out in this Manual (ie. it is a Restricted Seed), or lists such a seed as 'other seed', the lot must also satisfy the relevant Import Requirement/s. These Import Requirements and the Restricted Seeds to which they apply are listed in Table 1 below.

Soil and stones

(iv) The 'Inert Matter' section of the Statement of Seed Analysis must indicate soil content is not more than 0.1% by weight of the sample submitted for testing.

(v) In addition, all seed must be free of soil in quantities discernible to the naked eye.

(vi) Seed for sowing containing stones as contaminants is permitted entry provided the stones are free of soil discernible to the naked eye, and the Statement of Seed Analysis indicates soil content is not more than 0.1%.

Ryegrass nematode (*Anguina agrostis*)

(vii) The Statement of Seed Analysis for seed of any ryegrass (*Lolium*) species must state that the sample has been searched for ryegrass nematode (*Anguina agrostis*) galls, and that zero galls were detected.

(viii) If *Lolium* seeds are present as contaminants of other seed, the Statement of Seed Analysis must state that the *Lolium* seeds were searched for ryegrass nematode galls, and that zero galls were detected.

(ix) Alternatively, an importer may provide a certificate issued by an appropriate state or country authority indicating the area in which the seed was grown is free of ryegrass nematode.

Representative sample

(x) The Statement of Seed Analysis must indicate that the sample was drawn by an appropriately accredited person by identifying the statement as 'official', or by quoting the accredited sampler's licence number, or equivalent.

(b) SMALL WEIGHT SEED IMPORTS

A Statement of Seed Analysis may be submitted but is not required for seed lots of 1 kg or less. Seed lots of 1kg or less may be imported without a Statement of Seed Analysis if that seed:

(i) is not a Declared weed; **and**

(ii) is from a supplier (a business or other organisation) on the Approved Suppliers List*;

OR

(iii) is imported by an importer registered# to receive seed from sources not on the Approved Suppliers List.

(iv) If Clause II(b)(ii) or II(b)(iii) are not satisfied, conditions listed in Clause II(a) apply (i.e. a Statement of Seed Analysis must be supplied) unless Biosecurity Tasmania determines otherwise by inspecting the seed on arrival.

* The Approved Suppliers List is a list of businesses or other organisations that distribute seed in small quantities and which have production practices, quality control systems, or other protocols that reduce the likelihood of Declared weed seed presence to a level acceptable by the DPIPWE. The Approved Suppliers List is maintained in confidence. Importers of seed of 1 kg or less should confirm with Biosecurity Tasmania whether a supplier from which they wish to obtain seed is on the Approved Suppliers List. Enquiries about the Approved Suppliers List can be made to Biosecurity Tasmania.

Biosecurity Tasmania maintains a Register of Seed Importers permitted to import seed lots of 1kg or less from sources that are not on the Approved Supplier List. Enquiries about registration can be made to Biosecurity Tasmania.

***EXPLANATORY NOTE*:**
The arrangements for seed imports of 1kg or less DO NOT obviate the need to comply with other IRs, where these apply

(c) REQUIREMENTS FOR RESTRICTED SEEDS

Some seeds must meet conditions and restrictions for pests and diseases of biosecurity significance to Tasmania, set out in other Import Requirements in this Manual. Restricted Seeds and the relevant Import Requirements are listed in Table 1.

Table 1 Import Requirements for Restricted Seeds

RESTRICTED SEED	PEST OR DISEASE	IMPORT REQUIREMENT No.
Pea	Pea weevil	12
Lupin	Lupin anthracnose	22
Chick pea	Chick pea blight	27
Canola	Genetically modified brassica seed	32

EXPLANATORY NOTE:
Import Requirements for Restricted Seeds apply to all seed imports, including lots of 1 kg or less.

III. SEED FOR PROCESSING IN TASMANIA

(a) Importers must contact Biosecurity Tasmania prior to import of seed intended for extraction from pods, capsules, fleshy fruit or other reproductive structures, cleaning, coating, treatment or other processing.

IV. CONSIGNMENT CONDITION AND LABELLING

(a) All seed consignments must be contained in outer packaging that is clean and in good repair such that seed spillage does not occur.

(b) Consignments containing more than 1kg of seed must comply with Clause VI(b) and be labelled with:

(i) name and address of the supplier and of the consignee; **and**

(ii) weight and lot number matching individual packages to the relevant Statement/s of Seed Analysis, in compliance with Clause II(a).

(c) Consignments containing 1 kg of seed or less must be labelled with seed botanical name, name and address of the supplier and of the consignee, and comply with Clause VI(b).

(d) When consignments contain more than one line of seed or mixed seed, ALL species must be identified, consistent with Clauses IV(b) or IV(c).

V. NO GENETICALLY MODIFIED SEED

(a) Viable genetically modified seed of any species must not be imported to Tasmania unless authorised under the *Genetically Modified Organisms Control Act* 2004.

VI. PRESENT FOR INSPECTION

(a) All seed must be presented to Biosecurity Tasmania on arrival.

(b) Seed imported by air or sea freight or using Australia Post services must be presented for inspection by addressing to the consignee, and marked for the 'Attention of Biosecurity Tasmania'.

(c) Seed carried on a person or in personal baggage accompanying a person entering Tasmania must be presented to Biosecurity Tasmania at the permitted point of entry.

VII. NATIONAL IMPORT REQUIREMENTS

(a) Seed imported into Tasmania that originates from overseas must also meet national import requirements administered by the Commonwealth Department of Agriculture and described on the Import Conditions (ICON) database at http://www.agriculture.gov.au/biosecurity/import/icon-icd .

VIII. EXPORT OF TASMANIAN PRODUCED SEED AND ITS RE-IMPORTATION

(a) If certificates of analysis are supplied with the seed lots and the parameters (inert matter, declared weeds) on the analysis certificate meet import requirements, no additional certification or testing is required. Tasmanian seed that has been certified in Tasmania is considered to meet ryegrass nematode and inert matter requirements.

(b) Where blended seed lots are involved a separate certificate is required for each of the seed lots making up the blend.

(c) Seed certificates must be completed in full. Where certification details are not completed, entry of the seed is not allowed until such certification details are supplied or alternative arrangements are made with Biosecurity Tasmania. In situations where certification is incomplete e.g. no certification for one component of a blend, then entry certification is considered incomplete and entry will not be allowed.

IX. BIOSECURITY TASMANIA SEED CONTACT

Enquiries about importing seed for sowing can be directed to Biosecurity Tasmania on IDD + 61 (0)3 6165 3777.

EXPLANATORY NOTE:

- [1]*A seed lot is a quantity of a single type of seed, physically identifiable by reference to a line of packages, sacks, storage bin or silo number(s), container number(s) or hold number(s) of a ship, and for which a Seed Analysis Certificate/Statement can be issued.*

IMPORT REQUIREMENT 37

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

37 Plant Material and Soil for the Purpose of Laboratory Analysis or Diagnosis

A person must not import, or cause to be imported, into Tasmania any plant material or soil for the purpose of laboratory analysis or diagnosis, except in accordance with the following:

THIS IMPORT REQUIREMENT APPLIES TO:

- ***PLANT MATERIAL* AND SOIL# FOR LABORATORY ANALYSIS OR DIAGNOSIS NOT CONDUCTED IN THE COURSE OF AN AUSTRALIAN EMERGENCY PLANT PEST RESPONSE; SEPARATE AND SPECIFIC PROVISIONS APPLY DURING SUCH A RESPONSE.***

  ****PLANT MATERIAL INCLUDES, BUT IS NOT LIMITED TO, FRESH OR DRIED LEAVES, STEMS, PETIOLES, SEEDS, ROOTS, FLOWERS, OTHER REPRODUCTIVE STRUCTURES, or CALLUS.***

  #SOIL IS DEFINED AS THE TOP LAYER OF THE EARTH CONSISTING OF ROCK AND MINERAL PARTICULATES THAT MAY BE MIXED WITH ORGANIC MATTER IN WHICH PLANTS GROW OR ARE GROWN.

THIS IMPORT REQUIREMENT <u>DOES NOT APPLY TO</u>:

- ***PLANT EXTRACTS SUCH AS SAP, OILS, DNA, REFERENCE CULTURES OR DRIED/PRESERVED SPECIMENS.***

Laboratories in Tasmania wishing to import plant and soil material for analytical and diagnostic services may do so subject to the following conditions. All aspects of this Import Requirement are subject to audit by Biosecurity Tasmania.

I. Approval Requirements

(a) Any testing laboratory intending to undertake analysis or diagnosis of plant or soil material that originates from outside Tasmania must be registered as an Approved Quarantine Place (AQP) under the *Plant Quarantine Act* 1997 (Section 70), and are subject to additional requirements as part of that registration.

(b) A record of all samples received including sample type, origin and date received must be kept and be available for inspection by Biosecurity Tasmania.

(c) Where required by interstate authorities, appropriate permits to collect and export plant or soil samples must be obtained by the laboratory or their client prior to import, and copies submitted to Biosecurity Tasmania

(d) If the sample has originated from outside Australia, relevant national approvals must be obtained and copies submitted to Biosecurity Tasmania

(e) Material from genetically modified plants or soil containing viable genetically modified plant material must not be imported unless authorised under Tasmania's *Genetically Modified Organisms Control Act* 2004.

II. Sample Size Limits

(a) Sample sizes are limited to a maximum of 5kg/sample (plant material) and 10kg/sample (soil). Larger sample sizes will be considered subject to at least 48 hours pre-notification of Biosecurity Tasmania and packaging requirements being met.

III. Packing & Transport of Samples

(a) Samples must be packed for secure transit and must be contained in suitable air tight containers and further protected by a second layer of insulation; e.g. Double bagging using zip-lock bags. The double-bagged sample must then be placed in a durable outer container.

(b) The sample must be clearly labelled as follows: name and address of the sender (client), description of contents (eg. soil sample for analysis), name and telephone number of a contact person at the testing laboratory. Samples must be sent directly to the testing laboratory.

IV. Breaches

(a) Any accidents/incidents/or breaches of these conditions must be immediately reported to Biosecurity Tasmania.

(b) Failure to comply with any condition above may result in the application of penalties under the *Plant Quarantine Act 1997*, and the suspension of Approved Quarantine Place registration.

EXPLANATORY NOTE:

- *The guidelines provided in "CRC Plant Biosecurity (2010) How to send samples for diagnosis in Australia: Plant Disease and Insect Identification" (www.crcplantbiosecurity.com.au) also satisfy Clause III(a) of this Import Requirement, regarding sample packing and transport.*

IMPORT REQUIREMENT 38

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38 Nursery Stock

This Import Requirement (IR 38) provides five options for people who wish to bring or send nursery stock into Tasmania. Nursery stock means **plants in soil-less potting media, bulbs, corms and rhizomes, and bare-rooted plants or cuttings (including budwood and scionwood), with or without leaves**. It does not include plant tissue cultures, cut flowers, seeds or bagged or bulk potting media. Separate conditions and restrictions apply to those items. Prospective importers should consult other parts of this manual as relevant, or confirm conditions and restrictions with Biosecurity Tasmania's Biosecurity Operations Branch.

In summary, the five options are:

IR38 A - specifies in part a chemical treatment regime that reflects *ICA – 29 (Treatment of Nursery Stock and Soil-less Media)*. Under IR38A, pest risk is primarily managed prior to export. Use of IR38A is subject to certification by interstate biosecurity officials, or certification by ICA -29 accredited businesses.

IR38B – specifies conditions based on the Nursery and Garden Industry Australia (NGIA) standards for biosecurity which underpin the Nursery Industry Accreditation Scheme, Australia (NIASA). Under IR38B, pest risk is managed prior to export and in Tasmania, at around the same level. Use of IR38B is subject to DPIPWE assessment, approval and audit of Tasmanian importers and mainland suppliers.

IR38C – This IR is revoked from 19th December 2012.

IR38D – recognises that individual nursery stock importers in Tasmania or mainland suppliers may propose ways of managing pest risk to a level equivalent to that achieved by the other three options. Use of IR38D is subject to DPIPWE assessment, approval and, potentially, audit of Tasmanian importers and/or mainland suppliers.

IR38E – specifies conditions based on the Nursery and Garden Industry (NGIA) BioSecure *HACCP* program. Under IR38E, pest risk management is undertaken prior to export to Tasmania by a business certified under the BioSecure *HACCP* scheme and found competent in, and authorised to apply, a relevant Entry Condition Compliance Procedure (ECCP). Use of IR38E is subject to certification by BioSecure HACCP certified businesses.

Importers need only meet one of the five options for any particular type of nursery stock. However, consignments may be comprised of several types of nursery stock that meet different options, provided import documents show the specific option with which each type of nursery stock complies. Importers must comply with IR 38 AND other IRs in this manual that apply to specific pests of nursery stock, and any other relevant conditions and restrictions currently in effect for plants and plant products. Annex 1 outlines the relation between IR 38, other IRs, and other current conditions and restrictions for plants and plant products. Biosecurity Tasmania and interstate biosecurity authorities maintain the right to inspect certified nursery stock at any time, and to refuse to accept it if it does not meet all relevant conditions and restrictions, or if import documents do not clearly indicate the nursery stock meets those conditions and restrictions. Chemical use permits referred to in this Import Requirement are permits issued by the Australian Pesticides and Veterinary Medicines Authority. It is the user's responsibility to ensure any chemical treatment specified in or otherwise part of any Import Requirement option, is undertaken in accord with relevant federal and state legislation for chemical registration and safe use. The DPIPWE accepts no liability for any loss or damage resulting from chemical treatment applied for the purpose of this Import Requirement.

IMPORT REQUIREMENT 38A

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38A Treatment of Nursery Stock

A person must not import, or cause to be imported, any nursery stock except in accordance with the following:

I. NURSERY STOCK MUST NOT:

(a) be bearing fruit (hard, green immature fruit less than 1 cm is acceptable); **or**

(b) have soil attached; **or**

(c) be in pots of more than 20L in size; **or**

(d) be in potting medium that includes soil; **or**

(e) be in pots, other containers or packaging that is not new and in clean condition.

II. PLANTS IN POTTING MEDIUM:

(a) The potting medium has been treated:

(i) with Bifenthrin 2g/kg granules at 16 to 61g/10L potting medium (permit 9796), or in accordance with APVMA permits 13916 or 13959, within 60 days of export; **or**

(ii) with Chlorpyrifos 100g/kg granules at 750 g/m^3 potting mix (SuSCon Green® label), or in accordance with APVMA permit 14256, within 180 days of export; **or**

(iii) within 10 days of export to Tasmania, with:

- full immersion or drenching of the container and root ball using a product containing 80g/L bifenthrin as its only active constituent at a mixture rate of 25ml/100L (permit 10043), with a commercial wetting agent; **or**
- full immersion or drenching of container and root ball using a product containing 500g/L chlorpyrifos as its only active constituent at a mixture rate of 40ml/100L (permit 13504) with a commercial wetting agent; **or**
- drenching with cyfluthrin in accordance with APVMA permit 12073;

and

(iv) Propamocarb at label recommendations; **or**

(v) Etridiazole 150 g/kg /Thiothante-methyl 250g/kg at label rate for potted plants; **or**

(vi) Etridiazole 350g/kg at label rate for potted plants;

AND

(b) The above ground plant parts have been treated within 10 days of export to Tasmania with:

(i) Imidacloprid 200g/L at 25ml/100L at label rate (permit 9795); **or**

(ii) Acetamiprid 225g/L at 22ml/100L at label rate;

and

(iii) Bifenthrin 80g/L emulsifiable concentrate at 6ml/10L (permit 9795); **or**

(iv) Bifenthrin 100g/L emulsifiable concentrate at 5ml/10L (permit 9795); **or**

(v) Bifenthrin 250g/L emulsifiable concentrate at 2ml/10L (permit 9795)

and

(vi) Mancozeb 800g/kg or 750g/kg, at 15g/10L or 18g/10L, respectively (permit 9795); **or**

(vii) Chlorothalonil, or another Group Y fungicide at label rate.

III. BULBS, CORMS, RHIZOMES AND ROOT MATERIAL FREE FROM POTTING MEDIA

All parts have been treated within 10 days before export to Tasmania with:

(a) Mancozeb 800g/kg or 750g/kg, at 15g/10L or 18g/10L, respectively (permit 9795); **or**

(b) Chlorothalonil, or another Group Y fungicide at label rate.

IV. BARE ROOTED PLANTS OR CUTTINGS, WITH LEAVES

The above ground plant parts have been treated within 10 days before export to Tasmania with:

(a) Imidacloprid 200g/L at 25ml/100L at label rate (permit 9795); **or**

(b) Acetamiprid 225g/L at 22ml/100L;

AND

(c) Mancozeb 800g/kg or 750g/kg, at 15g/10L or 18g/10L, respectively (permit 9795); **or**

(d) Chlorothalonil or another Group Y fungicide at label rate;

V. BARE ROOTED PLANTS OR CUTTINGS, WITHOUT LEAVES

The above ground plant parts have been treated at label recommendations within 10 days before export to Tasmania with:

(a) Mancozeb 800g/kg or 750g/kg, at 15g/10L or 18g/10L, respectively (permit 9795); **or**

(b) Chlorothalonil or another Group Y fungicide at label rate;

VI. SECURE TRANSPORT

All nursery stock must be held in a designated and secure treatment area post-treatment before being securely packaged in a way that prevents pest contamination during transport to Tasmania. Secure packaging may include new, clean packaging such as shrink wrapping or containment in a truck or container compartment. Nursery stock treated under this Import Requirement must not come in contact with untreated nursery stock or other prescribed matter after treatment or during transport to Tasmania.

EXPLANATORY NOTE:

- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-29 (Treatment of Nursery Stock and Soil-less Media) satisfy Import Requirement 38A.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 38B

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38B Importation of Nursery Stock by Best Practice Biosecurity

A person must not import, or cause to be imported, any nursery stock except in accordance with the following:

I. CONDITIONS FOR TASMANIAN NURSERY STOCK IMPORTER

(a) **IMPORTER MUST RECEIVE NURSERY STOCK FROM NIASA-ACCREDITED SUPPLIERS ONLY**

Importer must:

(i) identify and maintain updated lists of mainland plant suppliers that are either Nursery Industry Accreditation Scheme, Australia (NIASA) -accredited or non-NIASA accredited; **and**

(ii) maintain copies of NoIs, packing lists and Material Dispatch Inspection Records for each imported consignment.

(b) **IMPORTER MUST RECEIVE NURSERY STOCK INTO CLEAN FACILITY**

Importer must ensure nursery stock is received only into an area that:

(i) is separate from growing areas; **and**

(ii) has a hard, well drained surface; **and**

(iii) is clean, well-organised, and free of pests.

(c) **IMPORTER MUST INSPECT NURSERY STOCK IN RECEIVAL AREA BEFORE ON-GROWING, DISPLAY, SALE OR DISTRIBUTION IN TASMANIA**

Importer must undertake:

(i) thorough on-arrival inspections of nursery stock; **and**

(ii) appropriate response in the event of pest detection.

(d) **IMPORTER MUST MAINTAIN PLANT PEST INCURSION RESPONSE PLAN**

Importer must maintain a *Plant Pest Incursion Response Plan* that demonstrates adequate preparation for containing and eradicating new plant pests, whether these arise from imported nursery stock or other sources.

(e) **IMPORTER MUST ENSURE STAFF ARE COMPETENT IN PEST MANAGEMENT**

Importer must ensure plant pest management training for staff who deal with imported nursery stock on arrival.

(f) **IMPORTER MUST REGISTER AS A DPIPWE BIOSECURITY STAKEHOLDER AND HAVE CURRENT COPY OF TASMANIAN PLANT PEST REGULATIONS**

Importer must:

(i) register as a Tasmanian biosecurity stakeholder; **and**

(ii) ensure all relevant staff view DPIPWE Biosecurity Advisories; **and**

(iii) obtain up to date copies of the *Tasmanian Plant Biosecurity Manual* and regulated plant pest lists.

II. CONDITIONS FOR AUSTRALIAN MAINLAND NURSERY STOCK SUPPLIER

(a) SUPPLIER MUST HAVE NIASA ACCREDITATION

Supplier must have:

(i) current NIASA production nursery accreditation; **and**

(ii) a NIASA audit history that demonstrates compliance with biosecurity-relevant NIASA criteria.

(b) SUPPLIER MUST ENSURE CLEAN MOTHERSTOCK

Supplier must:

(i) identify nursery stock sources as either NIASA-accredited or non-NIASA accredited, and maintain lists of both; **and**

(ii) inspect all incoming stock on arrival, and record the inspection results and responses to pest detection; **and**

(iii) isolate, treat and monitor stock from non-NIASA accredited sources.

(c) SUPPLIER MUST USE CLEAN POTTING MEDIUM

Supplier must:

(i) Identify media suppliers as either NIASA-accredited or non-NIASA accredited and maintain lists of both; **and**

(ii) treat media from non-NIASA accredited media suppliers in accord with BioSecure HACCP guidelines.

(d) SUPPLIER MUST USE CLEAN POTS AND PACKAGING

Supplier must:

(i) use new, clean pots and packaging; **or**

(ii) treat used pots and packaging in accord with BioSecure HACCP guidelines; **and**

(iii) store all pots and packaging above ground level and maintain them free of soil, potting media, debris, pests

(e) SUPPLIER MUST PREPARE AND DISPATCH NURSERY STOCK FROM CLEAN AREAS

Supplier must ensure nursery stock preparation and dispatch areas:

(i) are separate from growing areas; **and**

(ii) have a hard, well drained surface; **and**

(iii) are clean, well-organised, and free of pests.

(f) SUPPLIER MUST INSPECT NURSERY STOCK FOR DISPATCH TO TASMANIA

Supplier must undertake:

(i) thorough inspections of nursery stock; **and**

(ii) appropriate response in the event of pest detection

(g) **SUPPLIER MUST MAINTAIN PEST INCURSION RESPONSE PLAN**

Supplier must maintain a *Plant Pest Incursion Response Plan* that demonstrates adequate preparation for dealing with new plant pests, and for preventing export of nursery stock to Tasmania until the incursion is eradicated.

(h) **SUPPLIER MUST PACKAGE NURSERY STOCK FOR SECURE TRANSIT TO TASMANIA**

Supplier must package nursery stock in a way that prevents contamination during transport to Tasmania.

(i) **SUPPLIER MUST ARRANGE SUBMISSION OF DOCUMENTS PRIOR TO ARRIVAL OF NURSERY STOCK IN TASMANIA**

Supplier must:

(i) Complete a NoI, and attach packing list and Dispatch Inspection Record to NoI; **and**

(ii) Liaise with Tasmanian importer/s to ensure documents in Clause II(i)(i) are submitted at least 24hrs prior to nursery stock arriving in Tasmania.

(j) **SUPPLIER MUST ENSURE STAFF ARE COMPETENT IN PEST MANAGEMENT**

Supplier must ensure plant pest management training for staff who deal with nursery stock for export.

(k) **SUPPLIER MUST REGISTER AS A DPIPWE BIOSECURITY STAKEHOLDER AND HAVE CURRENT COPY OF TASMANIAN PLANT PEST REGULATIONS**

Supplier must:

(i) register as a Tasmanian biosecurity stakeholder; **and**

(ii) ensure all relevant staff view DPIPWE Biosecurity Advisories; **and**

(iii) obtain copies of the Tasmanian Plant Biosecurity Manual and regulated plant pest lists.

Glossary

NGIA means Nursery and Garden Industry Australia
NIASA means Nursery Industry Accreditation Scheme, Australia
NIASA guidelines means the NGIT "Best Practice Management Guidelines"
BioSecure HACCP means the NGIT "Guidelines for Managing Biosecurity in Nursery Production".

EXPLANATORY NOTE:

- *Enquiries about applying for approval to import nursery stock on the basis of best practice biosecurity for the purpose of IR38B can be made to Plant Biosecurity & Diagnostics Branch at* biosecurity.planthealth@dpipwe.tas.gov.au

PROOF:	**NoI and consignment must show Approved Importer and Approved Supplier (IR38B) registration numbers**

IMPORT REQUIREMENT 38C

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38C REVOKED (Importation of Nursery Stock to Approved Quarantine Place)

NOTE: *THIS IMPORT REQUIREMENT IS REVOKED FROM 19th DECEMBER 2012, AS DECLARED BY PUBLIC NOTICE ON 7th DECEMBER 2012.*

IMPORT REQUIREMENT 38D

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38D Importation of Nursery Stock by Special Approval

I. A person must not import, or cause to be imported, any nursery stock unless given Special Approval by the DPIPWE to do so.

EXPLANATORY NOTE:

- *Enquiries about applying for Special Approval for the purpose of IR38D can be made to Plant Biosecurity & Diagnostics Branch at* biosecurity.planthealth@dpipwe.tas.gov.au.

