United States Department of Agriculture

Importation of *Citrus* spp. (Rutaceae) fruit from China into the continental United States

United States
Department of
Agriculture

Animal and Plant
Health Inspection
Service

October 3, 2017

Version **4.0**

A Qualitative, Pathway-Initiated Pest Risk Assessment

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Executive Summary

The Animal and Plant Health Inspection Service (APHIS) of the United States Department of Agriculture (USDA) prepared this risk assessment document to examine plant pest risks associated with importing commercially produced fruit of *Citrus* spp. (Rutaceae) for consumption from China into the continental United States. The risk ratings in this risk assessment are contingent on the application of all components of the pathway as described in this document (e.g., washing, brushing, and disinfesting). Citrus fruit produced under different conditions were not evaluated in this risk assessment and may have a different pest risk. The proposed species or varieties of citrus for export are as follows: *Citrus sinensis* (sweet orange), *C. grandis* (= *C. maxima*) cv. *guanximiyou* (pomelo), *C. kinokuni* (cherry orange), *C. poonensis* (ponkan), and *C. unshiu* (Satsuma mandarin).

This assessment supersedes a qualitative assessment completed by APHIS in 2014 for the importation of citrus from China. This assessment is independent of the previous assessment, however it draws from information in the previous document. This assessment is updated to be inline with our current methodology, incorporates important new research, experience, and other evidence gained since 2014.

Based on the scientific literature, port-of-entry pest interception data, and information from the government of China, we developed a list of potential pests with actionable regulatory status for the continental United States that are known to occur in China and that are known to be associated with the commodity plant species anywhere in the world. From that list, we identified and further analyzed organisms that are reasonably likely to be associated with the commodity following harvesting from the field and post-harvest processing.

Of the pests selected for further analysis, we determined that the fungi *Zasmidium fructicola* and *Zasmidium fructigenum* are *not* candidates for risk management because they rated negligible for the likelihood of introduction.

We determined that the below listed pests are candidates for risk management. In the current risk assessment, all the listed arthropods **met the threshold to likely cause unacceptable consequences of introduction** <u>and</u> they received an overall **likelihood of introduction** risk rating **above** Negligible. The pathogens *Phyllosticta citricarpa* (citrus black spot), and *Xanthomonas citri* subsp. *citri* (citrus canker) are of limited distribution in the United States and are considered quarantine pests. USDA-APHIS previously conducted pest risk assessments examining the likelihood that these pathogens will spread through the movement of commercial citrus fruit intended for consumption. USDA-APHIS has determined that asymptomatic or commercially packed fruit is not an epidemiologically significant pathway for the introduction and establishment of these pathogens into new areas. For the above reasons, these pathogens were not analyzed in the pest risk assessment; however, additional import requirements will be specified in the risk management document as a condition of entry for citrus fruit from China to the continental United States.

Taxonomy	Scientific name	Likelihood of Introduction overall rating
Acari: Tenuipalpidae	*Brevipalpus junicus* Ma & Yuan	Medium

Taxonomy	Scientific name	Likelihood of Introduction overall rating
Acari: Tuckerellidae	*Tuckerella knorri* Baker & Tuttle	Medium
Diptera: Cecidomyiidae	*Resseliella citrifrugis* Jiang	Medium
Diptera: Tephritidae	*Bactrocera correcta* (Bezzi)	High
	Bactrocera cucurbitae (Coquillett)	Medium
	Bactrocera dorsalis (Hendel)	High
	Bactrocera minax (Enderlein)	High
	Bactrocera occipitalis (Bezzi)	High
	Bactrocera pedestris (Bezzi)	High
	Bactrocera tau (Walker)	Medium
	Bactrocera tsuneonis (Miyake)	High
Lepidoptera: Carposinidae	*Carposina niponensis* Walsingham	Medium
	Carposina sasakii Matsumura	Medium
Lepidoptera: Crambidae	*Ostrinia furnacalis* Guenée	Medium
Lepidoptera: Pyralidae	*Cryptoblabes gnidiella* (Millière)	Medium
Fungi	*Phyllosticta citricarpa* (McAlpine) van der Aa	Analyzed previously[a]
Bacteria	*Xanthomonas citri* subsp. *citri* (ex Hesse) Gabriel et al.	Analyzed previously[a]

[a] Plant pests with limited distribution and under official control in the United States; therefore, additional import requirements may be required.

Detailed examination and choice of appropriate phytosanitary measures to mitigate pest risk are part of the pest risk management phase within APHIS and are not addressed in this document.

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1. Introduction

1.1. Background

This document was prepared by the Plant Epidemiology and Risk Analysis Laboratory of the Center for Plant Health Science and Technology, USDA Animal and Plant Health Inspection Service (APHIS), Plant Protection and Quarantine (PPQ), to evaluate the risks associated with the importation of commercially produced fresh fruit of citrus (*Citrus* spp.) for consumption from China into the continental United States. The proposed species or varieties of citrus for export are as follows: *Citrus sinensis* (sweet orange), *C. grandis* (= *C. maxima*) cv. *guanximiyou* (pomelo), *C. kinokuni* (cherry orange), *C. poonensis* (ponkan), and *C. unshiu* (Satsuma mandarin).

The International Plant Protection Convention (IPPC) provides guidance for conducting pest risk analyses. The methods used here are consistent with guidelines provided by the IPPC, specifically the International Standard for Phytosanitary Measures (ISPM) on "Pest Risk Analysis for Quarantine Pests" (IPPC, 2016b). The use of biological and phytosanitary terms is consistent with the "Glossary of Phytosanitary Terms" (IPPC, 2016a).

Three stages of pest risk analysis are described in international standards: Stage 1, Initiation; Stage 2, Risk Assessment; and Stage 3, Risk Management. This document satisfies the requirements of Stages 1 and 2.

This is a qualitative risk assessment. We express the risk based on qualitative ratings for the likelihood and consequences of pest introduction via imported citrus fruit from China. The details of the methodology and rating criteria are found in the *Guidelines for Plant Pest Risk Assessment of