PROOF:	**NoI and consignment must show Special Approval (IR38D) registration number**

IMPORT REQUIREMENT 38E

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

38E Importation of Nursery Stock by a BioSecure *HACCP* Entry Condition Compliance Procedure (ECCP)

A person must not import, or cause to be imported, any nursery stock except in accordance with the following:

I. SUPPLIER CERTIFICATIONS:

The Supplier must:

(a) hold current BioSecure *HACCP* certification; **and**

(b) be authorised by the certifying body to issue a BioSecure *HACCP* Biosecurity Certificate (BHBC) for a relevant ECCP; **and**

(c) maintain an audit history that demonstrates compliance with all mandatory requirements of BioSecure *HACCP* and the relevant ECCP;

AND

II. SUPPLIER ACTIONS IN ACCORD WITH THE ECCP

The Supplier must act in accordance with all conditions specified within a relevant ECCP

AND

III. SUPPLIER SUBMISSIONS ACCOMPANYING NOTICE OF INTENTION TO IMPORT

The Supplier must:

(a) complete and supply a Notice of Intention (NoI) to Import Plants or Plant Products into Tasmania not less than 24 hours prior to importation, as required under Section 2.2 of the Manual; **and**

(b) attach a packing list (plant inventory) and Dispatch Inspection Record to the NoI

AND

IV. SUPPLIER REGISTRATIONS WITH BIOSECURITY TASMANIA

The Supplier must:

(a) register as a Tasmanian biosecurity stakeholder through its online registration platform; **and**

(b) ensure all relevant staff both receive and view Biosecurity Tasmania electronic Advisories; **and**

(c) hold a current copy of the Plant Biosecurity Manual Tasmania; **and**

(d) hold current copies of Biosecurity Tasmania's Quarantine Pest listings for both Regulated Quarantine Pests (RQPs) and Unwanted Quarantine Pests (UQPs); **and**

(e) have online access to the Tasmanian Biosecurity Import Requirements Database (TBIRD).

Glossary

BioSecure HACCP means the NGIA "Guidelines for Managing Biosecurity in Nursery Production".
Certifying body means the NGIA.
ECCP means an Entry Condition Compliance Procedure that meets the specific entry conditions of Biosecurity Tasmania.
NGIA means Nursery & Garden Industry Australia
Relevant ECCP means one or more ECCP that have been approved by Biosecurity Tasmania for entry of specified nursery stock into the State of Tasmania.

EXPLANATORY NOTE:

- *Enquiries about applying for approval to import nursery stock on the basis of importation in accordance with the conditions of an ECCP for the purpose of IR38E can be made to Plant Biosecurity & Diagnostics Branch at* biosecurity.planthealth@dpipwe.tas.gov.au
- *Biosecurity Tasmania reserves the right to withdraw the suppliers right to export plants or plant products to the State at any time, if for any reason it is deemed to be non-compliant with the State's regulatory standards as embodied in the Plant Biosecurity Manual Tasmania, and/or NGIA's Biosecure HACCP standards.*

PROOF:	**NoI and a BioSecure *HACCP* Biosecurity Certificate must be shown under a relevant ECCP**

Annex 1 (IR 38): Relation of Current Tasmanian Plant Regulations to IR 38A - Nursery Stock

Tasmanian Regulation	Subject	Relation to IR 38
Notices		
S 67 restriction on importation of Myrtaceae	Importation ban for myrtle rust covering myrtaceous plants, cut flowers, foliage and stems	Compliance with IR 38 does not override importation ban
Import Requirements		
Import Requirements 1 -8A	Fruit fly host produce, fruit and fruiting vegetables only	None
Import Requirement 9	Potatoes in respect of 3 pests, including tissue culture and mini-tubers	None
Import Requirement 10	Hosts and vectors of grape phylloxera, including *Vitis* cuttings	Compliance with IR 38 does not negate the need to comply with IR 10
Import Requirement 11	Hosts and vectors of onion smut and Iris Yellow Spot Tospovirus, including *Allium* bulbs and seedlings for planting	Compliance with IR 38 does not negate the need to comply with IR 11
Import Requirement 12	Hosts and vectors of pea weevil	None
Import Requirement 13	Hosts of boil smut: REVOKED	None
Import Requirement 14	Hosts of Chrysanthemum white rust: REVOKED	N/A
Import Requirement 15	Vectors of Red Imported Fire Ant, including potted nursery stock from Queensland	In regard to granular, drench and dip insecticidal treatments, IR 38 Clause II (a) is the same as IR 15 Clause I (b)(i)
Import Requirement 16	Hosts of San Jose Scale: REVOKED	N/A
Import Requirement 17	Hosts of Tobacco blue mould: REVOKED	N/A
Import Requirement 18	Hosts of fire blight, including various plants	Compliance with IR 38 does not negate the need to comply with IR 18
Import Requirement 19	Hosts of Western Flower Thrips: REVOKED	N/A
Import Requirement 20	Hosts of melon thrips: REVOKED	N/A
Import Requirement 21	Seed of pyrethrum: REVOKED	N/A
Import Requirement 22	Hosts and vectors of lupin anthracnose, including lupin plants	Compliance with IR 38 does not negate need to comply with IR 22
Import Requirement 23	Hosts of spiralling whitefly: REVOKED	N/A
Import Requirement 24	Hosts of Ash Whitefly: REVOKED	N/A

Annex 1 (IR 38) – Relation of Current Tasmanian Plant Regulations to IR 38A - Nursery Stock (cont.)

Tasmanian Regulation	Subject	Relation to IR 38
Import Requirements (cont.)		
Import Requirement 25*****	Vectors of green snail, including nursery stock from WA	Compliance with IR 38 does not negate the need to comply with IR 25
***NOTE:** Green Snail Host Produce from Victoria	All host material from specified area of Victoria where Green Snail incursions are being eradicated and contained	Compliance with IR 38 does not negate the need to comply with conditions and restriction on Green Snail Host material from Victoria.
Import Requirement 26	Argentine Ant: REVOKED	N/A
Import Requirement 27	Hosts and vectors of chickpea blight, including chickpea plants	Compliance with IR 38 does not negate the need to comply with IR 27
Import Requirement 28	Hosts and vectors of blueberry rust including *Vaccinium* and other host plants	Compliance with IR 38 does not negate the need to comply with IR 28
Import Requirement 29	Plants and bulbs of all species from areas in Victoria where potato cyst nematode occurs	Compliance with IR 38 does not negate the need to comply with IR 29.
Import Requirement 30	Weeds, pests and diseases of animal feed	None
Import Requirement 31	Hosts and vectors of Citrus Canker: REVOKED	N/A
Import Requirement 32	Freedom from genetically modified material - canola seed and grain	None
Import Requirement 33	Hosts of silverleaf whitefly, including various plants	Importers may use IR 38A for host plants of silverleaf whitefly, except for poinsettia’s
Import Requirement 34	Hosts of Impatiens Downy Mildew: REVOKED	N/A
Import Requirement 35	Hosts of pepper anthracnose: REVOKED	N/A
Import Requirement 36	Seeds for sowing	None
Import Requirement 37	Soil and plant samples for analysis	None
Import Requirement 39	Agricultural Equipment, Machinery and Vehicles (New and Used)	None
Import Requirement 40	European House Borer - Vectors	None

Annex 1 (IR 38) – Relation of Current Tasmanian Plant Regulations to IR 38A - Nursery Stock (cont.)

Tasmanian Regulation	Subject	Relation to IR 38
Import Requirements (cont.)		
Import Requirement 41	Fruit Fly Host Produce – Splitting and Reconsigning	None
Import Requirement 42	Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Table Grapes	None
Import Requirement 43	Fruit Fly Host Produce - Pre-harvest Treatment and Inspection of Stone Fruit, Pome Fruit, Persimmons and Blueberries	None
Import Requirement 44	Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Tomatoes, Capsicums, Chillies and Eggplants	None
Import Requirement 45	Fruit Fly & Grape Phylloxera Host Produce – Repacking and Composite Lots	None
Import Requirement 46	Tomato Potato Psyllid – Hosts and Vectors	To be defined when IR finalised in early 2018

Note: N/A = Not Applicable

IMPORT REQUIREMENT 39

39 Agricultural Equipment, Machinery and Vehicles (New and Used)

A person must not import, or cause to be imported, any agricultural equipment[1] or machinery[2], or vehicle[3] except in accordance with the following:

I. GENERAL REQUIREMENTS

(a) The agricultural equipment, machinery or vehicle must be thoroughly cleaned prior to arrival to ensure it is free of any prescribed matter[4], including soil, plants, seeds or other plant material, debris or any other thing that may harbour a pest or disease agent; **and**

(b) The agricultural equipment, machinery or vehicle must meet all other relevant Import Requirements in this Manual and may be accompanied by either a certificate or other declaration detailing pre-shipment procedures such as cleaning, (or other treatment as considered necessary) [5].

EXPLANATORY NOTES:

- *Any agricultural equipment or machinery entering Tasmania that does not comply with Clause I(a) and I(b):*
  - *(i) will be directed for cleaning, (or other treatment as considered necessary), at a place and in a manner approved by Biosecurity Tasmania; (a substantial amount of dismantling may be required to prove no pockets of prescribed matter, soil, etc, remain hidden); **or***
  - *(ii) if satisfactory treatment is not possible, the contaminated agricultural equipment or machinery will be re-exported.*
- *All costs associated with cleaning or re-export will be the responsibility of the importer.*
- *A Cleaning Checklist is provided to serve as a guide to assist in the cleaning of a grain harvester. The numbered sections listed in the Cleaning Checklist correspond to the numbers in the diagrams of a Rotary Harvester and a Conventional Harvester. These represent contamination "hot spots", which must be found to be clean of all prescribed matter on inspection.*

[1] ***Agricultural equipment*** *means any equipment or vehicle used for the culture, harvesting, packing or processing of any plant or plant product.*

[2] ***Machinery*** *means any type of machinery or equipment, agricultural or non-agricultural, which may be contaminated with prescribed matter of any form.*

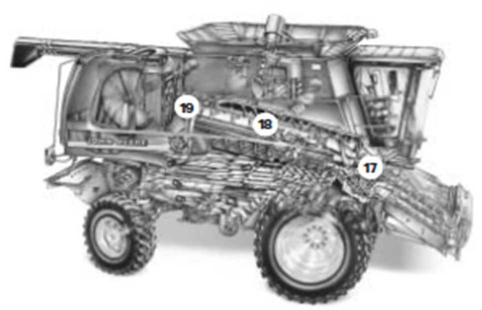
[3] ***Vehicle*** *means any form of transport equipment, whether it be private or commercial vehicle, dirt bikes, motorcycle, truck, towable trailer including horse floats, off-road 4-wheel drive vehicles, etc.*

[4] ***Prescribed matter*** *means: any plant; any plant product; any new or used package; a vehicle; any new or used agricultural equipment; any soil; and any disease agent.*

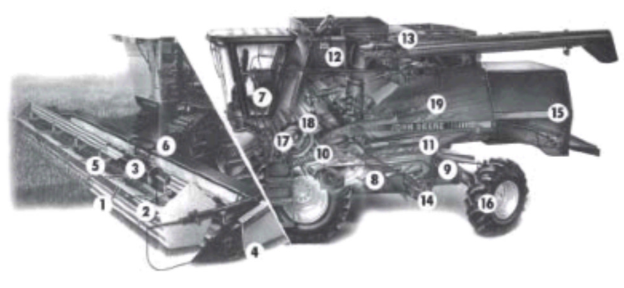
[5] ***Grain harvester*** *means (in addition to the meaning of 'agricultural equipment' and 'machinery'), any type of header ('combine harvester'), both self-propelled and towed, including parts thereof, which pick up, thresh and clean grain, and cutter rowers that cut and windrow the crop prior to harvest.*

Area to Clean	All Harvesters	Area Cleaned ☑	Checked by Biosecurity Tasmania ☑
1	Area under the skid plate		
2	Header knives and fingers		
3	Horizontal auger		
4	All areas behind covers		
5	Areas inside belts (draper fronts)		
6	Feeder house		
7	Driver's cab		
8	Fan, fan housing and shields		
9	Chassis, including axles, chassis rails and undercarriage areas		
10	Tailing auger		
11	Sieves and grain pan		
12	Grain bin and auger(s)		
13	Engine compartment, radiator core and covers		
14	Grain elevator, including cups and rubber flights		
15	Straw spreaders or choppers		
16	Tyres and rims		
	Conventional Harvester		
17	Threshing or separating area, including the drum, concaves concave wiring, and stone trap		
18	Beater drum, including the area between the drum and walkers		
19	Straw walkers, including the beater and chaff pan, underneath the straw walkers, and any concealed area under air flaps		
	Rotary Harvester		
17	External top and sides of the conical section of the rotor cage, and stone trap		
18	Areas inside the top of the conical section		
19	Threshing or separating area, including along the rotor cage		
	Bins and Augers		
	All bins and augers must be empty and clean		
	Wiring Looms		
	Conduit need not be removed, but must be cleaned		
After cleaning, machines should be left dismantled to facilitate biosecurity inspection.			

(Images courtesy of Department of Agriculture and Food, WA)



ROTARY HARVESTER



CONVENTIONAL HARVESTER

IMPORT REQUIREMENT 40

Prior to import, a *"Notice of Intention to Import Plants or Plant Products into Tasmania"* must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual. This Import Requirement becomes effective from 1st January 2012.

40 European House Borer - Vectors

A person must not import, or cause to be imported from Western Australia, any material[1] derived from hosts of European House Borer (*Hylotrupes bajulus*), these being coniferous trees including *Pinus* species (pines), *Abies* species (firs), *Picea* species (spruces), *Araucaria* species, or *Pseudotsuga* species (oregon), except in accord with the following:

I. TREATMENT

Host material must be either:

(a) Subject to insecticidal preservative treatment effective against European House Borer either by vacuum pressure impregnation, dipping or spraying in compliance with Australian Standard for Preservative Treatments of Timber (AS 1604); **or**

(b) Heated to achieve a core temperature of 56°C and held at that temperature for at least 30 minutes; **or**

(c) Fumigated with methyl bromide[2], at normal atmospheric pressure, with fumigation monitored at 2, 4, 12 and 24 hours and the minimum concentration for those periods maintained, in accord with Table 1;

AND

(d) After treatment as specified in either Clause I(a), I(b), or I(c), the material must be stored and handled in a manner that minimises potential for infestation or re-infestation with European House Borer.

Table 1 Methyl Bromide Fumigation Standard

Temperature	Dosage (g/m^3)	Minimum concentration (g/m^3) at:			
		2 h	4 h	12 h	24 h
21°C or above	48	36	31	28	24
16°C or above	56	42	36	32	28
10°C or above	64	48	42	36	32

OR

II. ACCREDITED PALLET SUPPLIER

(a) Pine pallets, other than new pine pallets, must be sourced from a supplier accredited under an approved pallet quality assurance scheme;

OR

III. PEST FREE AREA

Host material must originate from European House Borer Free Area, and be stored and handled in a manner that minimises potential for infestation or re-infestation with European House Borer.

EXPLANATORY NOTES:

- [1]***Material*** *means sawn softwood timber, pine dunnage, commercial lots of pine firewood, and pine pallets, excluding pallets made from heartwood;*

  Products made from processed pine, and pine furniture, artefacts, craft materials or household effects are not subject to this Import Requirement;
- [2]*Host material subject to methyl bromide fumigation must have at least one physical dimension less than 200mm thick.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate**

IMPORT REQUIREMENT 41

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

41 Fruit Fly Host Produce – Splitting and Reconsigning

A person must not import, or cause to be imported, any fruit of a plant listed in Schedule 1A except in accordance with the following:

I. Received, prior to splitting and reconsigning (see *Explanatory Notes*):

(a) with certification which states the host produce has been grown and packed in an area free from fruit fly; **or**

(b) with certification which states the host produce has been treated in accordance with a treatment method accepted by Tasmania.

AND

II. handled in a documented procedure that maintains traceability and reconciliation;

AND

III. Consigned with amended and certified copies of original certificates detailing new reconsignee and number of packages.

EXPLANATORY NOTES:

- *Splitting a consignment means sending sub-consignments to different consignees or transporting the sub-consignments to the same consignee on different vehicles;*
- *Reconsigning means forwarding a whole consignment or sub-consignments to another person or business, including secondary wholesalers, after initial consignment;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-17 (Splitting Consignments and Reconsigning Original Consignments of Certified Produce) satisfy this Import Requirement;*
- *Consignments must also satisfy the requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 42

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

42 Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Table Grapes

A person must not import, or cause to be imported, any table fruit of grapes (*Vitis* spp.) except in accordance with the following:

I. An approved system of pre-harvest bait or cover sprays;

AND

II. An approved system for identification and segregation of conforming and non-conforming lots;

AND

III. An approved system of post-harvest in-line or end-point inspection involving 1 in 50 packages or a 600 bunch inspection and found free from live fruit fly infestation.

EXPLANATORY NOTES:

- *Consignments that meet Interstate Certification Assurance protocol ICA-20 (Preharvest Treatment and Inspection of Table Grapes) satisfy this Import Requirement;*
- *Consignments must also satisfy the requirements of Import Requirement 10 for Grape Phylloxera;*
- *Consignments must also satisfy the requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 43

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

43 Fruit Fly Host Produce - Pre-harvest Treatment and Inspection of Stone Fruit, Pome Fruit, Persimmons and Blueberries

A person must not import, or cause to be imported, any stone fruit, pome fruit, persimmons and blueberries except in accordance with the following:

I. An approved program of pre-harvest cover sprays;

AND

II. An approved system for identification and segregation of conforming and non-conforming lots;

AND

III. An approved system of post-harvest in-line or end-point inspection of 2% or 600 pieces, whichever is greater, and found free from live fruit fly infestation.

EXPLANATORY NOTES:

- *Consignments that meet Interstate Certification Assurance protocol ICA-21 (Pre-harvest Treatment and Post Harvest Inspection of Approved Host Fruit) satisfy this Import Requirement;*
- *Consignments of blueberry fruit must also satisfy the requirements of Import Requirement 28 or Interstate Certification Assurance protocol ICA-31 (Pre-harvest Treatment and Inspection of Blueberries for Blueberry Rust);*
- *Consignments must also satisfy the requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 44

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

44 Fruit Fly Host Produce – Pre-harvest Treatment and Inspection of Tomatoes, Capsicums, Chillies and Eggplants

A person must not import, or cause to be imported, any fruit of tomatoes, capsicums, chillies and eggplants except in accordance with the following:

I. An approved program of pre-harvest cover sprays;

AND

II. An approved system for identification and segregation of conforming and non-conforming lots;

AND

III. An approved system of post-harvest in-line or end-point inspection involving a minimum of 600 units or a minimum of 2% of the carton count (one in every fifty packages) or part thereof, from randomly selected packed product, with a minimum of three cartons inspected.

EXPLANATORY NOTES:

- *Consignments that meet Interstate Certification Assurance protocols ICA-26 (Pre-harvest Treatment and Inspection of Tomatoes, Capsicums, Chillies and Eggplants), and ICA-48 (Pre-harvest Treatment and Post Harvest Inspection of Tomato and Capsicum in the Bowen Gumlu Region) satisfy this Import Requirement;*
- *Consignments must also satisfy the requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF:	**Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate**

IMPORT REQUIREMENT 45

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

45 Fruit Fly & Grape Phylloxera Host Produce – Repacking and Composite Lots

A person must not import, or cause to be imported, any fruit of a plant in Schedule 1A except in accordance with the following:

I. Received, prior to repacking or composing lots, with certification which states that the host produce has been:

(a) grown and packed in an area free from fruit fly; **or**

(b) treated in accordance with a treatment method accepted by Tasmania;

AND

II. Received, handled, stored and packed in an approved procedure that maintains segregation and traceability;

AND

III. In addition to Clauses I and II above, any fruit that is a host or vector of Grape Phylloxera (*Daktulosphaira vitifoliae* (Fitch)) must be received, prior to repacking or composing lots with certification:

(a) satisfying Import Requirement 10 (Grape Phylloxera – Hosts and Vectors).

EXPLANATORY NOTES:

- *'Repacking produce' means produce which is received by a business for the purpose of repacking into new packages for consignment to Tasmania;*
- *'Composite lots' means a consignment comprising packages of different types of host produce sourced from one or more suppliers;*
- *Consignments that meet Interstate Certification Assurance (ICA) protocol ICA-57 (Repacking of Fruit Fly and Phylloxera Host Produce) and/or ICA-58 (Certification of Composite Lots) satisfy this Import Requirement;*
- *After repacking or composing lots, consignments must also satisfy the requirements of Schedule 1B re fruit fly host secure fruit handling, storage and transport.*

PROOF: Consignments must be accompanied by a Plant Health Certificate or a Plant Health Assurance Certificate

IMPORT REQUIREMENT 46

Prior to import, a "Notice of Intention to Import Produce into Tasmania" must be submitted to the relevant Biosecurity Tasmania Operations Centre. Importation must occur in compliance with general Conditions and Restrictions for Prescribed Matter in Part 2 of this Manual.

46 Tomato Potato Psyllid – Hosts and Vectors

NOTE: *THIS IMPORT REQUIREMENT IS CURRENTLY UNDER FINAL DEVELOPMENT AND WILL BE RELEASED ON THE DPIPWE WEBSITE IN THE FIRST QUARTER 2018.*

2.22 Import Protocols

A business may elect to import plants and plant products into Tasmania under an individual certification arrangement between Biosecurity Tasmania and that business, or as an accredited business under an interstate certification assurance arrangement or protocol made between the DPIPWE Tasmania and any other State or Territory. This applies to Tasmanian or to interstate businesses.

To qualify for any such arrangement, a business must have in place an approved, documented quality system that ensures all the requirements of the *Plant Quarantine Act 1997* are met for the plants and plant products in question.

To obtain more information on these arrangements a business should contact the nearest regional Biosecurity Tasmania Centre in the first instance.

2.23 Plant and Plant Product Exports

2.23.1 Interstate Exports

(a) **General**

The produce to be exported must comply with the conditions of entry of the importing State or Territory. Tasmanian biosecurity authorities are provided with information from the other State organisations on their requirements. In general, produce must be accompanied by a valid Tasmanian Plant Health Certificate stating that the conditions of entry for that produce have been met (see forms online at: http://www.dpipwe.tas.gov.au/quarantine forms).

(b) **Inspection and Certification**

The requirements for inspection vary depending on the nature of the produce and the requirements of the importing State or Territory. Once the produce has passed inspection a Plant Health Certificate is issued and a fee is raised.

2.23.2 Export Protocols and Certification Assurance Arrangements

(a) A Tasmanian business may elect to export prescribed matter from Tasmania under an individual certification arrangement between Biosecurity Tasmania and that business, or as an accredited business under an interstate certification assurance arrangement or protocol made between the DPIPWE Tasmania and any other State or Territory.

(b) To qualify for such an arrangement a business must have in place an approved, documented quality system that ensures all the requirements of the *Plant Quarantine Act 1997* are met for the prescribed matter in question.

(c) Businesses that are accredited under a protocol or certification assurance arrangement with Biosecurity Tasmania are able to sign their own declaration or certificate. Accredited businesses are audited at least annually by Biosecurity Tasmania. They must demonstrate compliance with all the requirements of the protocol or arrangement to maintain their accreditation.

2.23.3 International Exports

(d) Inspections are undertaken and Tasmanian Plant Health Certificates or Certificates of Condition/Origin are issued for certain plants and plant products. This occurs where the importing country does not require phytosanitary certification by the Commonwealth Government Agency responsible for plant and plant products exports (Commonwealth Department of Agriculture) but certification has been requested by the importer or their agent.

Part 3 - Appendices

APPENDIX 1.1 List A and List B Declared Pests and Diseases (Tasmanian Plant Biosecurity 'Regulated Quarantine Pests')

Section 12 - Publication of pests and diseases

I, Andrew Christian Bishop, Chief Plant Health Manager, Biosecurity Tasmania, Department of Primary Industries, Parks, Water and Environment (position number 702019) and delegate of the Secretary of the Department of Primary Industries, Parks, Water and Environment under section 7 of the *Plant Quarantine Act 1997* ("the Act") in accordance with section 12 of the Act hereby publish a list of all pests declared under section 10 to be List A pests or List B pests; and a list of all diseases declared under section 11 to be List A diseases or List B diseases:-

Pests that have been declared under Section 10 to be List A pests:

INSECTA (insects)	
COLEOPTERA (beetles & weevils)	
Bruchus pisorum (Linnaeus)	pea weevil
Heteronychus arator (Fabricius)	African black beetle, black lawn beetle
Hylotrupes bajulus (Linnaeus)	European house borer
Scolytus multistriatus Marsham	elm bark beetle
Trogoderma variabile Ballion	warehouse beetle
DIPTERA (flies)	
Bactrocera tryoni (Froggatt)	Queensland fruit fly, Qfly, QFF
Ceratitis capitata (Wiedemann)	Mediterranean fruit fly
HEMIPTERA (bugs, aphids, mealybugs, pysllids, whitefllies & scale insects)	
Bemisia tabaci (Gennadius)	silverleaf whitefly, poinsettia whitefly, cotton whitefly
Bactericera cockerelli (Šulc) (syn. *Trioza cockerelli* Šulc)	tomato/potato psyllid
Daktulosphaira vitifoliae (Fitch)	grape phylloxera
HYMENOPTERA (ants, bees & wasps)	
Solenopsis invicta Buren	red imported fire ant
MOLLUSCS (snails & slugs)	
Cornu apertus (Born) (syn. *Cantareus apertus* (Born), *Helix aperta* (Born))	green snail
Lymnaea viridis Quoy & Gaimard (syn. *Austropeplea viridis* (Quoy and Gaimard))	green pond snail
Pseudosuccinea columella (Say)	American ribbed fluke snail
NEMATODES	
Anguina agrostis (Steinbuch) Filipjev (syn. *Anguina funesta* (Price, Fisher and Kerr), *Anguina lolii* Price)	ryegrass nematode
Globodera rostochiensis (Wollenweber) Behrens	yellow potato cyst nematode, PCN

Pests that have been declared under Section 10 to be List A pests:

PLANTS

Acacia nilotica (L.) Delile ssp. *indica* (Benth.) Brenan	prickly acacia
Acroptilon repens (L.) DC.	creeping knapweed, blueweed, hardheads
Alternanthera philoxeroides (Mart.) Griseb.	alligator weed
Amaranthus albus L.	tumble weed, white pigweed, white amaranth
Andropogon gayanus Kunth	gamba grass
Annona glabra L.	pond apple
Asparagus aethiopicus L.	ground asparagus
Asparagus africanus Lam.	climbing asparagus
Asparagus asparagoides (L.) Druce (Western Cape form)	western cape bridal creeper
Asparagus declinatus L.	bridal veil
Asparagus plumosus Baker	climbing asparagus fern
Austrocylindropuntia spp.	opuntioid cacti
Bassia scoparia (L.) A.J. Scott	kochia, Mexican firebrush, mock cypress
Berkheya rigida (Thunb.) Ewart et al.	African thistle
Bifora testiculata (L.) Spreng.	bifora
Cabomba caroliniana A. Gray	cabomba, fish-grass, Carolina fanwort
Carex buchananii Bergg.	leather leaf sedge
Carex testacea Sol. ex Boott	orange New Zealand sedge
Caulerpa taxifolia (Vahl) C.Ag.	marine green alga
Cenchrus incertus M.A. Curtis	spiny burr-grass
Cenchrus longispinus (Hack.) Fernald	spiny burr-grass
Centaurea calcitrapa L.	star thistle, purple star thistle
Centaurea eriophora L.	Mallee cockspur
Ceratophyllum demersum L.	hornwort, coontail
Chondrilla juncea L.	rush skeleton weed, naked weed
Crupina vulgaris Cass.	common crupina, bearded creeper
Cryptostegia grandiflora R. Br.	rubber vine
Cuscuta spp. (excluding *C. tasmanica* Englm.)	dodder
Cylindropuntia spp.	opuntioid cacti
Cynara cardunculus L.	artichoke thistle
Cyperus esculentus L.	yellow nut sedge, yellow nut grass
Cyperus rotundus L.	purple nut grass, nut sedge
Datura spp.	datura
Dittrichia viscosa (L.) Greuter	false yellow head
Dolichandra unguis-cati (L.) L.G.Lohmann	cat’s claw creeper
Egeria densa Planch.	egeria, Brazilian waterweed, leafy elodea
Eichhornia crassipes (Mart.) Solms	water hyacinth
Eleocharis parodii Barros	parodi spike rush
Emex australis Steinh.	spiny emex
Erica ciliaris L.	dorset heath
Erica cinerea L.	bell heather
Erica discolor Andrews	bicoloured heath
Erica erigena R.Ross	irish heath

Pests that have been declared under Section 10 to be List A pests:

PLANTS

Erica glandulosa Thunb.	
Erica herbacea L. (syn. *E. carnea* L.)*	winter heath
Erica melanthera L.	
Erica quadrangularis Salisb.	angled heath
Erica terminalis Salisb.	corsican heath
Erica tetralix L.	cross-leaved heath
Erica vagans L.	cornish heath
Festuca gautieri Hackel	bear-skin fescue
Galium spurium L.	false cleavers
Galium tricornutum Dandy	three-horn bedstraw, corn cleavers
Gymnocoronis spilanthoides (D. Don ex Hook. & Arn.) DC.	Senegal tea plant, temple plant
Heliotropium europaeum L.	common heliotrope, caterpillar weed
Heracleum mantegazzianum Sommier & Levier	giant hogweed, cart-wheel flower
Hydrilla verticillata (L.f.) Royle	hydrilla, Indian star grass, water thyme
Hymenachne amplexicaulis (Rudge) Nees	hymenachne
Hymenachne x calamitosa J.R.Clarkson	hymenachne
Jatropha gossypiifolia L.	bellyache bush
Lagarosiphon major (Ridl.) Moss	Lagarosiphon, African oxygen weed
Lantana camara L.	lantana
Mesquite spp.	mesquite
Miconia spp.	miconia
Mimosa pigra L.	mimosa
Nassella charruana (Arechav.) Barkworth	lobed needle grass
Nassella hyalina (Nees) Barkworth	Cane needle grass
Nassella tenuissima (Trin.) Barkworth	Mexican feather grass
Oenanthe pimpinelloides L.	meadow parsley, water dropwort
Opuntia spp. (excluding *Opuntia ficus-indica*)	opuntioid cacti
Orobanche spp. (except *O. minor* Sm. and *O. cernua* var. *australiana* (F.Muell. ex Tate) J.M.Black ex Beck))	broomrape
Parkinsonia aculeata L.	parkinsonia
Parthenium hysterophorus L.	parthenium weed
Sagittaria platyphylla (Engelm.) J.G. Sm.	sagittaria
Sagittaria montevidensis Cham. & Schltdl.	arrowhead
Salvinia molesta D.S. Mitch.	giant salvinia, acquarium water moss
Senecio glastifolius L. f.	holly leaved senecio, water dissel
Senecio madagascariensis Poir.	fireweed
Solanum elaeagnifolium Cav.	silverleaf nightshade
Solanum sodomaeum L.	apple of Sodom
Tamarix aphylla (L.) H. Karst.	athel pine, athel tamarisk, desert tarmarix
Trapa spp.	floating water chestnut
Tribulis terrestris L.	caltrop, puncture vine
Xanthium spp.	burrs
Zizania spp.	wild rice

Pests that have been declared under Section 10 to be List B pests:

PLANTS

Allium vineale L.	crow garlic, false garlic, wild garlic, field garlic
Amelichloa caudata (Trin.) Arriaga & Barkworth (syn. *Achnatherum caudatum* (Trin.) S.W.L. Jacobs & J. Everett)	espartillo
Amsinckia spp.	yellow burr weed, amsinckia
Anredera cordifolia (Ten.) Steenis	madeira vine
Anthemis cotula L.	stinking mayweed, stinking chamomile
Asparagus asparagoides (L.) Druce	bridal creeper
Asparagus scandens Thunb.	asparagus fern, climbing asparagus
Asphodelus fistulosus L.	onion weed
Berberis darwinii Hook.	Darwin's barberry, berberis
Calluna vulgaris (L.) Hull	heather, ling, scots heather
Carduus nutans L.	nodding thistle, musk thistle
Carduus pycnocephalus L.	slender thistle, Italian thistle
Carduus tenuiflorus W.M. Curtis	slender thistle
Carex albula Allan	New Zealand hair sedge
Carex flagellifera Col.	New Zealand sedge
Carthamus lanatus L.	saffron thistle
Chrysanthemoides monilifera (L.) Norl.	boneseed, bitou bush
Cirsium arvense (L.) Scop.	Californian thistle
Coprosma robusta M. Raoul	coprosma, karamu
Cortaderia spp.	pampas grasses
Cytisus multiflorus (Aiton) Sweet	white Spanish broom
Cytisus scoparius (L.) Link	English broom, common broom
Echium plantagineum L.	Paterson's curse, purple bugloss, purple echium
Echium vulgare L.	viper's bugloss, blue echium
Elodea canadensis Michx.	Canadian pondweed, water-thyme
Equisetum spp.	horsetail
Eragrostis curvula (Schrad.) Nees	African lovegrass, weeping lovegrass
Erica arborea L.	tree heath
Erica baccans L.	berry heath
Erica caffra L.	water heath
Erica holosericea Salisb.	
Erica lusitanica Rudolph	Spanish heath
Erica scoparia L.	besom heath
Fallopia japonica (Houtt.) Ronse Decr.	Japanese knotweed, Mexican bamboo
Foeniculum vulgare Mill.	Fennel (excluding sweet fennel bulbs and seed for human consumption)
Genista linifolia L.	flax-leaf broom
Genista monspessulana (L.) L. A. S. Johnson	Montpellier broom, cape broom, soft broom
Hieracium spp.	hawkweeds
Homeria spp.	cape tulip
Hypericum perforatum L.	St. John's wort, goatweed
Hypericum tetrapterum Fr.	square stemmed St. John's wort, St. Peter's wort

Pests that have been declared under Section 10 to be List B pests:

PLANTS

Ilex aquifolium L.	holly
Lepidium draba L. (syn. *Cardaria draba* (L.) Desv.)	white weed
Leycesteria formosa Wall.	Himalayan honeysuckle
Lycium ferocissimum Miers	African boxthorn
Marrubium vulgare L.	Horehound, white horehound
Myriophyllum aquaticum (Vell.) Verdc.	parrot's feather, water feather
Nassella leucotricha (Trin. & Rupr.) R. W. Pohl	Texas needle grass
Nassella neesiana (Trin. & Rupr.) Barkworth	Chilean needle grass
Nassella trichotoma (Nees) Hack. ex Arechav.	serrated tussock
Onopordum spp.	Onopordum thistles
Pennisetum macrourum Trin.	African feather grass
Pennisetum villosum R.Br. ex Fresen.	Feathertop, white foxtail, long style feather grass
Rorippa sylvestris (L.) Besser	creeping yellow cress, yellow field cress
Rubus fruticosus L. aggregate (including *R. anglocandicans*, *R. erythrops*, *R. echinatus*, *R. laciniatus*, *R. laudatus*, *R. leucostachys*, *R. polyanthemos*, *R. vestitus*, and R. species (Tasman), but does not include commercial varieties of blackberry)	blackberry
Salix spp., except *S. babylonica* L., *S. x. calodendron* Wimm., *S. x. reichardtii* Kern.	Willow
Salpichroa origanifolia (Lam.) Baill.	pampas lily-of-the-valley
Senecio jacobaea L.	ragwort
Solanum marginatum L.f.	white-edged nightshade
Solanum triflorum Nutt.	cut leaf nightshade
Ulex europaeus L.	gorse
Urospermum dalechampii (L.) F.W.Schmidt	Mediterranean daisy

Diseases that have been declared under Section 11 to be List A diseases:

BACTERIA

Curtobacterium flaccumfaciens pv. *flaccumfaciens* (Hedges) Collins & Jones	bacterial blight of legumes
Erwinia amylovora (Burrill) Winslow et al.	fire blight of apples and pears
Pseudomonas syringae pv. *striafaciens* (Elliott) Young et al. (syn. *Pseudomonas striafaciens* (Elliott) Starr & Burkholder)	bacterial stripe of barley, barley black node

Diseases that have been declared under Section 11 to be List A diseases:

BACTERIA

Ralstonia solanacearum (Smith) Yabuuchi et al. (syn. *Pseudomonas solanacearum* (Smith))	bacterial wilt of potato
Xanthomonas campestris pv. *cucurbitae* (Bryan) Vauterin et al. (syn. *Xanthomonas cucurbitae* (Bryan) Dowson)	of cucurbita spp., including pumpkin spot and cucurbits leaf spot

FUNGI

Alternaria mali Roberts	apple spot
Ceratocystis fimbriata Ellis & Halst.	of ornamentals
Colletotrichum lupini (Bondar) Nirenberg et al.	lupin anthracnose
Didymella rabiei (Kovatsch.) Arx (syn. *Ascochyta rabiei* (Pass.) Labr.)	chickpea blight
Ophiostoma spp.	Dutch elm disease
Phacidiopycnis tuberivora (Güssow & Foster) Sutton	potato rot
Thekopsora minima (P. Syd & Syd)	Blueberry rust
Urocystis cepulae Frost	onion smut

PHYTOPLASMAS

Grapevine yellows MLO

VIRUSES

Capsicum chlorosis virus	CCV
Iris yellow spot virus	IYSV
Pea seed-borne mosaic virus	PSbMV
Potato spindle tuber viroid	PSTVd
Tobacco streak virus	TSV
Tomato leaf curl virus	see Tomato yellow leaf curl virus
Tomato yellow leaf curl virus	TYLCV

Diseases that have been declared under Section 11 to be List B diseases:

FUNGI

Puccinia allii F. Rudolphi	onion rust
Puccinia psidii sensu lato^	guava rust, or myrtle rust

Note: Generally, a List A pest or disease is a pest or disease that does not occur at all in Tasmania, whilst List B pests or diseases are ones that do occur in Tasmania.

DATED this 17th day of November 2017

ANDREW BISHOP
Delegate to the Secretary
Department of Primary Industries, Parks, Water and Environment

Explanatory Note:
* This plant name entry was subsequently amended by public notice on 27 November 2017, further to its original declaration notice in the Tasmanian Government Gazette on 22 November, 2017. The name *Erica carnea* L. is now a conserved name, so *E. herbacea* is now a synonym of it:
http://powo.science.kew.org/taxon/urn:lsid:ipni.org:names:332092-2

^ This disease name has been amended by public notice on 27 November 2017, further to its original declaration notice in the Tasmanian Government Gazette on 22 November, 2017. The diseases scientific name is now *Austropuccinia psidii* (G. Winter) Beenken (syn. *Puccinia psidii* sensu lato).

APPENDIX 1.2 List of 'Unwanted Quarantine Pests' for Tasmanian Plant Biosecurity

- Unwanted Quarantine Pests (UQPs) are pests of intermediary concern, which are not officially regulated for through formal Import Requirement, unlike Section 12 List A & B pests (& diseases) which are Tasmania's 'Regulated Quarantine Pests' (RQPs - see Appendix 1A).

  UQPs are partially declared under the Plant Quarantine Act 1997, as described in Section 1.9 of the Manual. The risk that UQP's may present is managed through one or more regulatory levers or control points, such as:

  - the biosecurity barrier; and/or
  - Industry quality assurance programs; and/or
  - targeted seasonal risk pathway specific barrier inspection programs.

- The UQP list of pests and diseases of biosecurity concern to Tasmania is maintained separately from the Section 12 List A & B pests (& diseases), as the latter RQP listing is formally required to be published annually under Section 12 of the *Plant Quarantine Act 1997*.

- Compilation of this pest listing commenced in January 2011.

PLEASE NOTE:

- The great majority of UQPs are not present in Tasmania, but exceptions do apply such as pests present which vector important pests of regulatory concern which are not present, or hold a wide range of physiologic variation not present in the State
- **Any more recent UQP declaration changes between this edition of the Manual and the next edition can be found on the pest declaration summary table held on DPIPWE's web site under 'Biosecurity' (see www.dpipwe.tas.gov.au)**

Appendix 1.2 (cont.):
UNWANTED QUARANTINE PEST (UQP) INDEX FOR TASMANIAN PLANT BIOSECURITY BY PEST SCIENTIFIC NAME (ascending order)

Appendix 1.2 - UNWANTED QUARANTINE PEST (UQP) INDEX FOR TASMANIAN PLANT BIOSECURITY BY PEST SCIENTIFIC NAME (ascending order)

Pest Scientific Name	Pest Common Name	Pest Group	Present in Tasmania	Declaration Date	Declaration Comment
Aegagropila linnaei Kützing (syn. *Cladophora aegagropila* L.)	Marimo, moss balls	Alga	No	11-11-2015	UQP pest (s8 dec)
Aleurodicus dispersus Russell	Spiralling whitefly	Insect	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Aphanomyces raphani Kendr.	Black root disease of radish	Fungi	No	9-11-2011❶	Revoked List A Disease (s11 dec; retained s9)
Aphelenchus spp.	Ring nematodes (excluding one species which is present)	Nematode	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Candidula intersecta (Poiret)	Wrinkled dune snail	Mollusc	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Cernuella neglecta (Draparnaud)	Neglected snail	Mollusc	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Cochlicella acuta (Müller)	Pointed snail	Mollusc	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Coleonaema oleae (DC.) Höhn (syn. *Coleophoma oleae* (DC.) Petrak & Sydow, *Diplodia oleae* Peglion, & *Macrophoma oleae* (DC.) Berl. & Voglino; of olive)		Fungi	No	9-11-2011❶	Revoked List A Disease (s11 dec; retained s9)
Colletotrichum capsici (Syd.) E.J. Butler & Bisby (syn. *C. capricci* (Syd.))	Pepper anthracnose	Fungi	No	9-11-2011❶	Revoked List A Disease (s11 dec; retained s9)
Corythucha ciliata (Say)	Sycamore lace bug	Insect	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Criconemoides spp.	Ring nematodes	Nematode	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Cryphodera spp.	Nematodes	Nematode	No	9-11-2011❶	Revoked List A Pest (s10 dec; retained s8)
Didymella lycopersici (see *Phoma lycopersici* Cooke (anamorph))	Stem canker of tomato	Fungi	No	9-11-2011❶	Revoked List A Disease (s11 dec; retained s9)

Appendix 1.2 - UNWANTED QUARANTINE PEST (UQP) INDEX FOR TASMANIAN PLANT BIOSECURITY BY PEST SCIENTIFIC NAME (ascending order)

Pest Scientific Name	Pest Common Name	Pest Group	Present in Tasmania	Declaration Date	Declaration Comment
Didymosphenia geminata (Lyngbye) Schmidt	Didymo / rock snot	Algae	No[1]	7-12-2012	Revoked List A Pest (s10 dec; retained s8)
Eobania vermiculata (Müller)	Chocolate-band snail	Mollusc	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Fergusobia spp.	Nematodes	Nematode	No?	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Fomes spp. (of *Eucalyptus* & other spp.)		Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Frankliniella occidentalis (Pergande)	Western flower thrips – vectors several tospoviruses, including *Impatiens necrotic spot virus* (INSV), & the ilarvirus *Tobacco streak virus* (TSV)	Insect	Yes[2]	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Gnomonia comari P.Karst (syn. *Gnomonia fructicola* (G. Arnaud) Fall)	Strawberry leaf blotch	Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Heterodera spp. (excluding *H. avenae* Wollenweber & *H. humili* (Filipjev))	Cyst nematodes (excluding *H. avenae* Wollenweber & *H. humili* (Filipjev) which are present)	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Impatiens necrotic spot virus (INSV) - vectored by Western Flower Thrips and Onion Thrips	INSV	Virus	No	25-6-2013	UQP disease (s9 dec)
Monomorium destructor (Jerdon)	Singapore ant	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Monomorium pharaonis (Linnaeus)	Pharaoh's ant	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Mycosphaerella personata B.B. Higgins (*Pseudocercospora vitis* (Lév.) Speg. (anamorph))	Leaf spot of grape vines	Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Olpidium brassicae (Woronin) P.A. Dang.	Lettuce big vein – vectors several viruses, including *Tobacco necrosis virus* (TNV)	Fungi	Yes[2]	9-11-2011 ❶	Revoked List B Disease (s11 dec; retained s9)
Paralongidorus spp.	Needle nematodes	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)

Appendix 1.2 - UNWANTED QUARANTINE PEST (UQP) INDEX FOR TASMANIAN PLANT BIOSECURITY BY PEST SCIENTIFIC NAME (ascending order)					
Pest Scientific Name	**Pest Common Name**	**Pest Group**	**Present in Tasmania**	**Declaration Date**	**Declaration Comment**
Peronospora hyoscyami f.sp. *tabacina* (D.B. Adam) Skalicky (syn. *P. hyoscyami*)	Tobacco blue mould	Fungi	No	17-12-2010	Revoked List A Disease (s11 dec; retained s9)
Peronosclerospora maydis (Racib.) C. Shaw	Downy mildew of corn	Fungi	No	9-11-2011 ❶	UQP disease (s9 dec)
Phaeoisariopsis griseola (Sacc.) Ferraris (syn. *Isariopsis griseola* Sacc.)	Angular leaf spot (of *Phaseolus vulgaris*)	Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Phoma lycopersici Cooke (anamorph) (*Didymella lycopersici* (tel.))	Stem canker of tomato	Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Phytophthora megasperma Drechsler (of apple, stone fruit & *Pinus* spp.)	Root rot	Fungi	Yes[3]	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Plasmodiophora brassicae Woronin	Clubroot of brassica	Fungi	Yes[3]	9-11-2011 ❶	Revoked List B Disease (s11 dec; retained s9)
Plasmopara obducens (J. Schröt.) J. Schröt. in Cohn	Impatiens Downy Mildew	Fungi	No	17-12-2010	Revoked List A Disease (s11 dec; retained s9)
Polistes spp.	Paperwasps, social wasps	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Pseudocercospora vitis (Lév.) Speg. (see *Mycosphaerella personata* B.B. Higgins (teleomorph))	Leaf spot of grape vines	Fungi	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Pseudomonas savastanoi pv. *phaseolicola* (Burkholder) Gardan et al. (syn. *Pseudomonas phaseolicola* (Burkholder) Dowson)	Halo blight of beans	Bacteria	No[4]	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Pseudomonas syringae pv. *pisi* (Sackett) Young et al. (syn. *Pseudomonas pisi* Sackett)	Pea blight	Bacteria	No[4]	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Radopholus spp.	Burrowing nematodes	Nematode	No	9-11-2011 ❶	Revoked List B Pest (s10 dec; retained s8)
Rotylenchus spp. (excluding *R. robustus* (de Man) Filipjev)	Spiral nematodes (excluding *R. robustus* (de Man) Filipjev which is present)	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Scutellonema spp.	Spiral nematodes	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Solenopsis geminata (Fabricius)	Tropical fire ant, ginger ant	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Thrips palmi Karny	Melon thrips	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)

Appendix 1.2 - UNWANTED QUARANTINE PEST (UQP) INDEX FOR TASMANIAN PLANT BIOSECURITY BY PEST SCIENTIFIC NAME (ascending order)					
Pest Scientific Name	**Pest Common Name**	**Pest Group**	**Present in Tasmania**	**Declaration Date**	**Declaration Comment**
Thrips tabaci Lindeman	Onion thrips, potato thrips – vectors several tospoviruses including *Iris yellow spot virus* (IYSV), and the pollen-borne ilarvirus *Tobacco streak virus* (TSV).	Insect	Yes[2]	25-6-2013	UQP Pest (s8 dec)
Tobacco necrosis virus (TNV)	TNV – vectored by *Olpidium brassicae*	Virus	No	9-11-2011 ❶	Revoked List A Disease (s11 dec; retained s9)
Trichodorus spp.	Stubby root nematodes	Nematode	No	9-11-2011 ❶	UQP (s8 dec)
Tylenchulus spp.	Citrus nematode, of *Vitis* & *Olea*	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Tylenchus spp.	Stem nematodes	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Ustilago zeae (Beckm.) Unger (syn. *Ustilago maydis* (DC.) Corda)	Boil smut	Fungi	No	28-11-2013 ❷	Revoked List A Disease (s11 dec; retained s9)
Wasmannia auropunctata (Roger)	Electric ant, little fire ant	Insect	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)
Xiphinema spp.	Dagger nematodes	Nematode	No	9-11-2011 ❶	Revoked List A Pest (s10 dec; retained s8)

Key: Dec(s) = Declaraion(s); IR = Import Requirement; PQMTas = Plant Biosecurity Manual Tasmania; s = Section (of the Act); NA = Not Applicable

PLEASE NOTE: Some declaration effects are time delayed from date of Notice issue: ❶Notice issued 9/11/2011, taking effect on 21/12/2011; ❷Notice issued 28/11/2013, taking effect on 18/12/2013

[1] Though Didymo is not yet reported to be present in Australia, it is still cited as a UQP because of the very high degree of risk it presents for gaining entry into Australia and Tasmania through existing known pathways. Consequently vigilance is required for inspection of ‘at risk’ materials and goods at the State biosecurity barrier.

[2] Though the pest may be present and even widespread in the State, it qualifies as a UQP if it is known to vector one or more RQPs or UQPs of concern to Tasmania. Action can be taken if detected at the biosecurity barrier.

[3] Represents species of pest/pathogen that though present in the State, are proven to have a very wide range of physiologic variation, not yet present in the State

[4] Though officially believed to be not present, further targeted surveillance may need to be taken to prove the case

APPENDIX 2 Public Notices – Plants and Plant Products

Appendix 2.1 Section 66 & 67 Notice for Hosts of Fire Blight

Notice under Sections 66 and 67, *Plant Quarantine Act 1997*[1]

Prohibited and Restricted Plants and Plant Products

Any plant or plant product grown or packed anywhere outside Tasmania is declared to be a restricted plant or restricted plant product unless it is declared to be a prohibited plant or prohibited plant product.

The fruit of any host* of the disease Fire Blight caused by the organism *Erwinia amylovora* is declared to be a prohibited plant product where the fruit is grown or packed outside Tasmania in an area in which the disease is known to exist.

*The following are hosts of the disease Fire Blight:

Host Botanical Name#	Host Common Name
Amelanchier	Serviceberry, Juneberry
Cotoneaster spp.	Cotoneaster
Crataegus spp.	Hawthorns
Cydonia	Quince
Eriobotrya spp.	Loquat
Malus spp.	Apple varieties and species
Mespilus spp.	Medlar
Prunus salicina	Japanese Plum
Pyracantha spp.	Firethorn
Pyrus spp.	Pear varieties and species
Rubus spp. (including *R. idaeus**)	Thornless Blackberry (derived from crosses among a range of *Rubus* cultivars), and Raspberry*
Sorbus spp.	Mountain Ash
Stranvaesia spp.	

'spp.' means all species of plants in the genus

Dated this twentieth day of December 2000

KIM EVANS
SECRETARY
DEPARTMENT OF PRIMARY INDUSTRIES, PARKS, WATER, AND ENVIRONMENT

EXPLANATORY NOTE:

[1] The first paragraph of the original Section 66 Notice was revoked on 16th July 2010 by Section 67 Notice; see copy below

Revocation of Notice of Restricted Plants and Plant Products

Plant Quarantine Act 1997
Section 67

I, Alexander Harold Schaap, as delegate to the Secretary of the Department of Primary Industries, Parks, Water and Environment under section 7 of *Plant Quarantine Act* 1997 (the Act) hereby revoke pursuant to section 67 (4) of the Act the following declaration made under section 67 of the Act by public notice in the Tasmanian Government Gazette dated 20 December 2000:

(1) Any plant or plant product grown or packed anywhere outside Tasmania is declared to be a restricted plant or restricted plant product unless it is declared to be a prohibited plant or prohibited plant product.

The revocation takes effect on the date of this notice

Dated this 16th day of July 2010

Alex Schaap
GENERAL MANAGER
BIOSECURITY AND PRODUCT INTEGRITY DIVISION

Appendix 2.2 Section 67 Notices for Hosts of Myrtle (Guava) Rust

Notice of Restricted Plants and Plant Products

Plant Quarantine Act 1997
Section 67

I, Alexander Harold Schaap, as delegate to the Secretary of the Department of Primary Industries, Parks, Water and Environment under section 7 of *Plant Quarantine Act* 1997 (the Act), and pursuant to section 67 of the Act do hereby declare the following plants and plant products, being potential hosts of myrtle rust, to be restricted[1] plants and restricted plant products:

(1) any live plants, fruit, seed, tissue culture, pollen, cut flowers, foliage and stems of any plant of the Family Myrtaceae[2] that has been grown or packed in any part of Australia outside Tasmania

The declaration takes effect on 21st July 2010 and will remain in force until further notice.

Dated this 16th day of July 2010

Alex Schaap
GENERAL MANAGER
BIOSECURITY AND PRODUCT INTEGRITY DIVISION

EXPLANATORY NOTE:

MYRTACEAE NATIVE HOST SPECIES LIST FOR MYRTLE (GUAVA) RUST

- *The following list of Myrtaceae plant species is a non-exhaustive listing of hosts of myrtle rust (Puccinia psidii sensu lato), and is being continually maintained and updated Nationally under an interagency umbrella; 'National Pests and Disease Outbreaks':*

MYRTACEAE HOST GENUS LIST FOR MYRTLE (GUAVA) RUST

Ref: International
- http://data.kew.org/vpfg1992/vascplnt.html
- *R. K. Brummitt 1992. Vascular Plant Families and Genera, Royal Botanic Gardens, Kew*

Ref: Australian
- APC http://www.anbg.gov.au/chah/apc/index.html & APNI http://www.anbg.gov.au/cgi-bin/apni
- Some of these genera are not native but naturalised
- Tasmanian taxa can be found at the Census: http://tmag.tas.gov.au/index.aspx?base=1273
- Future reference: http://tmag.tas.gov.au/floratasmania

[1] *A person must not import or cause to be imported into Tasmania any restricted plant or restricted plant product without written approval of the Secretary, DPIPWE. Prospective importers who believe they can by alternate means provide a level of protection from myrtle rust equivalent to that achieved by the restriction outlined above may apply to Plant Biosecurity & Diagnostics Branch, DPIPWE using the form available at www. dpipwe.tas.gov.au*

[2] *A full list of genera of the Family Myrtaceae is available on www. dpipwe.tas.gov.au or can be obtained from Biosecurity Tasmania on request. Note that the Family Myrtaceae includes the genus Heteropyxis and the genus Psiloxylon.*

*MYRTACEAE HOST GENUS LIST FOR MYRTLE (GUAVA) RUST**

Please Note: *The list is does not necessarily represent a full list of hosts

Acca O.Berg	***Gomidesia*** O.Berg	***Petraeomyrtus*** Craven
Accara Landrum	***Gossia*** N.Snow & Guymer	***Phymatocarpus*** F.Muell.
Acmena DC. [= Syzigium]	***Heteropyxis*** Harv.	***Pileanthus*** Labill.
Acmenosperma Kausel [= Syzigium]	***Hexachlamys*** O.Berg	***Pilidiostigma*** Burret
Actinodium Schauer	***Homalocalyx*** F.Muell.	***Piliocalyx*** Brongn. & Gris
Agonis (DC.) Sweet	***Homalospermum*** Schauer [=Leptospermum]	***Pimenta*** Lindl.
Allosyncarpia S.T.Blake	***Homoranthus*** A.Cunn. ex Schauer	***Pleurocalyptus*** Brongn. & Gris
Amomyrtella Kausel	***Hottea*** Urb.	***Plinia*** L.
Amomyrtus (Burret) D.Legrand & Kausel	***Hypocalymma*** (Endl.) Endl.	***Pseudanamomis*** Kausel
Angasomyrtus Trudgen & Keighery	***Kania*** Schltr.	***Psidium*** L. [naturalised]
Angophora Cav.	***Kardomia*** Peter G. Wilson	***Psiloxylon*** Thouars ex Tul.
Archirhodomyrtus (Nied.) Burret	***Kjellbergiodendron*** Burret	***Purpureostemon*** Gugerli
Arillastrum Pancher ex Baill.	***Kunzea*** Rchb.	***Regelia*** Schauer
Astartea DC.	***Lamarchea*** Gaudich.	***Rhodamnia*** Jack
Asteromyrtus Schauer	***Legrandia*** Kausel	***Rhodomyrtus*** (DC.) Rchb.
Austromyrtus (Nied.) Burret	***Lenwebia*** N.Snow & ZGuymer	***Rinzia*** Schauer
Babingtonia Lindl.	***Leptospermum*** J.R.Forst. & G.Forst.	***Ristantia*** Peter G.Wilson & J.T.Waterh.
Backhousia Hook. & Harv.	***Lindsayomyrtus*** B.Hyland & Steenis	***Scholtzia*** Schauer
Baeckea L.	***Lithomyrtus*** F.Muell.	***Sannantha*** Peter G.Wilson
Balaustion Hook.	***Lophomyrtus*** Burret	***Siphoneugena*** O.Berg
Barongia Peter G.Wilson & B.Hyland	***Lophostemon*** Schott	***Sphaerantia*** Peter G.Wilson & B.Hyland
Basisperma C.T.White	***Luma*** A.Gray	***Stereocaryum*** Burret
Beaufortia R.Br.	***Lysicarpus*** F.Muell.	***Stenostegia*** A.R.Bean
Blepharocalyx O.Berg	***Malleostemon*** J.W.Green	***Stockwellia*** D.J.Carr, S.G.M.Carr & B.Hyland
Callistemon R.Br. [= Melaleuca]	***Marlierea*** Cambess.	***Syncarpia*** Ten.
Calothamnus Labill.	***Melaleuca*** L.	***Syzygium*** Gaertn.
Calycolpus O.Berg	***Meteoromyrtus*** Gamble	***Taxandria*** (Benth.) J.R.Wheeler & N.G.Marchant
Calycorectes O.Berg	***Metrosideros*** Banks ex Gaertn.	***Tepualia*** Griseb.
Calyptranthes Sw.	***Micromyrtus*** Benth.	***Thaleropia*** Peter G.Wilson
Calyptrogenia Burret	***Mitranthes*** O.Berg	***Thryptomene*** Endl.
Calythropsis C.A.Gardner [= Calytrix]	***Mitrantia*** Peter G.Wilson & B.Hyland	***Triplarina*** Raf.
Calytrix Labill.	***Monimiastrum*** J.Gueho & A.J.Scott	***Tristania*** R.Br.
Campomanesia Ruiz & Pav.	***Mosiera*** Small	***Tristaniopsis*** Brongn. & Gris
Carpolepis (J.W.Dawson) J.W.Dawson	***Myrceugenia*** O.Berg	***Ugni*** Turcz.
Chamelaucium Desf.	***Myrcia*** DC. ex Guill.	***Uromyrtus*** Burret
Chamguava Landrum	***Myrcianthes*** O.Berg	***Verticordia*** DC.
Choricarpia Domin	***Myrciaria*** O.Berg	***Waterhousea*** B.Hyland
Cleistocalyx Blume	***Myrrhinium*** Schott	***Welchiodendron*** Peter G.Wilson & J.T.Waterh.
Cloezia Brongn. & Gris	***Myrtastrum*** Burret	***Whiteodendron*** Steenis
Conothamnus Lindl.	***Myrtella*** F.Muell.	***Xanthomyrtus*** Diels
Corymbia K.D.Hill & L.A.S.Johnson	***Myrteola*** O.Berg	***Xanthostemon*** F.Muell.
Corynanthera J.W.Green	***Myrtus*** L. [naturalised]	
Cupheanthus Seem.	***Neofabricia*** Joy Thomps.	
Darwinia Rudge	***Neomitranthes*** Legrand	
Decaspermum J.R.Forst. & G.Forst.	***Neomyrtus*** Burret	
Eremaea Lindl.	***Ochrosperma*** Trudgen	
Eucalyptopsis C.T.White	***Octamyrtus*** Diels	
Eucalyptus L'Her.	***Osbornia*** F.Muell.	
Eugenia L.	***Paragonis*** J.R.Wheeler & N.G.Marchant	
Euryomyrtus Schaur	***Paramyrciaria*** Kausel	
Feijoa O.Berg	***Pericalymma*** (Endl.) Endl.	

Tasmanian Government

CONTACT DETAILS

Biosecurity Operations Branch

Phone: (03) 6165 3777

Fax: (03) 6173 0225

Email: biosecurity.tasmania@dpipwe.tas.gov.au

BL11241

Appendix Q

Ref: INT17/90315

Procedure

PRIMARY INDUSTRIES
Biosecurity & Food Safety NSW
PO Box 232, Taree NSW 2430
Tel: 02 6552 3000 Fax: 02 6552 7239
Email: ica.scheme@dpi.nsw.gov.au

ICA-31

PRE-HARVEST TREATMENT AND INSPECTION OF BLUEBERRIES FOR BLUEBERRY RUST

NUMBER	ICA31	VERSION	3.0
AUTHORISED BY	Manager, Plant Product Integrity & Standards		
AUTHORISED DATE	27/06/2017	EFFECTIVE DATE	01/07/2017
ISSUED BY	Primary Industries, Biosecurity & Food Safety		

REVISION HISTORY

VERSION	DATE	AMENDMENTS	
		SECTION	DETAILS
1.0	03 Sep 2012	All	New Procedure for rust only with trash inspection.
2.0	15 Oct 2014	6	Add a minimum of 2 cover sprays in combination of Propiconazole, Mancozeb and Boscalid / Pyraclostrobin.
		7.4.2	Include 600 piece harvest inspection rate.
		8.4.1	Standardised Packed Product Inspection to one in 50 packages.
		Attachment	Symptoms of blueberry rust infestation.
2.1	30 Oct 2014	6	Increased rate for Boscalid / Pyraclostrobin as per APVMA permit.
3.0	26 June 2017	All	Changes made to align with the *Biosecurity Act 2015*. Updated definitions, removed details for accreditation, auditing procedures, sanctions policy and charging, and replaced the application form and PHAC. Updated NSW Department of Primary Industries contact details. Clarify that 2 different cover sprays have been applied in succession with 14 days of harvest. Changed requirement from the use of a Pre-harvest treatment and inspection declaration, to a PHAC

NEXT REVIEW DATE:	01/07/2018

Disclaimers

The information contained in this Procedure is based on knowledge and understanding at the time of writing (June 2017). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up-to-date and to check currency of the information with the appropriate officer of the Department or the user's independent adviser.

PROCEDURE

Contents

1. PURPOSE

The purpose of this Procedure is to describe:

(a) the operation and principles; and

(b) the responsibilities and actions of personnel;

that applies to the pre-harvest treatment and inspection of blueberries for blueberry rust under an Interstate Certification Assurance (ICA) arrangement.

2. SCOPE

This Procedure covers all certification of blueberries from a Business operating under an ICA arrangement in New South Wales.

Disease: Blueberry rust

Produce: Blueberries

Location: This Procedure is separated into two (2) sections.

- Part A covering grower activities; and
- Part B covering packer activities.

IMPORTANT

ALWAYS READ THE LABEL

Users of agricultural (or veterinary) chemical products **must** always read the label and any Permit before using the product and strictly comply with the directions on the label and the conditions of any Permit. Users are not absolved from compliance with the directions of the label or the conditions of the Permit by reason of any statement made or omitted to be made in this Procedure.

Certification of fruit fly host produce under this Procedure may not be an accepted quarantine entry condition for all produce to all intrastate and interstate markets.

Some intrastate or interstate markets may require additional plant health certification for pests and diseases other than fruit fly as a condition of entry.

It is the responsibility of the Business consigning the produce to ensure compliance with all applicable quarantine requirements.

Information on intrastate and interstate quarantine requirements can be obtained by phoning 1800 084 881 or accessing http://www.interstatequarantine.org.au/.

3. REFERENCES

Biosecurity Act 2015

Further information – *http://www.dpi.nsw.gov.au/biosecurity/plant/ica*

Policies – *http://www.dpi.nsw.gov.au/biosecurityact/procedures*

Accreditation of Biosecurity Certifiers

Biosecurity Audit Frequency

Work Instruction – *http://www.dpi.nsw.gov.au/biosecurity/plant/ica*

WI-01 – 'Guidelines for Completion of Plant Health Assurance Certificates'

4. DEFINITIONS

In this Procedure:

Act	means the *Biosecurity Act 2015*.
APVMA	means the Australian Pesticides and Veterinary Medicines Authority.
Authorised Person	means an authorised officer under the Act or a person authorised under a law of another State or Territory that relates to plant biosecurity.
Authorised Signatory	means a person whose name is notified to the Secretary as a person who can issue a biosecurity certificate on behalf of the Business.
block	means an identifiable area of land on which produce is grown and pre-harvest treated as a unit and that is detailed on the property plan.
blueberries	means all commercial varieties of *Vaccinium spp.*
blueberry rust	means all stages of the fungus *Pucciniastrum vaccinia.*
Business	means the legal entity accredited as a biosecurity certifier under the Act.
Certification Assurance Arrangement	means a CA Arrangement that enables a Business or a person authorised under a corresponding law of a State or Territory, to issue a Plant Health Assurance Certificate that meets certain plant health quarantine conditions for trade within the State or between the State and other States and Territories.
consignment	means a discrete quantity of host produce transported to a single consignee at one time covered by a single PHAC.
damaged skins	means, for blueberries, splits or cracks in the skin due to causes prior to harvest, such as hail, but does not include the scar and tear which often occurs when the fruit is removed from the bush.
Department	means the NSW Department of Industry – Office of Primary Industries.
end-point inspection	means the process by which a representative sample is drawn and inspected from the consignment prior to certification.
facility	means a location where produce is assembled, inspected, securely stored, certified and dispatched.
in-line inspection	means the process by which a representative sample is drawn during the processing and packaging of the goods.
ICA Scheme	means a scheme developed by the States and Territories to meet their respective plant quarantine requirements under the Memorandum of Understanding on Interstate Certification Assurance dated 6 August 1999.
lot	means a quantity of homogenous product assembled for inspection at one place and at one time. A lot could consist of product from one or more growers/blocks/properties.
lot identification	means any coding or marking method used to identify a lot (for example, date, date code or block code).

non-conformance	means a failure to fulfil a specified requirement.
package	means the complete outer covering or container used to transport and market the product.
packed product	means host produce in packages following grading and packing and ready for marketing.
PHAC	means a Plant Health Assurance Certificate that is issued in accordance with the requirements of a Certification Assurance Arrangement.
property	means one or more contiguous parcels of land (lots on plan), owned or leased by a Business, that are managed as a unit and isolated from any other parcel of land owned or leased by the same Business.
SDS	means Safety Data Sheet, a procedure for handling or working with chemicals in a safe manner and includes information such as physical data, toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment and spill-handling procedures.

5. RESPONSIBILITY

Position titles have been created to reflect the responsibilities which must be met by the Business under the ICA arrangement. These positions must be assigned to trained staff. One person may carry out the responsibilities of more than one position.

Certification Controller is responsible for:

- ensuring the Business and its staff comply with their responsibilities and duties under this Procedure;
- representing the Business during audits and other matters relevant to the ICA Procedure;
- training staff in their duties and responsibilities under this ICA Procedure; and
- ensuring all certification of produce is carried out in accordance with this Procedure.

UNDER PART A

- Ensuring the Business has current accreditation for an ICA under PART A of this Procedure;
- maintaining a property plan for each property on which the produce is to be grown for certification under this Procedure;
- ensuring all source blocks of produce to be harvested have undergone pre-harvest treatment as per this Procedure;
- ensuring treated produce is identified and segregated from untreated produce to avoid mixing;
- instigating action following detection of blueberry rust infestation at harvest; and
- ensuring a PHAC is completed.

UNDER PART B

- Ensuring the Business has current accreditation for an ICA under PART B of this Procedure;
- ensuring all produce received for post-harvest packing and inspection and certification under PART B of this Procedure are sourced from a Business accredited under PART A of this Procedure and are accompanied by a valid PHAC;
- providing and maintaining a facility plan;
- ensuring treated and untreated produce are identified and controlled to prevent mixing during grading and packaging; and

- taking corrective action following detection of blueberry rust during grading and packing or packed product inspection.

Authorised Signatory is responsible for:

- ensuring that blueberries certified under the PHAC has been completed in accordance with this ICA Procedure and that the details on the certificate or declaration are tur and correct in every particular; and
- signing and issuing the PHAC.

Authorised Dispatcher is responsible for:

- ensuring all blueberries covered by a PHAC issued by the Business are identified; and
- maintaining duplicate copies of all PHACs issued by the Business under this Procedure.

Treatment Operator is responsible for:

- reading the label and/or permit, and SDS for the chemical product in use;
- preparing and applying pre-harvest chemical treatments to all source blocks certified under this Procedure;
- conducting pre-harvest spray application calibration tests on pre-harvest treatment equipment;
- maintaining pre-harvest spray application calibration test records;
- maintaining pre-harvest spray equipment; and
- maintaining pre-harvest spray mixture preparation and treatment records.

Harvest Supervisor is responsible for:

- undertaking produce inspection;
- all harvest activities, including identification of treated and untreated blocks and produce;
- advising of any infestations found and segregating infested produce; and
- completion of 'PHAC.

Produce Receival Officer is responsible for:

- ensuring all blueberries received for grading, packing and certification under PART B of this Procedure are sourced from a Business accredited under PART A of this Procedure; and
- ensuring all blueberries grown by another Business is accompanied by a completed PHAC.

Grader/Packer is responsible for:

- ensuring all host produce packed for certification under PART B of this Procedure is free from visible symptoms of blueberry rust; and
- ensuring all non-conforming produce is identified and controlled to prevent mixing with conforming produce.

Packed Product Controller is responsible for:

- sampling and inspecting for freedom from visible symptoms of blueberry rust, soil and plant debris;
- identifying all sample packages;
- taking corrective action following the identification of non-conforming produce in any sample package; and
- maintaining records of packed produce inspection.

6. REQUIREMENTS

Pesticides Act 1999

There may be additional requirements, including records which must be kept, that a Business must meet under the Pesticides Regulation 2009 of the *Pesticides Act 1999* that are not specified in this ICA Procedure.

Host produce certified under this ICA Procedure must comply with the following:

(a) a program of cover sprays consisting of a combination of the chemicals applied in accordance with all the requirements of 6 (a) (i), (ii) and (iii) below, where a minimum of two cover sprays of two different chemicals have been applied in succession, with the second of the two sprays being applied within 14 days of harvest:

(i) 32 mL of a concentrate containing 250 g/L Propiconazole per 100 L of water:

A. applied at 14 day intervals; and

B. via high volume sprayer as per label or APVMA Permit requirements; or;

(ii) 200 g of a concentrate containing 750 g/kg Mancozeb per 100 L of water or 2 kg/ha applied at 10-14 day intervals from early bloom as per label or APVMA Permit requirements; or;

(iii) a maximum of three applications of 125 - 150 g/100 L or 1.25 - 1.5 kg/ha of 252 g/kg Boscalid and 128 g/kg Pyraclostrobin:

A. applied at 7-14 day intervals as per label or APVMA Permit requirements; and

(b) harvest inspected and found free from blueberry rust; and

(c) post-harvest inspected and found free of plant debris and soil.

The Business must use products in accordance with the instructions included on the product's approved Permit and label, including any first aid, safety, protection, and storage and disposal directions.

Some produce may be damaged by chemical treatments. Businesses applying chemical treatments should check with experienced persons for any available information. Testing of small quantities is recommended.

Following the treatment requirements in this Procedure does not absolve the Business from the responsibility of ensuring that any pesticide run-off is fully contained and managed within the property.

The Department maintains the right to inspect at any time certified produce and to refuse to accept a certificate where the produce is found not to conform to specified requirements.

7. PROCEDURE – PART A

Part A – Covers grower activities.

7.1 Property Plan

A Property Plan (Attachment 2) must be provided with the Application for Accreditation of the Business for each block/land holding on which host produce is grown and pre-harvest treated for certification under this Procedure.

The Property Plan must include the following:

(a) location of all the blocks on which the host produce is grown; and

(b) Block Reference Code or Number used to identify each block; and

(c) variety and number of plants in the block; and

(d) road access including street name/s; and

(e) internal roadways within the property; and

(f) location and identification of buildings (for example, house, packing shed, equipment sheds); and

(g) whether it is intended to certify host produce harvested from the block under the ICA arrangement.

If any changes occur to the property plan information, a new Property Plan must be submitted to the Certification Assurance Records Officer.

7.2 Treatment – pre-harvest cover spraying

7.2.1 Cover spray equipment calibration

The **Treatment Operator** must carry out spray application calibration tests on pre-harvest spraying equipment prior to the commencement of the season and within 28 days of commencement of treatment. Water without concentrate added may be used in these calibration tests.

Application rate calibration tests may be carried out using the following method:

(a) **Dynamic calibration**

(i) Fill the spray tank with water. With pump operating at normal speed, check all nozzles. Collect and record the output of every nozzle for a given time (for example, for one minute) using an accurate measuring cylinder. Replace any nozzle with more that 10% variation from the manufacturers output specification.

(ii) Calculate the effective spraying width of the boom in metres -

- for broadcast spraying, use the number of nozzles x the nozzle spacing;
- for band spraying, add the bandwidths;
- for bed spraying, add the bed widths.

(iii) Divide effective spraying width into 100 for the distance in metres to travel in the calibration run (100 m2).

(iv) Accurately mark out this distance in the field, using stakes or pegs.

(v) Re-fill the spray tank with water to the maximum mixture level mark or an incremental volume mark.

(vi) Mark the position of the tractor so that you can return to exactly the same position after the calibration run, ensuring the spray tank has the same level of alignment for accurate measurement of the spray volume used.

(vii) Spray out over the measured distance at the same pressure, same engine RPM, gear and the same ground surface as in your field spraying.

(viii) Return to the exact starting position and refill tank to the same mark, measuring the volume of water required.

(ix) Multiply the number of litres to refill the tank by 100 to give the number of litres the spray will apply per hectare.

(b) **Spot checking**

(i) Divide the volume of spray used (in Litres) by the area treated (in hectares) in a given application.

(ii) If the actual application rate varies by more than 10% from the calculated application rate the spray equipment must be re-calibrated.

The Treatment Operator must carry out regular checks of the spraying equipment to ensure it continues to operate effectively and remains free from malfunction, blockages, damage or excessive wear.

7.2.2 Pre-harvest spray application calibration records

Records of spray equipment calibration tests must be maintained by the Treatment Operator which records the name of the person conducting the test, the date of the test and the results.

Results of testing must include the full calculations used to determine the application rate of the spray equipment.

An example of an Equipment Application Calibration Test Record is shown in Attachment 3.

7.2.3 Cover spray mixture preparation

The Treatment Operator must prepare the chemical mixture at least daily, or more frequently as required.

Using a clean graduate measuring vessel, measure the amount of concentrate required for the required volume of mixture. Suitable measuring vessels include graduate plastic or glass measuring cylinders.

Add the required amount of concentrate to the spray tank in accordance with the manufacturer's directions on the label. Fill the spray supply tank with clean water to the incremental volume mark or maximum mixture level mark.

Ensure that the chemical is completely diluted in all of the water by mixing the tank for a minimum of two minutes before commencing the spray operation. Some equipment may require extended periods of mixing to fully dilute the chemical in the water.

Spray equipment must have a means of continuous mixing of the spray mixture in the spray tank throughout the spray operation to avoid settling or separation of the concentrate. This can be achieved by mechanical mixing devices in the spray tank, or agitation from spray mixture returned via a by-pass from the spray pump.

> Host produce from treated blocks should not be harvested until the specified withholding period has been complied with after the cover spray application.

7.2.4 Cover spray mixture preparation and treatment records

The Treatment Operator must record details of all cover spray mixture preparation and pre-harvest treatment using a 'Cover Spray Mixture Preparation and Treatment Record' (Attachment 4).

The 'Cover Spray Mixture Preparation and Treatment Record' must identify:

(a) the date and time of cover spray mixture preparation and application; and

(b) the trade name of the concentrate used; and

(c) volume of concentrate used (millilitres or grams) in the spray mixture; and

(d) the total volume (litres) of the made up spray mixture; and

(e) any other pesticide or additives in the spray mixture; and

(f) calibrated (Y/N); and

(g) the spray equipment used; and

(h) type of host produce; and

(i) the block/s treated; and

(j) the number of blocks/hectares sprayed; and

(k) the identification of the Treatment Operator.

7.2.5 Cover spray application

The Treatment Operator must undertake pre-harvest cover spraying of all blueberries on the property as per the label or Permit requirements. Cover sprays must begin prior to harvest and continue until the end of harvest.

7.3 Harvesting

The **Certification Controller** must oversee the harvest process to ensure only treated produce is harvested for certification under this Procedure.

7.3.1 Identification of blocks of produce

A Business with blocks of treated and untreated host produce must identify the treatment status of blocks to prevent mixing of treated and untreated host produce.

Examples of acceptable methods of identifying treated and untreated blocks include:

(a) signs indicating both treated and untreated blocks; or

(b) colour markers indicating treated and untreated blocks.

Other methods may be used provided they clearly identify treated and untreated blocks and are acceptable to the auditor.

7.3.2 Identification of treated and untreated produce at harvest

A Business that maintains treated and untreated blocks of host produce must identify the treatment status of harvested produce to prevent mixing of treated and untreated host produce.

Examples of acceptable methods of identifying treated and untreated host produce include:

(a) using picking trays which differ in colour for treated and untreated host produce; or

(b) using picking trays which differ significantly in appearance for treated and untreated produce.

Other methods may be used provided they clearly identify treated and untreated host produce at harvest and are acceptable to the auditor.

7.4 Harvest inspection – blueberry rust

A harvest inspection for blueberry rust must be undertaken and a 'Harvest Inspection Record' (Attachment 5) must be completed prior to the completion of a PHAC (Attachment 9) and delivery to the packer.

7.4.1 Inspection equipment

The Business must maintain the following inspection equipment:

(a) adequate illumination; and

(b) a hand lens, dissection microscope or other device that provides at least X10 magnification.

7.4.2 Inspection procedure

Pickers shall remain alert for evidence of rust infection in treated host produce harvested for certification under this Procedure. Any host produce showing symptoms of blueberry rust must be rejected and retained in suitably marked reject bins or other receptacles for inspection by the Harvest Supervisor.

The **Harvest Supervisor** must complete the inspection of blueberries as follows:

(a) inspect a random selection of 600 pieces of host produce from each variety, each day of harvest to look for signs of infestation. (Attachment 10 - Symptoms of blueberry rust infestation); and

(b) host produce received from multiple growers, or blocks, must have undergone a separate 600 piece inspection for each day of harvest.

The Harvest Supervisor must immediately advise the Certification Controller on detection of rust infection.

> NOTE: It is recommended that each Business set up an inspection station consisting of a dissection microscope and adequate illumination, and that berries are examined in batches under the microscope for signs of rust (Attachment 10).

7.4.3 Harvest inspection records

The Harvest Supervisor must maintain a record of harvest inspection of host produce. Harvest inspection records shall be in the form of a ‘Harvest Inspection Record’ (Attachment 5) or records which capture the same information.

Harvest inspection records must include:

(a) the date of inspection; and

(b) the Interstate Produce (IP) number of the Business that grew and pre-harvest treated the host produce; and

(c) the block/s from which the produce was harvested; and

(d) the cultivar; and

(e) the number of punnets or other packs harvested; and

(f) the number of blueberries examined; and

(g) the presence or absence of blueberry rust and details; and

(h) the Harvest Supervisor’s name and signature.

7.4.4 Detection of non-conforming produce at harvest

The **Certification Controller** must ensure that the following actions occur if any blueberry rust infected fruit is found:

(a) all host produce harvested from the source block on the day of the detection shall be rejected for certification under this ICA Procedure; and

(b) all host produce from the source block(s) shall be rejected for certification under this ICA Procedure until:

  (i) at least seven days have elapsed after the source block(s) had received a pre-harvest cover spray (not counting repeat spraying if rain occurs within two hours of spraying) with a pesticide according to Section 6 Requirements; and

(c) the detection shall be reported to the Department’s Certification Assurance Supervisor for the district within 24 hours so an investigation of the cause may be carried out and any problems rectified.

7.4.5 Rejected produce

After sorting and removal of infected host produce, rejected produce must be isolated and may be consigned to markets that do not require certification of treatment and/or inspection for blueberry rust.

7.5 Plant Health Assurance Certificate

A Business which pre-harvest treats produce that is to be packed and certified by another Business must be accredited under PART A of this Procedure.

The accredited Business must provide the packing Business with a completed PHAC (Attachment 9) with each delivery (lot) of produce supplied for certification under this ICA Procedure.

The Harvest Supervisor must ensure a PHAC is completed and signed by an Authorised Signatory prior to the consignment being dispatched.

PHACs must be completed, issued and distributed in accordance with the Work Instruction *WI-01 Guidelines for the completion of Plant Health Assurance Certificates*.

PHACs must include:

(a) in the ‘Accredited Business that Prepared the Produce’ section, the name and address of the Accredited Business that packed and inspected the host produce; and

(b) in the ‘Grower’ section, the name and address of the property on which the host produce was grown, pre-harvest treated and harvest inspected; and

(c) in the ‘Consignment Details’ section,

    (i) the number and type of packages in the consignment; and

    (ii) in the *‘Type of Produce’* column, a description of the host produce; and

(d) in the ‘Treatment Details’ section, the details of the last pre-harvest treatment applied to the source block or blocks in which the host produce was grown; and

(e) in the ‘Additional Certification’ section the statement “inspected during harvest and found free of blueberry rust.”

The Business must not issue a PHAC for host produce owned by another Business. An individual PHAC must be issued to cover each consignment to avoid splitting of consignments.

Books of pre-printed PHACs are available from ICA Records Management, Department of Primary Industries, phone 02 6552 3000. Upon suspension, cancellation or withdrawal of accreditation, the PHAC book must be immediately returned to the Department.

A PHAC is not required where the Business that grows and pre-harvest treats and inspects the host produce is the same Business that packs, inspects, certifies and dispatches the host produce under this Procedure.

8. PROCEDURE – PART B

Part B – Covers the packer activities of host produce receival, grading and packing, post-harvest inspection and certification.

8.1 Facility Plan

A Facility Plan must be provided with the Application for Accreditation of the Business for the approved facility (Attachment 2).

The Facility Plan must include the location and identification of buildings and facilities including:

(a) loading docks; and

(b) packed product receival areas; and

(c) segregated storage areas; and

(d) produce grader; and

(e) sorting/packing lines; and

(f) quality inspection areas; and

(g) cool rooms; and

(h) for each location identified on the plan, the name of the location or location code used to identify the location; and

(i) road access including street names; and

(j) internal roadways.

A copy of the Facility Plan must be included with the Application for Accreditation of the Business.

8.2 Receival of produce

The **Produce Receival Officer** must ensure the following:

(a) all host produce received for certification under this Procedure is supplied by a grower accredited under Part A; and

(b) where the Business receives treated and untreated produce, the treatment status of the host produce is clearly identified at receival by the packing facility to prevent mixing of treated and untreated produce; and

(c) each delivery of host produce supplied by another Business is accompanied by a PHAC (Attachment 9). A PHAC is required for each day for each block supplying produce for certification under this Procedure; and

(d) host produce supplied for certification has undergone pre-harvest treatment in accordance with Part A of this Procedure; and

(e) grower identification and pre-harvest treatment details are maintained for all host produce received and certified under this Procedure; and

(f) host produce is segregated or secured upon arrival to ensure host produce does not mix with untreated produce; and

(g) a 'Record of Receipt' (Attachment 6), or similar record which captures the same information, is maintained by the Business. The record must include the following information:

    (i) name and IP number of the Business; and

    (ii) receipt record number; and

    (iii) PHAC number; and

    (iv) PHAC received (Y/N); and

    (v) date of receipt; and

    (vi) produce type; and

    (vii) quantity; and

    (viii) Produce Receival Officer's name and signature.

Any host produce received that is not clearly identified as treated must be regarded as non-treated, and rejected and managed as untreated host produce for the purpose of this Procedure.

The Business must maintain copies of all declarations received from growers whose host produce is packed and certified under this Procedure.

8.3 Grading and packing

All blueberries graded and packed for certification under this Procedure shall be inspected for evidence of soil and plant debris during the normal grading and packing process.

The Certification Controller shall oversee the grading and packing process to ensure only conforming fruit is packed for certification under this Procedure.

8.4 Packed product inspection – soil and plant debris

The **Packed Product Controller** shall continually monitor the grading and packing process by selecting a sample for examination from the packed product.

The Packed Product Controller shall advise the Certification Controller of any problems or potential problems detected in these samples so that corrective action can be implemented.

Packed Product Inspection may be carried out as an:

(a) in-line inspection during grading and packing; or

(b) end-point inspection following assembly of a consignment.

The Packed Product Controller shall ensure that packed product is assembled in an orderly fashion so product packed since the last sample can be easily identified.

8.4.1 Sample selection

The Packed Product Controller shall select a minimum of 2% of packages (one in every 50 packages) or part thereof.

In-line Inspection

Samples shall be selected at random from the final packed product as it leaves the packing line.

End-point Inspection

Samples shall be selected at random from the consignment following consignment assembly.

8.4.2 Examination of the sample

The Packed Product Controller shall carry out an inspection of the package for evidence of soil and plant debris.

8.4.3 Identification of sample packages

Sample packages shall be sequentially numbered during the day of packing.

The Packed Product Controller shall identify each sample package with a Packed Product Sample number (PPS No.) by placing either a stamp or sticker bearing the lettering PPS No. on the exposed end of the package, then marking on or below the identifier the sequential sample number and their initials.

Where consignments are palletised, the sample packages examined by the Certification Controller shall be stacked on the pallet with the PPS No. visible on the outside of each pallet packed for certification under this Procedure.

An example of a PPS No. stamp or sticker is shown in Attachment 8.

8.4.4 Action following identification of non-conforming packed product

The Certification Controller shall be notified of any rejection. The Certification Controller shall advise the grading and packing staff of the non-conformance and conduct an investigation to identify the cause.

8.4.5 Detection of soil and plant debris during packed product inspection

If any sample package contains soil or plant debris, the Packed Product Controller shall for:

(a) **in-line inspection** -

- (i) reject the sample package; and
- (ii) withdraw and isolate all packed product on incomplete pallets at the time of inspection; and
- (iii) stop the packing line.

Once any problems have been identified and rectified, grading and packing may re-commence on to new pallets.

The Packed Product Controller shall note in the “Comments” section of the ‘Packed Product Inspection Record’ (Attachment 7) next to the entry for the sample package which failed inspection, the reason for failure and the number of withdrawn packages.

Following resumption of grading and packing, the Packed Product Controller shall select an additional one sample package in every 50 packages from the withdrawn pallets. The Packed Product Controller shall examine the three sample packages for soil or plant debris.

Sample packages shall be given the next PPS numbers after the sample package which initially failed inspection. The inspection results shall be entered on the ‘Packed Product Inspection Record’.

If all sample packages are found to conform, the withdrawn pallets and the sample packages may be passed for certification and returned to the pallet assembly point.

If any of the sample packages contain soil or plant debris, the withdrawn pallets and the sample packages shall be rejected.

(b) **end-point inspection** -

If any soil or plant debris is found in a sample package the entire pallet shall be rejected.

The Packed Product Controller shall note in the “Comments” section of the ‘Packed Product Inspection Record’ (Attachment 7) next to the entry for any sample package which failed inspection, the reason for failure and the number of packages on the rejected pallet.

8.4.6 Rejected product

Rejected packages shall be isolated and clearly identified to prevent mixing with conforming packages.

The Packed Product Controller shall select an additional one sample package in every 50 packages each of the withdrawn pallets. The Packed Product Controller shall examine the three sample packages for soil or plant debris.

Sample packages shall be given the next PPS numbers after the sample package which initially failed inspection. The inspection results shall be entered on the ‘Packed Product Inspection Record’.

If all sample packages are found to conform, the withdrawn pallets and the sample packages may be passed for certification and returned to the pallet assembly point.

If any of the sample packages contain soil or plant debris, the withdrawn pallets and the sample packages shall be rejected.

Rejected packages must be re-graded, re-packed and re-inspected in accordance with this Section prior to certification under this Procedure.

Alternatively, rejected packages may be treated and certified in accordance with an alternative quarantine entry condition, or consigned to markets that do not require certification for absence of soil or plant debris.

8.4.7 Packed product inspection records

The Packed Product Controller shall maintain records of the results of packed product inspection.

Packed product inspection records shall be in the form of a ‘Packed Product Inspection Record’ (Attachment 7) or a record which captures the same information.

Packed product inspection records must include:

(a) the name and Interstate Produce Number (IP No.) of the Business that operates the approved facility in which the blueberries were packed; and

(b) the host produce type; and

(c) the date of inspection of the sample package; and

(d) PHAC number; and

(e) the sample package sequential number (PPS No.); and

(f) the type of inspection undertaken (in-line or end-point); and

(g) the inspection result for the sample package; and

(h) details of any soil or plant debris detected during inspection; and

(i) the number of any withdrawn or rejected packages; and

(j) the inspection results and follow-up action by the Certification Controller following withdrawal; and

(k) the Packed Product Controller’s name and signature.

8.5 Dispatch

8.5.1 Package identification

The **Authorised Dispatcher** must ensure that, prior to issuing a PHAC, each package intended for certification under this Procedure is marked in indelible and legible characters of at least 5 mm with:

(a) the IP No. of the Business that operates the approved facility in which the host produce was packed; and

(b) the words “Meets ICA-31”; and

(c) the date (or date code) on which the host produce was packed; and

(d) the IP No. or other identifier of the grower of the produce, where the grower is a different Business to the packer.

Where the packer uses a different identifier to the IP No. of the grower, the packer must maintain a Grower Identifier Record that matches the grower identifier with the grower’s name or IP No. so that the grower can be easily identified if required.

Any packages containing host produce that has not been prepared in accordance with the requirements of this Procedure must not be marked as stated above.

8.5.2 Plant Health Assurance Certificates

The Authorised Dispatcher must ensure a PHAC (Attachment 9) is completed and signed by an Authorised Signatory prior to the consignment being dispatched.

Assurance Certificates must be completed, issued and distributed in accordance with the work instruction *WI-01 Guidelines for the completion of Plant Health Assurance Certificates*.

Assurance Certificates must include:

(a) in the ‘*Accredited Business that Prepared Produce*’ section, the name and address of the Accredited Business that treated and inspected the blueberries; and

(b) in the ‘*Grower*’ section, the name and address of the property on which the blueberries were grown. Where the consignment contains blueberries from a number of growers the word “VARIOUS” must be used; and

(c) in the ‘*Consignment Details*’ section,; and

    (i) the number and type of packages in the consignment; and

    (ii) in the ‘*Type of Produce*’ column, a description of the blueberries.

The Business must not issue a PHAC for blueberries owned by another Business. An individual PHAC must be issued to cover each consignment to avoid splitting of consignments.

Books of pre-printed PHACs are available from ICA Records Management, Department of Primary Industries, phone 02 6552 3000. Upon suspension, cancellation or withdrawal of accreditation, the PHAC book must be immediately returned to the Department.

8.5.3 PHAC distribution

The **original** (yellow copy) must accompany the consignment.

The **duplicate** (white copy) must be retained by the accredited Business.

9. RECORDS AND DOCUMENT CONTROL

9.1 ICA system records

The Business must maintain the following records, or similar, which record the same information:

Under PART A

(a) a current ‘Property Plan’ (Attachment 2); and

(b) ‘Equipment Application Calibration Test Record’ (Attachment 3); and

(c) ‘Cover Spray Mixture Preparation and Treatment Record’ (Attachment 4); and

(d) ‘Harvest Inspection Record’ (Attachment 5); and

(e) the duplicate copy of each PHAC issued under this Procedure (Attachment 9).

Under PART B

(a) a copy of the 'Facility Plan' (Attachment 2); and

(b) a copy of each PHAC received (Attachment 9); and

(c) 'Record of Receipt' (Attachment 6); and

(d) 'Packed Product Inspection Record' (Attachment 7); and

(e) Packed Product Sample Number (Attachment 8 example); and

(f) the duplicate copy of each PHAC issued under this Procedure (Attachment 9).

Records must be retained for at least 4 years from completion.

Records shall be made available on request to an Authorised Person.

9.2 ICA system documentation

The Business must maintain the following documentation:

(a) a current copy of the ICA Procedure; and

(b) a current Certificate of Accreditation.

Documentation must be made available on request to an Authorised Person.

10. ATTACHMENTS

Attachment 1	Application for Accreditation as a Biosecurity Certifier
Attachment 2	Property Plan, Facility Plan
Attachment 3	Equipment Application Calibration Test Record
Attachment 4	Cover Spray Mixture Preparation and Treatment Record
Attachment 5	Harvest Inspection Record
Attachment 6	Record of Receipt
Attachment 7	Packed Product Inspection Record
Attachment 8	Example of a Packed Product Sample Number (PPS No.)
Attachment 9	Plant Health Assurance Certificate (PHAC)
Attachment 10	Symptoms of blueberry rust infestation

Application for accreditation as a Biosecurity Certifier

A business seeking to become accredited or renew accreditation for an ICA or CA arrangement must complete and lodge an application for accreditation using the prescribed form and paying the application fee.

The application form can be accessed at:

http://www.dpi.nsw.gov.au/biosecurity/plant/ica under the heading Resources

Alternatively, contact ICA Records Management:

Phone: 02 6552 3000

Fax: 02 6552 7239

Email: *ica.scheme@dpi.nsw.gov.au*

Property Plan – ICA-31

Grower Name:		
Property Address:		

The Property Plan is to include the following:

(a) location of all the blocks on which the produce is grown;

(b) Block Reference Code or Number used to identify each block;

(c) variety and number of plants in the block;

(d) road access including street name/s;

(e) internal roadways within the property;

(f) location and identification of buildings (for example, house, packing shed, equipment sheds); and

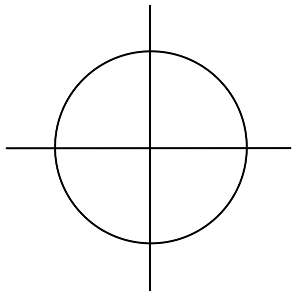
(g) whether it is intended to certify produce harvested from the block under the ICA arrangement.

Note: A Property Plan (overleaf) must be included for each property covered by the Interstate Certification Assurance arrangement of the Business.

Complete the following details for each block shown on the Property Plan:

Block Reference Code or No.	**Variety**	**Number of plants**	**For certification** (Y/N)

Property Plan – ICA-31



Indicate North

ATTACHMENT 2

Facility Plan – ICA-31

Business Name:	
Property Address:	

The Facility Plan is to include the following:

(a) loading docks; and

(b) packed product receival areas; and

(c) segregated storage areas; and

(d) produce grader; and

(e) sorting / packing lines; and

(f) quality inspection areas; and

(g) cool rooms; and

(h) for each location identified on the plan, the name of the location or location code used to identify the location; and

(i) road access including street names; and

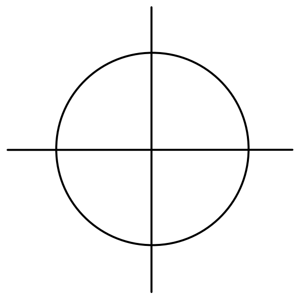
(j) internal roadways.

Note: A Facility Plan (overleaf) must be included for each property covered by the Certification Assurance arrangement of the Business.

Complete the following details for each location shown on the Facility Plan:

Reference Code or No. on Plan	**Location name** (e.g. Cold-room)	**Size**	**Secure** (Y/N)

Facility Plan – ICA-31



Indicate North

ATTACHMENT 2

Equipment Application Calibration Test Record

Date of test	No. of nozzles	Output for individual nozzles (litres/minute/nozzle)	Effective spray width (metres)	Calibration run (metres)	Litres used in run (L/run)	Application rate (L/ha)	Testing Officer’s name

Cover Spray Mixture Preparation and Treatment Record

Mixture Preparation						Treatment Application				
Date and time of preparation and application	**Volume/Weight of concentrate** (mL or g)	**Total volume of mixture** (L)	**Trade name of concentrate**	**Other adjuvant**	**Calibrated** (Y/N)	**Treatment equipment used**	**Type of host produce**	**Number of blocks treated**	**Treatment Operator**	
									Name	Signature

Harvest Inspection Record

Pick Date	Grower IP No.	Source block	Cultivar	Number of punnets/packs harvested	Number inspected	Rust present (Y/N)	Details	Harvest Supervisor	
								Name	Signature

Record of Receipt

Business Name:		N					Record No.:	

PHAC Number(s)	Pre-harvest Treatment and Harvest Inspection Declaration (Y/N)	Date of Receipt	Produce Type	Quantity	Produce Receival Officer	
					Name	Signature

ATTACHMENT 6

Packed Product Inspection Record

Business Name		**IP Number:**	
Host produce type			

Date of inspection	**PHAC No.**	**PPS No.**	**Type of inspection**		**Free of rust**		**Comments**	**Free of soil and debris**		**Packed Product Controller**	
			In-line	End-point	Yes	No	Note any problems detected during inspection and the number of any withdrawn or rejected packages	Yes	No	Printed Name	Signature

Example of Packed Product Sample Number

Marking sample packages after Packed Product Inspection

Following inspection, the Packed Product Controller must:

(a) mark one end of each sample package by applying a stamp or sticker with the PPS Number (Packed Product Sample Number) and their initials as shown below; and

(b) ensure that the PPS Number stamp or sticker is visible on the exposed end of the package when the package is assembled on the pallet.

Stamp or Sticker Design (Example Only)

PPS NO.

Completed Stamp or Sticker (Example Only)

PPS NO.

22 RB.

Certificate Number	

Business Specific Information*

Dispatch Date: / / Ref No:

Arrival Date: / / PO No:

* These items display business specific information entered at the discretion of the consignor. They do not represent any part of the certifying conditions of the produce.

NSW GOVERNMENT | Department of Primary Industries

Plant Health Assurance Certificate

A biosecurity certificate issued under Part 13 of the *NSW Biosecurity Act 2015*

All accreditation details must be completed. Please print clearly and initial any alterations.

Consignment Details

Consignor

Name:

Address:

State: Postcode:

Consignee

Name:

Address:

State: Postcode:

Reconsigned to: (If applicable)

Splitting consignments, preparing composite lots or reconsigning whole consignments

Name:

Address:

State: Postcode:

Certification Details

IP Number	Facility Number	Procedure
N		

Accredited Business that prepared produce

Name:

Address:

State: Postcode:

Grower(s) (If more than one grower – attach list)

Name:

Address:

State: Postcode:

	Number of Packages	Type of Packages (e.g. trays, cartons)	Type of Produce	Brand Name or identifying marks (as marked on packages)	Date Code (as marked on packages)	Authorisation for reconsignment
1						
2						
3						
4						

Treatment Details

	Treatment Date	Treatment Chemical (Active Ingredient), Concentration, Duration, Temperature
1	/ /	
2	/ /	
3	/ /	
4	/ /	

Additional Certification/Codes:

This certificate is valid for 21 days from date of certification

Declaration

I am a person authorised under the *NSW Biosecurity Act 2015* to issue this biosecurity certificate and I hereby certify that the details shown above are true and correct and the procedure(s) listed above have been completed.

Full name *Signature* *Date*

Note: A person who provides false or misleading information on a biosecurity certificate is guilty of an offence under the Act. Such action could result in a penalty infringement notice or prosecution. The maximum penalty for an individual is $1,100,000, and the maximum penalty for a corporation is $2,200,000. This information is collected by the collecting agency identified in this form in relation to its functions under the Biosecurity Act 2015. This agency/s and the NSW Department of Industry may use and disclose this information as reasonably necessary for the purpose of performing biosecurity risk functions under, or reasonably contemplated by, the Biosecurity Act 2015.

ATTACHMENT 9

Symptoms of Blueberry Rust Infestation

Figure1. Sunken lesions around calyx of berry and yellow flecking.

Figure 2. Sunken lesion displaying yellow flecking (rust pustules) adjacent to calyx.

Symptoms of Blueberry Rust Infestation

Figure 3. Rust pustules on lesion adjacent to calyx of berry.

Appendix R

INTERNATIONAL STANDARDS FOR PHYTOSANITARY MEASURES

ISPM No. 2

GUIDELINES FOR PEST RISK ANALYSIS

(1995)

Produced by the Secretariat of the International Plant Protection Convention

CONTENTS

ENDORSEMENT

The following standard was endorsed by the 28th Session of the FAO Conference in November 1995.

INTRODUCTION

SCOPE

This standard describes the process of pest risk analysis for plant pests for the purpose of preparing phytosanitary regulations by National Plant Protection Organizations.

REFERENCES

FAO Glossary of Phytosanitary Terms, *FAO Plant Protection Bulletin* 38(1), 1990: 5-23.
International Plant Protection Convention, 1992. FAO, Rome.
Principles of plant quarantine as related to international trade, 1995. ISPM No. 1, FAO, Rome.

DEFINITIONS

Definitions of phytosanitary terms used in the present standard can be found in ISPM No. 5 (*Glossary of phytosanitary terms*).

OUTLINE OF REQUIREMENTS

Pest risk analysis (PRA) consists of three stages: initiating the process for analyzing risk, assessing pest risk, and managing pest risk (See Figures 1-3).

Initiating the process involves identification of pests or pathways for which the PRA is needed. Pest risk assessment determines whether each pest identified as such, or associated with a pathway, is a quarantine pest, characterized in terms of likelihood of entry, establishment, spread and economic importance. Pest risk management involves developing, evaluating, comparing and selecting options for reducing the risk.

PRA is only meaningful in relation to a defined "PRA area" considered to be at risk. This is usually a country, but can also be an area within a country, or an area covering all or parts of several countries [e.g. the area covered by a Regional Plant Protection Organization (RPPO)].

GENERAL REQUIREMENTS FOR PEST RISK ANALYSIS (PRA)

1. STAGE 1: INITIATING THE PRA PROCESS

There are generally two initiation points for a pest risk analysis (see Figure 1):

- the identification of a pathway, usually an imported commodity, that may allow the introduction and/or spread of quarantine pests
- the identification of a pest that may qualify as a quarantine pest.

Either can involve pests already present in the PRA area but not widely distributed and being officially controlled, as well as pests absent from the PRA area, since both are covered by the quarantine pest definition.

1.1 PRA Initiated by a Pathway

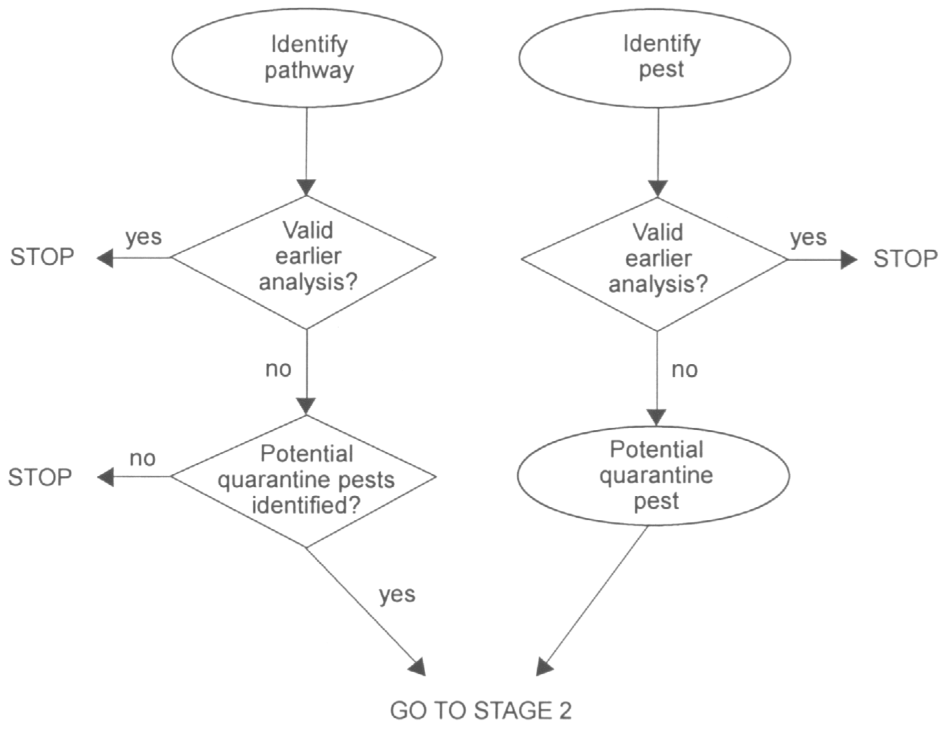
A requirement for a new or revised PRA originating from a specific pathway will most frequently arise in the following situations:

- International trade is initiated in a new commodity (usually a plant or plant product) or a commodity from a new origin. The PRA may be triggered by a request for import, or by the appearance in trade of consignments of a commodity. The pathway may concern a single area of origin or several.
- New plant species are imported for selection and scientific research purposes
- A pathway other than commodity import is identified (natural spread, mail, garbage, passenger's baggage etc.)
- A policy decision is taken to establish or revise phytosanitary regulations or requirements concerning specific commodities
- A new treatment, system or process, or new information impacts on an earlier decision.

FIGURE 1

PEST RISK ANALYSIS

Stage 1: Initiation



The pests which are likely to follow the pathway (e.g. be carried by the commodity) are then listed, and each is then subjected to Stage 2 in the PRA process[1]. If no potential quarantine pests are identified as likely to follow the pathway, the PRA stops at this point.

1.2 PRA Initiated by a Pest

A requirement for a new or revised PRA originating from a specific pest will most frequently arise in the following situations:

- An emergency arises on discovery of an established infestation or an outbreak of a new pest within a PRA area
- An emergency arises on interception of a new pest on an imported commodity
- A new pest risk is identified by scientific research
- A pest is introduced into a new area other than the PRA area
- A pest is reported to be more damaging in a new area other than the PRA area itself, than in its area of origin
- Audits reveal that a particular pest is repeatedly intercepted
- A request is made to import, as such, an organism, for example by researchers, educators, biological practitioners, businesses (pet store owners), the food industry (snails for consumption) or hobbyists (aquatic plants for aquaria)
- A policy decision is taken to revise phytosanitary regulations or requirements concerning specific pests
- A proposal is made by another country or by an international organization (RPPO, FAO)
- A new treatment system, process, or new information impacts on an earlier decision.

The specific pest identified is then subjected to Stage 2 in the PRA process.

1.3 Review of Earlier PRAs

Prior to proceeding with a new PRA, a check should be made as to whether the pathway or pest has already been subjected to the PRA process, either nationally or internationally. If a PRA exists, its validity should be checked as circumstances may have changed. The possibility of using a PRA from a similar pathway or pest, that may partly or entirely replace the need for this PRA, should also be investigated.

1.4 Conclusion for Stage 1

At the end of Stage 1, pests have been identified as potential quarantine pests, individually or in association with a pathway.

2. STAGE 2: PEST RISK ASSESSMENT

Stage 1 has identified a pest, or list of pests (in the case of initiation by a pathway), to be subjected to risk assessment. Stage 2 considers these pests individually (see Figure 2). It examines, for each, whether the criteria for quarantine pest status are satisfied:

> "a pest of potential economic importance to the area endangered thereby and not yet present there, or present but not widely distributed and being officially controlled".

In this context, "area" should be understood to mean:

> "an officially defined country, part of a country, or all or part of several countries",

and "endangered area" should be understood to mean:

> "an area where ecological factors favour the establishment of a pest whose presence in the area will result in economically important loss".

In doing so, the PRA considers all aspects of each pest and in particular actual information about its geographical distribution, biology and economic importance. Expert judgement is then used to assess the establishment, spread and economic importance potential in the PRA area. Finally, the potential for introduction into the PRA area is characterized.

In characterizing the risk, the amount of information available will vary with each pest and the sophistication of the assessment will vary with available tools. For example, one country may have elaborate pest databases and geographical information systems, another may depend on books, printed soil maps, and climate maps. In some cases, virtually no information may be available, or research may be needed to obtain it. Assessments will be limited by the amount of information available on the biology of a particular pest. Countries where the pest is present may provide available information for the country conducting the PRA, on request.

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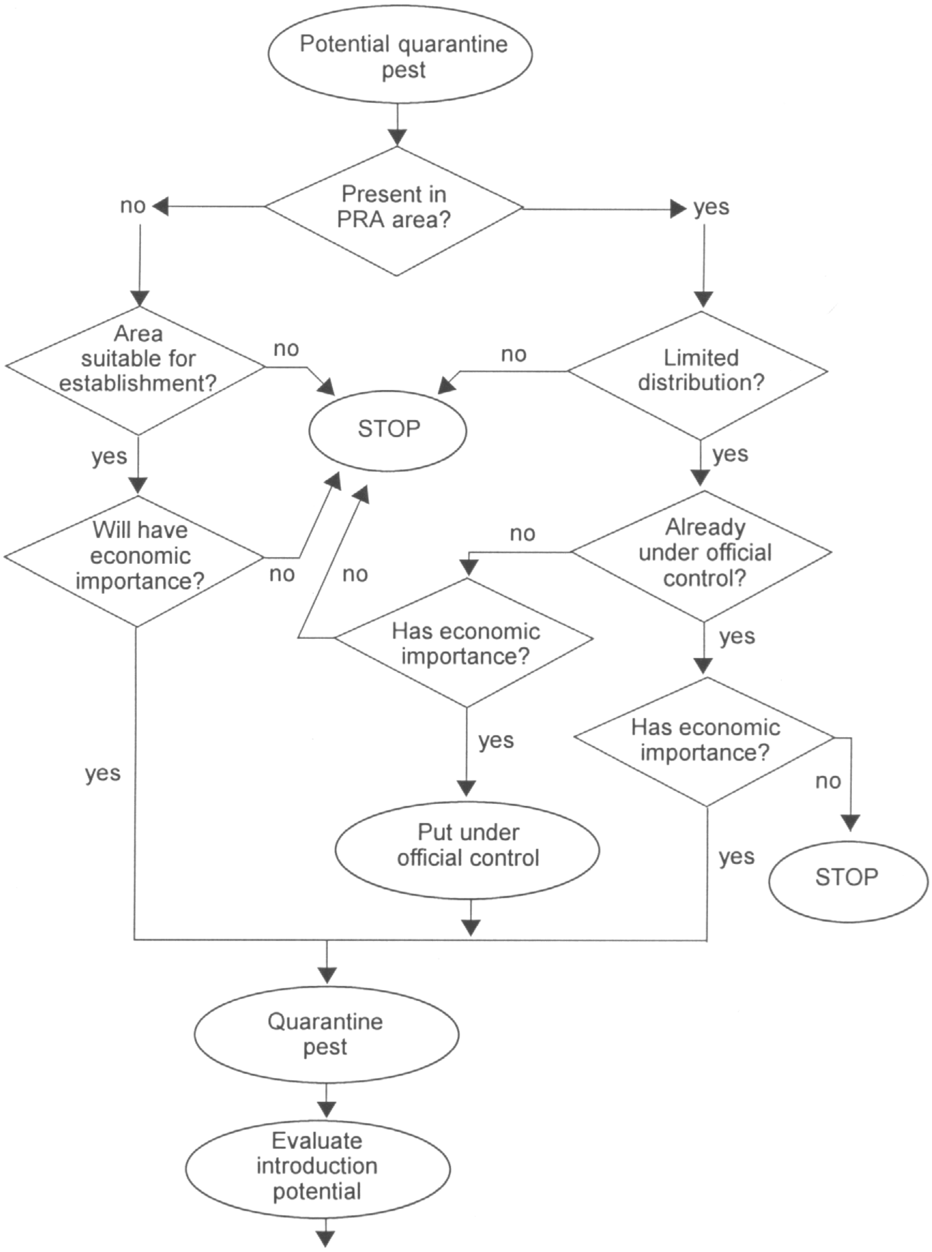
[1] The list of pests may be generated by any combination of databases, literature sources, or expert consultation. Once the list of pests has been established, it is preferable to prioritize it by using expert judgement before the next step. According to the results obtained, it may or may not be necessary to conduct a risk assessment on all pests on the list.

FIGURE 2

PEST RISK ANALYSIS

Stage 2: Assessment



2.1 Geographical and Regulatory Criteria

For each pest subjected to the PRA process, the geographical and regulatory criteria in the quarantine pest definition should be considered:

- If the pest is present in the PRA area and has reached the limits of its ecological range (i.e. is widely distributed), then the pest does not satisfy the definition of a quarantine pest and the PRA for the pest stops at this point
- If the pest is present in the PRA area and has not reached the limits of its ecological range (i.e. not widely distributed), and the pest is subject to official control in the PRA area, then the pest satisfies this aspect of the definition of a quarantine pest
- If the pest is not widely distributed but is under consideration of future official control in the PRA area, then the PRA will determine whether the pest should be placed under official control. If the conclusion is reached that the pest should be subject to official control, then the pest satisfies this aspect of the definition of the definition of a quarantine pest.

- If the pest is not widely distributed but is not subject to official control or consideration of future official control in the PRA area, then the pest does not satisfy the definition of a quarantine pest and the PRA for the pest stops at this point
- If the pest is absent from the PRA area, then it satisfies this aspect of the definition of a quarantine pest.

2.2 Economic Importance Criteria

For potential economic importance to be expressed, a pest must become established and spread. Thus the risk of a pest, having entered, becoming established and spreading in the PRA area must be characterized. The factors to be considered are set out below[2].

2.2.1 Establishment potential

In order to estimate the establishment potential of a pest, reliable biological information (life cycle, host range, epidemiology, survival etc.) should be obtained from the areas where the pest currently occurs.

The situation in the PRA area can then be carefully compared with that in the areas where it currently occurs and expert judgement used to assess the establishment potential. Case histories concerning comparable pests can usefully be considered. Examples of the factors to consider are:

- availability, quantity and distribution of hosts in the PRA area
- environmental suitability in the PRA area
- potential for adaptation of the pest
- reproductive strategy of the pest
- method of pest survival.

If a pest has no potential for establishment in the PRA area, then it does not satisfy the definition of a quarantine pest and the PRA for the pest stops at this point.

2.2.2 Spread potential after establishment

In order to estimate spread potential of the pest, reliable, biological information should be obtained from areas where the pest currently occurs.

The situation in the PRA area can then be carefully compared with that in the areas where the pest currently occurs and expert judgement used to assess the spread potential. Case histories concerning comparable pests can usefully be considered. Examples of the factors to consider are:

- suitability of the natural and/or managed environment for natural spread of the pest
- movement with commodities or conveyances
- intended use of the commodity
- potential vectors of the pest in the PRA area
- potential natural enemies of the pest in the PRA area.

The information on spread potential is used to estimate how rapidly a pest's potential economic importance may be expressed within the PRA area. This also has significance if the pest is liable to enter and establish in an area of low potential economic importance and then spread to an area of high potential economic importance. In addition it may be important in the risk management stage (see Figure 3) when considering the ease with which an introduced pest could be contained or eradicated.

2.2.3 Potential economic importance

The next step in the PRA process is to determine whether the pest is of potential economic importance in the PRA area.

In order to estimate the potential economic importance of the pest, information should be obtained from areas where the pest currently occurs. For each of these areas, note whether the pest causes major, minor or no damage. Note whether the pest causes damage frequently or infrequently. Relate this, if possible, to biotic and abiotic effects, particularly climate.

The situation in the PRA area can then be carefully compared with that in the areas where the pest currently occurs. Case histories concerning comparable pests can usefully be considered. Expert judgement is then used to assess the potential for economic importance. Examples of the factors to consider are:

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[2] Fuller checklists of information which can usefully be considered in assessing the potential for establishment, spread and economic importance, are available from national and international sources.

- type of damage
- crop losses
- loss of export markets
- increases in control costs
- effects on ongoing integrated pest management (IPM) programmes
- environmental damage
- capacity to act as a vector for other pests
- perceived social costs such as unemployment.

If a pest has no potential economic importance in the PRA area, then it does not satisfy the definition of a quarantine pest and the PRA for the pest stops at this point.

2.3 Introduction Potential

The final stage of assessment concerns the introduction potential which depends on the pathways from the exporting country to the destination, and the frequency and quantity of pests associated with them. Documented pathways for the pest to enter new areas should be noted. Potential pathways which may not currently exist should be assessed if known.

The following is a partial checklist that may be used to estimate the introduction potential divided into those factors which may affect the likelihood of entry and those factors which may affect the likelihood of establishment.

Entry:

- opportunity for contamination of commodities or conveyances by the pest
- survival of the pest under the environmental conditions of transport
- ease or difficulty of detecting the pest at entry inspection
- frequency and quantity of pest movement into the PRA area by natural means
- frequency and number of persons entering from another country at any given port of entry.

Establishment:

- number and frequency of consignments of the commodity
- number of individuals of a given pest associated with the means of conveyance
- intended use of the commodity
- environmental conditions and availability of hosts at the destination and during transport in the PRA area.

2.4 Conclusion for Stage 2

If the pest satisfies the definition of a quarantine pest, expert judgement should be used to review the information collected during Stage 2 to decide whether the pest has sufficient economic importance and introduction potential, i.e. sufficient risk, for phytosanitary measures to be justified. If so, proceed to Stage 3; if not, the PRA for the pest stops at this point[3].

3. STAGE 3: PEST RISK MANAGEMENT

Pest risk management (see Figure 3) to protect the endangered areas should be proportional to the risk identified in the pest risk assessment. In most respects it can be based on the information gathered in the pest risk assessment. Phytosanitary measures should be applied to the minimum area necessary for the effective protection of the endangered area.

3.1 Risk Management Options

A list of options for reducing risks to an acceptable level should be assembled. These options will primarily concern pathways and in particular the conditions for permitting entry of commodities. Examples of the options to consider are:

- inclusion in list of prohibited pests
- phytosanitary inspection and certification prior to export
- definition of requirements to be satisfied before export (e.g. treatment, origin from pest free area, growing season inspection, certification scheme)
- inspection at entry
- treatment at point of entry, inspection station or, if appropriate, at place of destination
- detention in post-entry quarantine
- post-entry measures (restrictions on use of commodity, control measures)
- prohibition of entry of specific commodities from specific origins.

[3] Decision-making schemes, or expert systems, may be useful at this stage to assist expert judgement.

They may also, however, concern ways of reducing the risk of damage, for example, introduction of a biological control agent, or ease of eradication or containment.

3.2 Efficacy and Impact of the Options

The efficacy and impact of the various options in reducing risk to an acceptable level should be evaluated, in terms of the following factors:

- biological effectiveness
- cost/benefit of implementation
- impact on existing regulations
- commercial impact
- social impact
- phytosanitary policy considerations
- time to implement a new regulation
- efficacy of option against other quarantine pests
- environmental impact.

The positive and negative aspects of the options should be specified. While it is recognized that countries according to the sovereignty principle may exercise their sovereign right to utilize phytosanitary measures, countries should also take particular note of the "Minimal impact" principle:

> *Phytosanitary measures shall be consistent with the pest risk involved, and shall represent the least restrictive measures available which result in the minimum impediment to the international movement of people, commodities and conveyances.*

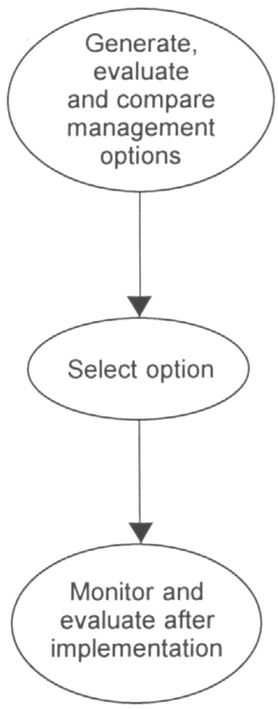
Article VI.2(f) of the International Plant Protection Convention makes a similar but less comprehensive provision. Phytosanitary measures recommended should be based on all of the above factors.

FIGURE 3

PEST RISK ANALYSIS

Stage 3: Management

from Stage 2



In order to determine which options are appropriate, it may be advisable to communicate with interested and affected groups within and outside the PRA area.

3.3 Conclusion for Stage 3

At the end of Stage 3, the appropriate phytosanitary measures concerning the pest or pathway have been decided. Completion of Stage 3 is essential; it is in particular not justified to complete only Stages 1 and 2 and then take phytosanitary measures without proper assessment of risk management options. After implementation of the phytosanitary measures, their effectiveness should be monitored and the risk management options should be reviewed, if necessary.

4. DOCUMENTING THE PRA PROCESS

A PRA should be sufficiently documented so that when a review or a dispute arises, the PRA will clearly state the sources of information and the rationales used in reaching a management decision regarding phytosanitary measures taken or to be taken.

INTERNATIONAL STANDARD FOR PHYTOSANITARY MEASURES 9

Food and Agriculture Organization of the United Nations

International Plant Protection Convention
Protecting the world's plant resources from pests

Appendix S

ISPM 9

ENG

Guidelines for pest eradication programmes

Produced by the Secretariat of the
International Plant Protection Convention (IPPC)

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INTERNATIONAL STANDARDS FOR
PHYTOSANITARY MEASURES

ISPM 9

Guidelines for pest eradication programmes

Produced by the Secretariat of the
International Plant Protection Convention
Adopted 1998; published 2016

Publication history

This is not an official part of the standard

1995-09 TC-RPPOs added topic *Eradication* (1995-001)

1996-05 CEPM-3 added *Guidelines for Eradication Programmes*

1996-12 EWG developed draft text

1997-10 CEPM-4 revised draft text and approved for MC

1998 Sent for MC

1998-05 CEPM-5 revised draft text for adoption

1998-11 ICPM-1 adopted standard

ISPM 9. 1998. *Guidelines for pest eradication programmes*. Rome, IPPC, FAO.

2013-08 IPPC Secretariat applied ink amendments as noted by CPM-8 (2013).

2015-06 IPPC Secretariat incorporated ink amendments and reformatted standards following revoking of standards procedure from CPM-10 (2015).

Publication history last modified: 2015-12.

CONTENTS

Adoption

This standard was adopted by the First Session of the Interim Commission on Phytosanitary Measures in November 1998.

INTRODUCTION

Scope

This standard describes the components of a pest eradication programme which can lead to the establishment or re-establishment of pest absence in an area.

References

The present standard refers to International Standards for Phytosanitary Measures (ISPMs). ISPMs are available on the International Phytosanitary Portal (IPP) at https://www.ippc.int/core-activities/standards-setting/ispms.

IPPC. 1997. *International Plant Protection Convention*. Rome, IPPC, FAO.

Definitions

Definitions of phytosanitary terms used in the present standard can be found in ISPM 5 (*Glossary of phytosanitary terms*).

Outline of Requirements

A programme for pest eradication may be developed by a national plant protection organization (NPPO) as:

- an emergency measure to prevent establishment or spread of a pest following its recent entry (re-establish a pest free area), or
- a measure to eliminate an established pest (establish a pest free area).

After a preliminary investigation that includes the consideration of data collected at the site(s) of detection or occurrence, the extent of the infestation, information on the biology and potential economic impact of the pest, current technology and available resources for eradication, a cost-benefit analysis of the pest eradication programme should be undertaken. Whenever possible, it is also useful to gather information concerning the geographical origin of the pest, and pathways for its reintroduction. Pest risk analysis (PRA) provides a scientific basis for informed decision-making (see ISPM 2 (*Framework for pest risk analysis*)). From these studies, one or more options should be made available to decision-makers. However, in an emergency situation, the benefits of speed of action in preventing spread may outweigh the benefits normally achieved through a more structured approach.

The eradication process involves three main activities: surveillance, containment, and treatment and/or control measures.

When an eradication programme is completed, the absence of the pest must be verified. The verification procedure should use criteria established at the beginning of the programme and should be supported by adequate documentation of programme activities and results. The verification stage is integral to the programme, and should involve independent analysis if trading partners require this reassurance. Successful programmes result in a declaration of eradication by the NPPO. When unsuccessful, all aspects of the programme should be reviewed, including the biology of the pest to determine if new information is available, and the cost-benefit of the programme.

GENERAL REQUIREMENTS

This standard provides guidance on the development of a pest eradication programme and for reviewing the procedures of an existing eradication programme. In most instances, the pests considered for these programmes have newly entered the area where eradication is undertaken, and emergency eradication measures may be needed. However, eradication programmes may also be directed toward established pests or indigenous pests in defined areas.

1. General Information and Planning Processes

1.1 Evaluation of pest reports

NPPOs should systematically evaluate pest reports and the impact of these pests to determine if eradication is required. This evaluation will involve reporting to an official contact point and assessment by experts capable of considering the importance of the pest report and of recommending a course of action.

1.2 Contingency plans

It is desirable to have contingency plans to address specific pests or pest groups that have a high potential for introduction, and for which an eradication plan is deemed to be both feasible and necessary, before the pest is found in an area. The development of such plans is advantageous because it provides additional time for deliberation, evaluation and research necessary to ensure that an eradication programme is well designed and can be executed quickly and effectively. Such plans are particularly important where cooperative programmes are anticipated, as they allow for the actions of cooperating parties to be specified and agreed upon prior to implementing the programme. Knowledge gained from previous successful eradication programmes can be extremely useful for developing contingency plans or judging the feasibility of eradication programmes under consideration. A general contingency plan is also particularly useful for ensuring rapid action in the case of emergency eradication measures.

It should be recognized that the biology of pests varies considerably as do the technologies available for eradication. Therefore, not all the factors listed in this standard for consideration will be of value in planning every eradication programme.

1.3 Reporting requirements and information sharing

Verification of the occurrence of a new pest of immediate or potential danger initiates the process that leads to reporting requirements for the NPPO under the International Plant Protection Convention (see Article VII.2(j) and Article VIII.1(a) and VIII.1(c)) and is described in ISPM 8 (*Determination of pest status in an area*).

Prior to the implementation of a pest eradication programme, public information programmes or other means for sharing information with broader audiences such as growers, residents, and local governments, should be considered for raising the level of awareness and understanding of the programme.

2. Decision to Undertake an Eradication Programme

The decision to undertake an eradication programme results from an evaluation of the circumstances of detection of a pest, its identification, the risk identified by a pest-initiated PRA, estimation of the present and potential distribution of the pest, and assessment of the feasibility of conducting an eradication programme. It is normally good practice to give due consideration to all the elements recommended. However, this approach may be limited in practice by the availability of data and resources. Particularly in cases where emergency eradication measures seem necessary (e.g. recent entry of a pest capable of rapid spread), the need to take action rapidly should be carefully balanced and may outweigh the benefits of more detailed analyses and planning.

2.1 Initiation

The eradication programme may be initiated by detection of a pest new to an area arising from general surveillance or specific surveys (see ISPM 6 (*Guidelines for surveillance*)). In the case of established pests, the eradication programme will be initiated by policy considerations (e.g. a decision taken to establish a pest free area).

2.2 Identification

Accurate identification of the pest is essential so that the appropriate means of eradication can be selected. NPPOs should proceed with the identification process recognizing that it may have to withstand scientific or legal challenge. Therefore, it may be appropriate to have the identification confirmed by acknowledged independent experts.

Identification may be immediate when the pest is easily and confidently recognized by the NPPO.

Identification methods may range from recognition based only on morphological characteristics to more sophisticated bioassay, chemical or genetic analyses. The method ultimately adopted by the NPPO will depend on the organism in question and the most widely accepted and practical means to confirm identification.

In cases where a conclusive identification is not immediately possible, the actions to be taken may be justified by other factors such as the extent of damage to host plants. In these circumstances it is important to conserve specimens for possible future analysis.

2.3 Estimating present and potential pest distribution

An estimate of the present distribution of the pest is necessary for both pests new to an area and established pests. The potential distribution is usually of greater importance for new pests, but may have relevance as well in evaluating established pests. The data elements identified for initial investigation include a level of detail not necessarily required for a programme directed toward established pests.

2.3.1 Initial investigation

Data associated with the detection of a pest new to an area, the geographical origin of the pest, and the pathway, should be compiled and reviewed. This information is not only useful for decision-making related to eradication, but is also helpful for identifying and correcting weaknesses of phytosanitary measures that may have contributed to the entry of the pest.

2.3.1.1 Data gathered at the site of detection or occurrence

Information should be gathered concerning the pest and conditions at the site of detection or occurrence, including:

- geographical location
- hosts infested at the site
- extent and impact of damage and level of pest incidence
- how the pest was detected and identified
- recent imports of plants or plant products
- history of the pest at the place of production or in the area
- movement of people, products, equipment, conveyances
- mechanism of spread within the area
- climatic and soil conditions
- condition of infested plants
- cultivation practices.

2.3.1.2 Geographical origin

To the extent possible, information should be obtained on the country or area most likely to be the origin of the pest. Information concerning countries of re-export or transit may also be considered when attempting to determine the source and pathway.

2.3.1.3 Pathways of the pest

To the extent possible, the NPPO should determine the pathways by which the pest may have entered or spread, to ensure that eradication programmes are not jeopardized by new pest entries, and to help identify potential exclusion options. Pathway information includes identifying the commodities or items that may have carried the pest as well as the possible mode of movement. Where there is a possible association with newly imported plants or plant products, similar material should be located and examined.

2.3.2 Survey for distribution

The preliminary processes should provide sufficient information to determine if a survey is required.

Surveys may be of various types:
- delimiting survey
- survey based on pathway studies
- other targeted surveys.

These surveys should be designed and executed to provide the level of statistical confidence necessary for the results to be meaningful for regulatory purposes.

In cases where survey data are to provide the basis for establishing a pest free area for export purposes, it may be desirable to consult trading partners in advance to determine the quantity and quality of data necessary to meet their phytosanitary import requirements.

2.3.3 Predicting spread

Data collected during a preliminary investigation should be used to estimate the potential for spread and the anticipated rate of spread, and to identify endangered areas.

2.4 Feasibility of undertaking an eradication programme

An estimate of the impact of the pest, the extent of the infested area, the potential for spread, and the anticipated rate of spread is necessary to judge the feasibility of an eradication programme. PRA provides a scientific basis for this estimate (see ISPM 2 and ISPM 11 (*Pest risk analysis for quarantine pests*)). Possible eradication options and cost-benefit factors should also be considered.

2.4.1 Biological and economic information

Information needs to be obtained on:
- pest biology
- potential hosts
- potential spread and anticipated rate of spread
- possible eradication strategies:
  - financial and resource costs
  - availability of the technology
  - logistical and operational limitations
- impact on industry and the environment:
  - without eradication
  - with each eradication option identified.

2.4.2 Conducting cost-benefit analysis for eradication programmes

One of the first actions to be taken is the preparation of a list of the most feasible eradication techniques. The total cost and the cost-benefit ratio for each strategy should be estimated over the short and long term. The option to take no action, or to take a pest management approach, should be considered as well as eradication options.

All feasible options should be described or discussed with decision-makers. Anticipated advantages and disadvantages, including cost-benefit should be outlined to the extent possible. One or more options should be recommended, recognizing that the ultimate decision requires consideration of the technical options, cost-benefit, the availability of resources, and political and socio-economic factors.

3. Eradication Process

The eradication process involves the establishment of a management team followed by the conduct of the eradication programme, which should, where possible, follow an established plan. Three main activities are included in the programme:

- surveillance: to fully investigate the distribution of the pest
- containment: to prevent the spread of the pest
- treatment: to eradicate the pest when it is found.

Direction and coordination should be provided by an official management authority, ensuring that criteria are established to determine when eradication has been achieved and that appropriate documentation and process controls exist to provide sufficient confidence in the results. It may be necessary to consult with trading partners over some aspects of the eradication process.

3.1 Establishment of a management team

A management team should be established to provide direction and coordination to eradication activities once it has been decided to undertake an eradication programme. The size of the management team may vary depending on the scope of the programme and the resources available to the NPPO. Large programmes may require a steering committee or an advisory group including the various interest groups that may be affected. Where a programme includes several countries, a regional steering committee should be considered.

The management team should have responsibility for:

- ensuring that the eradication programme meets the agreed criteria for successful eradication
- formulating, implementing, and modifying as necessary an eradication plan
- ensuring programme operators have appropriate authority and training to undertake their duties
- financial and resource management
- appointing and defining duties of operators, ensuring operators understand their responsibilities, and documenting their activities
- managing communication, including a public relations programme
- communicating with affected parties, e.g. growers, traders, other government departments and non-governmental organizations
- implementing an information management system, including programme documentation and appropriate record-keeping
- daily management of the programme
- continuous monitoring and evaluation of critical elements
- periodic overall programme review.

3.2 Conducting the eradication programme

3.2.1 Surveillance

A delimiting survey should be completed either initially or to confirm earlier surveys. Monitoring surveys should then continue in accordance with the eradication plan to check the distribution of the pest and assess the effectiveness of the eradication programme (see ISPM 6). Surveillance may include a pathway analysis to identify the source of the pest and its possible spread, the inspection of clonally or contact-linked material, inspection, trapping, and aerial observation. This may also include targeted inquiries to growers, those responsible for storage and handling facilities, and the public.

3.2.2 Containment

The NPPO should define a quarantine area using surveillance information. The initial investigations will provide information that is used to identify plants, plant products, or other articles whose movement out of the quarantine area needs to be regulated to prevent the spread of the pest. Owners of affected plants, plant products and other regulated articles should be notified of the regulations. Others interested or affected by regulations should also be provided with adequate information. It may be appropriate to verify compliance using methods described in the eradication plan.

Arrangements should be made for the release of plants, plant products or other regulated articles from the quarantine area, by clearance following verification of compliance with phytosanitary measures such as inspection, treatment or destruction. Provision should be made for the withdrawal of regulations when an eradication programme has been declared to be successful.

3.2.3 Treatment and/or control measures

Measures to eradicate pests may include:

- host destruction
- disinfestation of equipment and facilities
- chemical or biopesticide treatment
- soil sterilants
- leaving land fallow
- host-free periods
- the use of cultivars that suppress or eliminate pest populations
- restriction of subsequent cropping
- trapping, lures or other physical control methods
- inundative release of biological control agents
- use of sterile insect technique
- processing or consumption of infested crop.

In most cases, eradication will involve the use of more than one treatment option. The selection of treatment and/or control options may be limited by legislative restrictions or other factors. In such situations, exceptions for emergency or limited use may be available to the NPPO.

3.3 Verification of pest eradication

The official management authority should verify that the criteria for successful pest eradication established at the beginning of the programme have been achieved. The criteria may specify the intensity of the detection method and how long the survey must continue to verify the absence of the pest. The minimum period of time of pest freedom to verify eradication will vary according to the biology of the pest, but should take into consideration factors such as:

- sensitivity of detection technology
- ease of detection

- life cycle of the pest
- climatic effects
- efficacy of treatment.

The eradication plan should specify the criteria for a declaration of eradication and steps for the withdrawal of regulations.

3.4 Documentation

NPPOs should ensure that records are kept of information supporting all stages of the eradication process. It is essential that NPPOs maintain such documentation in case trading partners request information to support claims of pest freedom.

3.5 Declaration of eradication

A declaration of eradication by the NPPO follows the completion of a successful eradication programme. The status of the pest in the area is then "**absent: pest eradicated**" (see ISPM 8). It involves communication with affected and interested parties, as well as appropriate authorities concerning the fulfilment of programme objectives. Programme documentation and other relevant evidence supporting the declaration should be made available to other NPPOs upon request.

4. Programme Review

Throughout the eradication, the programme should be subject to periodic review to analyse and assess information gathered, to check that objectives are being achieved, or to determine if changes are required. Reviews should take place at:

- any time when unforeseen circumstances are encountered that could affect the programme
- pre-set intervals
- the termination of the programme.

Where the criteria for eradication are not met, the eradication plan should be reviewed. This review should take into account any newly gained knowledge that might have contributed to that result. Cost-benefit factors and operational details should be reviewed to identify inconsistencies with initial predictions. Depending on the outcome, a new eradication plan may be developed or altered to become a pest suppression or pest management programme.

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IPPC

The International Plant Protection Convention (IPPC) is an international plant health agreement that aims to protect cultivated and wild plants by preventing the introduction and spread of pests. International travel and trade are greater than ever before. As people and commodities move around the world, organisms that present risks to plants travel with them.

Organization

- There are over 180 contracting parties to the IPPC.
- Each contracting party has a national plant protection organization (NPPO) and an Official IPPC contact point.
- Nine regional plant protection organizations (RPPOs) work to facilitate the implementation of the IPPC in countries.
- IPPC liaises with relevant international organizations to help build regional and national capacities.
- The Secretariat is provided by the Food and Agriculture Organization of the United Nations (FAO).

International Plant Protection Convention (IPPC)

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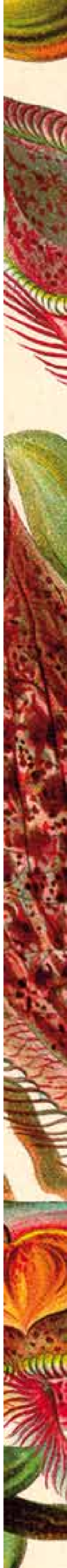

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European and Mediterranean Plant Protection Organization
Organisation Européenne et Méditerranéenne pour la Protection des Plantes PM 9/18 (1)

National regulatory control systems
Systèmes de lutte nationaux réglementaires

PM 9/18 (1) Decision-Support Scheme for prioritizing action during outbreaks

Specific scope

The Decision-Support Scheme for prioritizing action during outbreaks (DSS for outbreaks) is used to identify measures for specific outbreaks, to review existing measures and to generate contingency plans.

Specific approval and amendment

Approved in 2014-09.

Introduction

NPPOs are often faced with the challenge of how best to respond rapidly, proportionately and effectively to pest outbreaks. Pest risk managers in NPPOs have to react quickly to outbreak situations by evaluating the information available, considering the possible options and then presenting justified recommendations for appropriate action to policy makers. Consequently many EPPO member countries are developing contingency plans or DSS for pests which are likely to cause a major economic and/or environmental impact. In 2009, a Standard PM 9/10 *Generic elements for contingency plans* was developed (EPPO, 2009). In addition, specific Standards outlining control strategies for certain important pests have been developed in the series PM 9 *National regulatory control systems*. These Standards should help EPPO countries to draft their own pest specific contingency plans.

In the framework of the PRATIQUE project a generic scheme was developed to provide guidance on possible pest management programmes (Sunley *et al.*, 2011). This generic scheme which is applicable to all pest outbreak situations was designed to enable policy makers to compare and contrast different management options. The Decision-Support Scheme presented in this Standard (DSS for outbreaks) is based largely on the outcome of the PRATIQUE project. The target user for the DSS for outbreaks is the pest risk manager.

The DSS for outbreaks is designed to aid decision making in the following situations:

- When a new outbreak of a quarantine or potential quarantine pest has been reported;
- When an existing management programme against a quarantine pest needs to be reviewed;
- If a contingency plan for a quarantine pest needs to be generated.

As specific information is needed to be able to run the DSS for outbreaks, it is particularly applicable for situations where:

- The pest has been identified;
- The pest is known to be a quarantine or a potential quarantine pest;
- A risk assessment is available for the pest;
- The situation in the outbreak area is at least partially known (or for contingency planning, an appropriate scenario or scenarios can be generated).

However, the scheme has been designed with sufficient flexibility to enable it to be also used even when there is very limited information available and/or in cases where there is no risk assessment available.

The DSS for outbreaks takes into account the pest biology, the assessment of costs and the operational constraints.

The structure of the DSS for outbreaks is outlined in Table 1.

The phytosanitary terms used in this Standard are defined in ISPM 5 (FAO, 2012), e.g. eradication containment and suppression.

This DSS covers all types of pests (including arthropods, bacteria, fungi, nematodes, phytoplasmas, viruses and viroids, and invasive alien plants). When dealing with specific pest groups (e.g. invasive alien plants), the assessor may need to be flexible in his/her interpretation of the questions.

Table 1 Structure of the DSS

Part	Table or decision point	Title	Function
Key information and selection of management measures			
A	1	Basic Information	To collect and summarize basic information on the pest and the location of the outbreak. The name and institute of the person completing this DSS for outbreaks together with the date are also recorded
A	2	Key factors to consider based on the current situation of the outbreak	To assess the key factors about the current outbreak situation that need to be known in order to select the most appropriate management measures
A	3	Additional key factors to consider based on the risk assessment	To summarize the key factors from the risk assessment that are required to select the most appropriate management measures
A	4	Definition of the risk management area	To define the risk management area to be considered in the assessment. This may extend beyond the immediate outbreak area
A	5	Decision on considering 'official action'	To determine whether it is already clear on the basis of the initial assessment that no eradication, containment or suppression action is appropriate
A	6	Selection of measures	To select the measures that are most appropriate for the current outbreak situation or scenario
Comparison and selection of measures			
B	1	Matrix for comparing different management measures	To provide a comparison of the most appropriate (combination of) measures in terms of efficacy and feasibility, cost and acceptability and safety
B	2	Summary report: detailed analysis and justification of the recommended strategy(ies)	To provide a summary of the reasons for selecting a strategy (ies) to control the outbreak
B	3	Other recommendations	To consider other measures (e.g. review of import requirements)

Computerized version of the EPPO Decision-Support Scheme for prioritizing action during outbreaks

A computer programme named CAPRA was developed by the EPPO Secretariat to assist experts in running the EPPO decision-support scheme for prioritizing action during outbreaks, and other decision-support schemes. It presents all questions included in the Decision-Support Scheme in a user friendly interface. The software, together with a manual for the user, can be downloaded at the following address: http://capra.eppo.int/download.php.

In Part A, the current outbreak situation (or scenario in the case of contingency planning) is summarized and information from the risk assessment is obtained in order to select the appropriate measures for evaluation in Part B.

The questions in the DSS for outbreaks are designed to structure the reasoning in order to ensure that decision-making is well informed. In emergency situations, it is recommended that the DSS for outbreaks is completed as quickly as possible and used as a checklist to ensure all key factors and potential management measures are considered. It will not always be possible to answer all the questions, and the information for some may not be available until after the onset of an eradication programme. Furthermore, questions may be answered in more detail when there is more time and as more information becomes available, especially in situations when the recommendation is not clear-cut.

The output of the DSS for outbreaks is a document that includes all the relevant information, together with the evidence and the rationale behind the selection of the management programme. The conclusions and report should also highlight why some measures were not selected.

In both Parts A and B, some scales are suggested to assist with the responses to these questions. These are by no means definitive. Indeed, the responses to the questions may be subjective depending on the situation, in which case the suggested scales may be less useful. The justification/basis for the assessment should be outlined in the comments boxes.

When eradication, containment and suppression programmes are continued over a prolonged period of time, it is important to review the situation and the relevance/success of the management programme. It is particularly useful to review the answers given in the DSS for outbreaks regularly, paying particular attention to the justification for the initial decisions to ensure that the programme chosen is still the best management option.

Part A: Key information and selection of management measures

Before starting the DSS for outbreaks it is important to ensure that the species concerned is not native to the area, or for intentional introductions, that it is present in unintended habitats.

For applicable questions the user of the DSS for outbreaks should select both a score and an uncertainty for this score. When using the paper version these should both be reported in the comments section. Additional comments may also be added in the comment lines to justify the score and uncertainty.

A1. Basic information

Name of the assessor	Date

If this DSS is being conducted to generate a contingency plan, the scheme should be used for one or more outbreak scenarios, e.g. for Anoplophora chinensis *this could be a single infested tree in an urban area, or a small cluster of infested trees surrounding a nursery producing host plants.*

A1.1	Pest scientific name
Note	The scientific name and taxonomic position should be specified as appropriate. If the identity of the species is unclear, then there are limits to the application of this DSS for outbreaks.

A1.2	Pest common name

A1.3	Stage(s) of the life cycle present, where appropriate

A1.4	Host (s) on which the pest was detected, when appropriate
Note	Note that the pest may have been detected without being associated with a host (e.g. caught in a trap)

A1.5	Location of the outbreak/finding (maps should be provided if available)
Note	The geographical location should be given with as much detail as possible: latitude, longitude, grid reference and name as appropriate. The preliminary delimitation of the outbreak area should be indicated. Information should also be provided on the circumstances of the detection.

A1.6	Habitat type
Note	Relevant habitat(s) associated with the pest in the outbreak area should be selected from the EUNIS hierarchy at http://eunis.eea.europa.eu/habitats-code-browser.jsp.

A1.7	Hosts
Note	Hosts present in the outbreak area should be listed (including details of species, variety, developmental stage, and spatial distribution and abundance)

A1.8	Is a pest risk assessment already available for the pest or another comparable pest?
Note	If so, details should be given and its validity assessed, e.g. the risk assessment may concern a different ;area/country, be out of date or cover a closely related species or a pest with a similar biology. If no suitable pest risk assessment is available, then an Express PRA (EPPO Standard PM 5/5) or at least Stage 1 and Stage 2A of PM 5/3 should preferably be conducted before completing the DSS for outbreaks.
Reference to the existing PRA(s)	Information should be provided on the date when the PRA was performed, the name of the risk assessors who conducted it, their institute and country
Is the existing PRA relevant to this particular case?	

A1.9	Has an eradication or containment programme already been performed or is a contingency plan available for this pest or another comparable pest?
Note	If so, details should be given and it should be noted whether it is valid (it may concern a different area/country, be out of date or have been carried out for a closely related species or a pest with a similar biology)
Reference of existing documentation	Information should be provided on the date when the document was produced, the name of its author(s), their institute and country
Is the programme appropriate to this particular case?	

A2. Key factors to consider based on the current situation of the outbreak

A2.1	What is the extent of the infested area(s)?
Note	It should be the current best estimate, taking into account the fact that delimiting surveys may still be necessary or ongoing. The extent can be expressed in terms of the overall area or areas infested (ha, etc.), the number of infested sites (glasshouses, fields, gardens, parks, etc.), or the number of infested plants.
Score Suggested scale:	**Very small, Small, Moderate, Large, Very large** For field crops/forests: Very small: < 1 ha; Small: more than 1 to 10 ha; Medium: more than 10 to 100 ha; Large: more than 100 to 1000 ha; Very large: more than 1000 ha
Uncertainty	**Low, Medium, High** When rating uncertainty, the likelihood that the pest has already spread outside the delimited area should be considered, i.e. the confidence that the current outbreak has been successfully delimited and that no other outbreaks exist.
Comments	

A2.2	What is the incidence of the pest in the outbreak area?
Note	This should be expressed according to terms that are relevant to the type of organism, e.g. abundance, prevalence, density or in actual numbers. It can also be expressed as a proportion, relative to the total available hosts. In addition, it may be useful to compare with other known outbreaks.
Score	**Very low, Low, Moderate, High, Very high**
Uncertainty	**Low, Medium, High**
Comments	

A2.3	What is the reproductive capability of the pest in the outbreak area?
Note	In answering this question the following factors may be taken into account: • suitability of weather conditions for reproduction, • the proportion of the population capable of reproducing or infesting, • the likelihood of finding sexual partners or alternate hosts if required, • the expected length of time before pests become sexually “mature” or infective, • the expected number of “offspring” per “parent”, • the number of generations per year.
Score	**Very low, Low, Moderate, High, Very High**
Uncertainty	**Low, Medium, High**
Comments	

A2.4	What is the natural spread capacity of the pest from the outbreak area?
Note	When a PRA is available, an assessment of the overall capacity of this pest to spread naturally should be available (see answer to question 4.01 in a PRA following PM 5/3(5), or point 11 in a PRA following PM 5/5(1)). However, it is also important to take into account specific factors relating to the current outbreak which may prevent the organism from exhibiting its full potential for spread. Examples include when: • life stages present are immobile • vectors are not present • the outbreak occurred in a contained or isolated physical situation or habitat, e.g. a glasshouse, an island or a lake • weather conditions are unsuitable (e.g. maximum daily temperatures are insufficient for insect flight, or too dry or too cold for spore release for a fungus)
Score	**Very low, Low, Moderate, High, Very High**
Suggested scale: (as in PM 5/3(5))	Use the guidance below to evaluate natural spread and adapt as necessary to take into account the situation of the outbreak (isolation, weather conditions…) **Very low**: The pest cannot spread naturally (the vector is absent or it can only spread by intervention of man (e.g. grafting or budding)) or the pest has a very low rate of spread (less than 10 m per year). **Low**: The pest has a low mobility (10 m to 1 km per year) that only allows movement within production sites or within sites of suitable habitat (Spreading to occupy a circular area at a linear speed of between 10 m and 1 km per year would, within 4 years, lead to up to 50 km^2 being occupied). **Moderate**: The pest has a medium mobility (more than 1 km to 10 km per year) (Spreading to occupy a circular area at a linear speed of between 1 and 10 km per year would, within 4 years, lead to between approximately 50 km^2 and 5000 km^2 being occupied). **High**: The pest has a high mobility (more than 10 to 50 km per year). (Spreading to occupy a circular area at a linear speed of between 10 and 50 km per year would, within 4 years lead to between approximately 5000 and 125 000 km^2 being occupied). **Very High**: The pest has a very high mobility (more than 50 km/year) (Spreading to occupy a circular area at a linear speed of 50 km per year would, within 4 years over 125 000 km^2 would be occupied).
Uncertainty	**Low, Medium, High**
Comments	

A2.5	What is the spread capacity of the pest from the outbreak area due to human activity?
Note	When a PRA is available, an assessment of the overall capacity of this pest to spread with human assistance should be available (see answer to questions 4.02 in a PRA following PM 5/3(5), or point 11 in a PRA following PM 5/5 (1)). However, factors regarding the current outbreak situation such as biological, geographical and environmental factors may limit human assisted spread.
Score	**Very low, Low, Moderate, High, Very High**
Suggested scale (as in PM 5/3(5))	1. Has a pathway that involves human activity been identified for this pest? If yes, the spread capacity from the outbreak area by human assistance is at minimum moderate go to 2. If no, the spread capacity from the outbreak area by human assistance is very low or low. 2. Can the pest be transmitted by seed or (other) plants for planting (cuttings, budwood, grafted plants, etc.), plant products, with packaging, conveyance, machinery? If yes, the rate of increase in the infested area by human assistance is at minimum high go to 3 If no, the spread capacity from the outbreak area by human assistance is moderate. 3. Is the pathway on which the pest is likely to be present widely distributed outside the outbreak area (trade or movement with persons) or is the pest likely to be moved intentionally by persons outside the outbreak area? If yes, the spread capacity from the outbreak area by human assistance is very high If no, the spread capacity from the outbreak area by human assistance is high
Uncertainty	**Low, Medium, High**
Comments	

A2.6	How easy is the organism to detect?
Note	When a PRA is available, see responses and guidance to question 2.09 in a PRA following PM 5/3(5), or point 2 in a PRA following PM 5/5(1)
Score	**Very easy, Easy, With some difficulty, Difficult, Very difficult**
Uncertainty	**Low, Medium, High**
Comments	

A2.7	How easy is the organism to identify?
Note	When a PRA is available according to PM 5/5(1), see section 2. Pest overview
Score	**Very easy, Easy, With some difficulty, Difficult, Very difficult**
Uncertainty	**Low, Medium, High**
Comments	

A2.8	How long has the pest been present in the outbreak area?
Note	A rating should be given and related to the length of the life cycle of the pest whenever appropriate in the comments box. For example, *A. chinensis* needs 2-3 years to complete its life cycle in Northern Europe, so the presence of this pest for less than a year does not have the same significance as for other pests with a much shorter life cycle.
Rating	**Less than one month, Less than six months, Less than one year, Less than three years, More than three years**
Uncertainty	**Low, Medium, High**
Comments	

A2.9	What damage is the pest currently causing in the outbreak area?
Note	An estimate of the economic, environmental and social impacts of the pest should be provided. When a PRA is available, see responses and guidance to section 6 in a PRA following PM 5/3(5), or point 12 and 13 in a PRA following PM 5/5(1), and/or refine to the area being addressed.
i.	**Economic damage**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	
ii.	**Environmental damage**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	
iii.	**Social damage**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	

A3. Additional key factors to consider based on the risk assessment

In this section factors of risk for other areas are also considered.

A3.1	How likely is it that subsequent introductions of the pest may occur?
Note	This is an estimate of the overall probability of entry taking into account the risk presented by different pathways and an estimate the overall likelihood of entry. When a PRA is available this information should be provided, in the written summary and summary scores for Entry Potential in question 2.14 in a PRA following PM 5/3(5), or point 8 in a PRA following PM 5/5(1). When no PRA is available follow the guidance provided for entry in PM 5/5
Score	**Very unlikely, Unlikely, Moderately likely, Likely, Very likely**
Uncertainty	**Low, Medium, High**
Comments	

A3.2	How large an area is still available for further establishment?
Note	When a PRA is available, the area suitable for establishment should be described in section 3 in a PRA following PM 5/3(5) or in points 9 and 11 in a PRA following PM 5/5(1).
Score	**Very limited, Limited, Medium, Large, Very large**
Uncertainty	**Low, Medium, High**
Describe the area	

A3.3	What is the potential impact of this pest?
Note	When a PRA is available, the potential economic, environmental and social impacts should be described in section 6 in a PRA following PM 5/3(5) or in points 12 and 13 in a PRA following PM 5/5(1). If no PRA is available, refer to the guidance provided for impact in PM 5/5.
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	
i.	**Economic impact**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	
ii.	**Environmental impact**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	
iii.	**Social impact**
Score	**Minimal, Minor, Moderate, Major, Massive**
Uncertainty	**Low, Medium, High**
Comments	

A4. Definition of the risk management area

A4	Define the risk management area to be considered in this assessment, i.e. the area beyond the immediate outbreak defined in A1.5 where measures should be taken.
Note	It is unlikely that the area to be subject to management measures can be precisely delimited in the first stages of an outbreak. However, uncertainty will usually be high and further investigations and delimiting surveys will be necessary in order to define the area in which measures are to be taken. Consequently, it is recommended to come back to this question as new information becomes available. This is an important question to carefully readdress each time the outbreak situation is reviewed, and this should be done regularly. When official measures are taken this will be defined as the regulated area.
Uncertainty	**Low, Medium, High**
Define the risk management area	

A5. Decision on considering 'official action'

A5	Based on the current situation and the information from the risk assessment, is it already clear that it is not appropriate to take official action? If yes with a low uncertainty: justify your recommendation to take no action Otherwise, continue by selecting and evaluating appropriate measures.
Note	At this stage it may be clear that taking official measures with the aim of eradication, containment or suppression of the pest in question is not feasible. Examples of such situations include cases where the pest is already widely distributed, is difficult to detect, has a high rate of natural spread and is very likely to enter again. If it is clear that no official action would be appropriate, this recommendation should be justified in the comments box. In situations where uncertainty is high about the recommendation to take no official action, it may still be useful to run potential scenarios (in particular "no action") through Part B in order to gather further information to assist with, and possibly also justify, this recommendation. It should be noted that when 'no official action' is recommended there this does not mean that the pest will not cause damage.
Score	**Yes, No**
Uncertainty	**Low, Medium, High**
Comments	

A6. Selection of measures

Potential official measures to be applied for a given strategy of action (eradication, containment or suppression) should be selected and listed. Expert judgement should be applied in this selection process, taking into account the pest biology, the outbreak area, and experience of pest management. The measures that are chosen through this process are taken forward to part B. When considering candidate measures for comparison, it may be useful to consider a range of different measures in terms of severity e.g. from complete destruction of all hosts, through to more targeted treatments with a different overall objective (e.g. containment or suppression), and the consideration of no action.

When a PRA is available, measures to prevent entry with commodities of plants and plant products may have been identified in section 7 in a PRA following PM 5/3(5) or in point 16 in a PRA following PM 5/5(1). This may provide valuable information for measures to prevent further spread from an outbreak area.

Measures that are not considered in part B because they are unlikely to be effective or practical, should be noted and the justification for their non-selection added to the summary report (B2).

The checklist in Table 2 is provided to assist with the identification of candidate measures but other measures can be added.

Table 2 Checklist of measures

Type of measures	Yes/No	Comments (optional)
a. Measures based on chemical control		
• Plant Protection products targeting the pest/vector (preventive/curative treatments)		
• Mating disruption		
b. Measures based on biological control		
• Biological control agents		
• Sterile insect release		
c. Measures based on physical control		
• Destruction of all host plants		
• Selective destruction of some host plants		
• Clear cut area		
• Trapping of the pest/vector		
• Physical barriers		
• Soil sterilisation (solar, by heat)		
d. Measures based on specific cultural practices		
• Crop rotation		
• Crop break		
• Changing sowing or harvest date		
• Restrictions to post-harvest processes		
• Hygiene measures		
• Sanitation (removing infested plant parts or pests)		
• Choosing resistant crop variety		
• Modifying environment (e.g. reducing moisture levels)		
• Cultivation (e.g. introducing deep ploughing, changing irrigation regime, creating stale seed bed, etc.)		
• Use of healthy planting material (e.g. certified material)		
e. Measures to be implemented to prevent further spread from an outbreak area		
• Sale restrictions		
• Restriction on movement of potentially infested plants and plant products, soil, machineries, etc. including treatments.		
• Restriction of movement of people in the outbreak area.		
f. Other requirements		
• Trace back and trace forward activities		
• Obligation to report findings		
• Safe disposal of infested material		
• Communication campaigns		
• Repeated surveys		

Part B: Comparison and selection of measures

B1. Matrix for comparing different management measures to determine their applicability for the outbreak

In addition to answering the questions for section B1, fill in the matrix (B1 Matrix for comparison of candidate individual or combined measures). It is recommended to evaluate the situation when no measure is taken by way of comparison (see baseline scenario).

Using expert judgment, measures should be identified that would be suitable as a stand-alone measure to achieve the objective of the potential strategy (eradication, containment, or suppression). These will need to be evaluated individually in this section. However, in many situations, outbreak management will involve a combination of measures which will need to be evaluated. In such cases it may not always be necessary to undertake a detailed analysis of each of the individual component measures.

In all cases, it is recommended to evaluate the situation when no official action is taken by way of comparison. For the case where no official action is taken, questions B1.1–B1.3 may not need to be answered. However in cases where voluntary control measures are taken by stakeholders (e.g. increase of plant protection products used by growers), these questions should be answered in order to be able to make a comparison with the other strategies. These measures may result in a reduction of pest populations which need to be compared to that achieved through official measures.

Detailed evaluation of the most appropriate measures.

Candidate measure or combination of measures:	
Objective:	

In the following questions '*measure'* should be understood as '*a stand-alone measure or a combination of measures*'.

B1.1	What is the likelihood that the measure will be successful?
Note	The response should be based on an assessment of the chances of achieving the desired aims of the measure over the time period specified (B 1.2). This should take into account not only the knowledge of the general efficacy of a particular measure, but also on how well the measure will work in the current situation as described in Part A. Factors that have a significant impact on the success and failure of eradication programmes, include: - Early detection/official action (see A2.6) - Size of the infested area (see A2.1) - Spread related factors (see A2.4, 2.5) However, other crucial factors affecting success may relate to the specific outbreak scenario and may include e.g. local geography, prevailing weather, season.
Score	**Very likely, Likely, Moderately likely, Unlikely, Very unlikely**
Uncertainty	**Low, Medium, High**
Comments	

B1.2	How long will it take for this measure to be successful?
Note	The chances of achieving the desired aims of the measure over a time period should be assessed taking into account an evaluation of the efficacy of the measure and the biology of the pest. If the objective is containment or suppression, then success is considered differently and the measure will be continued indefinitely. Explain your response accordingly.
Score	**Less than one month, Less than six months, Less than one year, Less than three years, More than three years**
Uncertainty	**Low, Medium, High**
Comments	

B1.3	How difficult will it be to apply this measure taking into account enforcement, resources and operational factors?
Note	For the purposes of a quick assessment, it may be sufficient to assume that all of the chosen official measures are complied with in full. However, it is possible that there are known compliance problems associated with certain measures and these should be captured. The following factors should be taken into account: • Are funds available to support action? • Is there supporting political will and clear lines of responsibility in the outbreak management team (Ministerial/departmental ownership/leadership)? • Are there sufficient numbers of well trained and competent staff available? • Is there an adequate legal basis for action? • Have relevant parties (growers, nurseries, public) been informed about the outbreak and possible official measures? • Are all relevant authorities involved and supportive of the proposed strategy (municipal, provincial, police, water boards, etc.)? • Are other relevant parties likely to be cooperative, or do you expect significant opposition (opposing lobbies, organizations, legal restrictions)? • Are specific derogations or approvals necessary for the use of appropriate plant protection products? If yes, this is likely to delay treatment? • Is access possible to relevant areas and can entry and the application of measures be undertaken in a timely manner? • Have issues of infrastructure and transport been addressed (e.g. road control)? • Are there effective means of communication in place (including publicity)?
Score	**Very easy, Easy, Some difficulty, Difficult, Very difficult**
Uncertainty	**Low, Medium, High**
Comments	

B1.4	How high are the direct costs of the measure?
Note	Direct costs include the costs of applying the measure itself as well as the costs incurred as a consequence of the application of the measure(s). Direct costs are sometimes called ‘on-farm costs’. This implies that any costs that occur at the place where the measures are applied (this may not only be a farm but also a private garden, a public park or a forest etc.) should be considered as direct costs. Direct costs include costs associated with • Treatments (including additional machinery and workforce costs), • Surveys/monitoring (including additional machinery and workforce costs), • Crop/host plant or consignment losses, • Financial compensation, • Income losses resulting from the measures (e.g. from yield loss or crop rotation), • Destruction of hosts (including additional machinery and workforce costs), • Waste removal/disposal (including additional machinery and workforce costs), • Loss of land value and availability of land for other crops, • Communication costs. Costs may be borne by different parties (official authorities such as NPPOs, farmers/growers, or private persons such as gardeners). In the framework of the EU FP7 PRATIQUE project, documents have been prepared on Cost: Benefit Analysis (Breukers *et al.*, 2011) and can be referred to for a detailed analysis (http://capra.eppo.int/deliverables/get.php5?f=38).
Score	**Minimal, Minor, Moderate, Major, Massive**
Suggested scale:	Minimal: less than 5 000 EUR, Minor: 5 000 EUR to 25 000 EUR, Moderate: 25 000 EUR to 250 000 EUR, Major: 250 000 EUR to 2 500 000 EUR, Massive: more than 2 500 000 EUR.
Uncertainty	**Low, Medium, High**
Comments	

B1.5	How high are the indirect costs of the measure?
Note	Indirect costs do not include environmental impacts, as these are considered in B 1.6. Indirect costs are those effects that are not wanted or expected from the application or termination of a measure. They include costs related to: • Potential impact on future trade in plants and plant products (e.g. loss of pest-free area status, loss of market due to the increase in price of plants and plant products), • Penalties associated with failure to satisfy existing contracts for plants/plant products • Social impacts including the impact on tourism and recreation, potential increase of plants and plant products price, or reduced availability of plants and plant products. These are sometimes called 'off-farm costs' (they occur at other "places" and also to other groups than those directly associated with the application of the measures). In the framework of the EU FP7 PRATIQUE project, documents have been prepared on Cost: Benefit Analysis and can be referred to for a detailed analysis (http://capra.eppo.org/deliverables/get.php5?f=38).
Score	**Minimal, Minor, Moderate, Major, Massive**
Suggested scale:	Minimal: less than 5 000 EUR, Minor: 5 000 EUR to 25 000 EUR, Moderate: 25 000 EUR to 250 000 EUR, Major: 250 000 EUR to 2 500 000 EUR, Massive: more than 2 500 000 EUR.
Uncertainty	**Low, Medium, High**
Comments	

B1.6	How high are the environmental impacts of the measure?
Note	Include, e.g.: • pollution (e.g. of water courses, soil or air) • indirect effects on non-target and/or beneficial organisms, • loss of biodiversity, habitat or ecosystem services
Score	**Minimal, Minor, Moderate, Major, Massive**
Suggested scale:	Minimal impact (e.g. the removal of a small number of plants by hand); Minor impact (e.g. application of pesticides to plants within a nursery, disposal of plants or plant products by burning or landfill); Moderate impact (anticipated short term [$\leq$3 years] impact [loss of biodiversity] on a native habitat - e.g. applying an insecticide to woodland or hedgerows); Major impact (anticipated long term impact [more than 3 years)] on a native habitat [<10 km^2] or short term impact on a sensitive/protected area, e.g. national park, or endangered species); Massive impact (anticipated long term impact [more than 3 years] over a wide area of any natural habitat [more than10 km^2], or to a sensitive/protected area, e.g. national park, or an endangered species).
Uncertainty	**Low, Medium, High**
Comments	

B1.7	How acceptable is the measure likely to be to the public?
Note	A judgement should be made on the acceptability of measures from a social perspective. This is likely to be related to perceived impacts on human health and the environment. It may also be necessary to consider other important stakeholders such as growers when considering this question.
Score	**Zero/minimal opposition, Minor opposition, Moderate opposition, Major opposition, Massive opposition**
Suggested scale:	Minimal: No or very little opposition to action anticipated, general public support for need for measure(s); Minor: Minor opposition anticipated - mostly from those directly affected, but unlikely to draw media attention; Moderate: A local campaign against measure(s) likely, but not leading to national media interest. Public support exceeds opposition; Major: Anticipate a co-ordinated campaign against measure(s), but balanced by support for action. Disruption by protesters also possible; Massive: Anticipate a national campaign against measure(s) to be taken up by significant Non-Governmental Organizations and a strong possibility on protesters disrupting action.
Uncertainty	**Low, Medium, High**
Comments	

B1. Matrix for comparison of candidate individual and combined measures											
	Proposed individual measure or combination of measures	Efficacy and feasibility			Costs		Acceptability and safety		Suitability of measure (s) for:		
		B1.1 Likelihood of success and feasibility	B1.2 Time needed for success	B1.3 Enforcement, resources and operational factors	B1.4 Direct costs	B1.5 Indirect costs	B1.6 Environmental impacts?	B1.7 Acceptability of the measures	Eradication	Containment	Suppression
i	No official action (but possible voluntary measures)										
ii	Physical host destruction										
iii											
iv											
v											
vi											

B2. Summary report: detailed analysis and justification of the recommended strategy(ies)

B2	Conclusions. The objective (eradication, containment, suppression) and associated measure (or combination of measures) proposed should be described, if the assessment shows that official measures should be considered. In most cases more than one strategy will be considered and a preferred option may be identified. The merits of the optimal strategy (ies) can usually be best illustrated by comparing it (them) with an evaluation of no action and the most stringent action. Presentation and comparison of these options will help the decision-makers. It may also be useful to describe the other potential options which are not considered to be appropriate. When the situation is changing, it is important to review the scheme and the justification for the preferred strategy accordingly.
Note	The questions in the comparison of measures matrix under Part B1 have been divided into three topics: efficacy and feasibility, costs, and acceptability and safety. Although some of the questions overlap, it is useful for decision makers to be able to see the responses broken down under the seven questions. It is also recognised that some questions are likely to be more important in the decision making process than others. It is considered that in general, the most important questions are as follows: • Likelihood of success • Direct costs • Indirect costs • Environmental impacts • Public acceptability However, the importance of the questions will vary on a case by case basis. Other information gathered when collecting information in Parts A and B will also be very important in the decision making process for selecting the best strategy.
Comment	

B3. Other recommendations

Review of import requirements. In the case of an outbreak of a quarantine pest, it is recommended to review existing import measures and any existing PRA (e.g. to check if all pathways for entry had been considered).

Additional national measures to be considered for organisms that are introduced intentionally. For organisms that are introduced intentionally and have invaded non-intended habitats, the following general measures may be considered

• Restriction on holding, sale and/or movement;
• Prohibition to release in unintended habitats;
• Requirements for specified growing/rearing conditions.

References

Breukers A, Kehlenbeck H, Cannon R, Leach A, Battisti A & Mumford J (2011) PRATIQUE Deliverable 5.2 A protocol for the cost: benefit analysis of eradication and containment measures during outbreaks. https://secure.fera.defra.gov.uk/pratique/publications.cfm#fldr_D5 [accessed on 17 April 2013].

EPPO (2009) PM 9/10(1): generic elements for contingency plans. *Bulletin OEPP/EPPO Bulletin* **39**, 471–474.

FAO (2012) ISPM No. 5 Glossary of Phytosanitary Terms, Rome, IPPC, FAO.

Sunley R, Battisti A, Cannon R, Baker R & Griessinger D (2011) PRATIQUE Deliverable 5.3 A Decision-Support Scheme that generates contingency plans and prioritises action during outbreaks. https://secure.fera.defra.gov.uk/pratique/publications.cfm#fldr_D5 [accessed on 17 April 2013].

Department of Primary Industries, Parks, Water and Environment

Biosecurity Tasmania

Blueberry rust

On this page

Blueberry Rust Update May 2017

Blueberry rust was found on a North-West property in August 2016. It has since spread to two smaller nearby properties (detected March 2017).

Because the incursion is of a much larger scale than a previous one eradicated in 2015, a containment and ongoing management strategy was adopted to address the disease through the past growing season.

The focus of the management approach is now reducing the risk of further movement of the disease, and provide time for local industry to meet requirements to enable interstate market access over the last season.

As this disease is now considered established in Tasmania, Blueberry rust will be de-regulated as a disease exotic to Tasmania in coming months. The industry will be informed of any changed conditions of trade.

The Department will be continue to work closely with blueberry industries in coming months as well as interstate authorities to maintain future domestic market access.

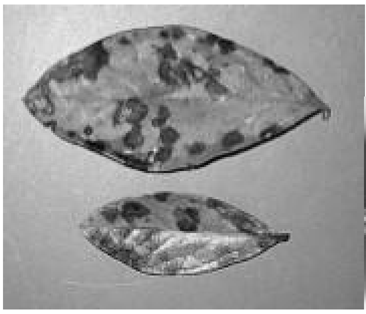
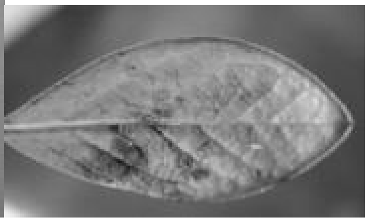
What is blueberry rust?

Blueberry rust (*Thekopsora minima*) is a serious disease of blueberries that causes extensive defoliation and may cause plant death on plants with severe infections.

Blueberry rust is a fungi and is classified under Tasmania's *Plant Quarantine Act 1997* as a List A disease.

What to look for:

- Initial small yellow, chlorotic leaf spots on upper surface of young leaves
- Lesions turn rust/brown coloured and enlarge as the infection progresses (*Fig 1.)*
- Yellow-orange powdery pustules develop on the underside of leaves (*Fig 2.)*
- Similar pustules may also appear on blueberry fruit (*Fig 3.*)
- Premature leaf drop and defoliatio

 (Click to enlarge images)

When do symptoms first appear?

In the field, the symptoms appear on leaves by mid-season at any growth stage of plants and on fruits by late season.

How does blueberry rust spread?

The disease spreads by airborne urediniospores mainly via wind. In glasshouse environments, urediniospores can be carried by people, on clothing for example, when walking past and contacting plants.

What to do if you suspect you have an unusual plant disease.

It's very important that you not disturb or move the plant. Care should also be taken to ensure that any clothes or equipment has not become contaminated.

You should, as soon as possible, phone the plant disease hotline on **1800 084 881** and report the symptoms noticeable on the plant.

Ways you can protect your crops

Adopt a range a farm biosecurity measures that will assist in protecting your property from the entry and spread of various pests and diseases. Farm biosecurity is a shared responsibility, and that of every person visiting or working on your property.

- Ensure you and your staff are aware of plant diseases, and are familiar with symptoms
- On-site disease identification information should be on-site and be easily accessible
- Limit the access of people (visitors and staff) onto your property
- Disinfect all equipment/vehicles that move off-site and return to operate on the property
- Implement a hygiene protocol for essential visitors (contractors, suppliers, etc)
- Restrict all non-business vehicles from entry onto the property
- Minimise or allocate specific staff who might come in contact with host material
- Source plant material from known professional growers with good accreditation
- Inspect imported blueberry host material prior to introduction to your property

Further Information

For detailed information, together with a range of farm biosecurity resources that will assist in protecting your property – and livelihood – visit the Farm Biosecurity Program website (the Program is a joint initiative of Animal Health Australia (AHA) and Plant Health Australia (PHA).

Download the blueberry rust fact sheet.

Remember if you suspect that your plants may be infected with a new disease please call **Biosecurity Tasmania on 1800 084 881**

Contact

Biosecurity - Plant
Phone: 03 6165 3777, or 1800 084 881 (for biosecurity service in your state)
Email: Biosecurity.planthealth@dpipwe.tas.gov.au

This page was created by the Department of Primary Industries, Parks, Water and Environment (Tasmania).

Questions concerning its content can be sent using the feedback form or by telephone.

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Blueberry rust

1 message

Appendix V

Martin Agatyn <martin.agatyn@7ad.com.au>
To: brocklandsnursery@gmail.com

Fri, Jul 21, 2017 at 12:08 PM

Hi Karen,

Greg McCulloch suggested I contact you to either talk to me on-air this afternoon about blueberry rust eradication, or alternatively, if you knew a blueberry farmer on the North-West Coast (my listening audience) who would be willing to talk.
I'm on air from 3 and I have live slots at 3.20, 3.40, 4.15 or 4.45.
If that's not suitable, I can also pre-record up until 2.15 at the latest.

Hoping you can help me,

Regards

Martin Agatyn
7AD & 7BU Announcer
Host - Across the Coast
Listen to Across the Coast, weekdays from 3 pm

900 7AD AM Devonport's Best Mix
558 7BU AM Burnie's Best Mix

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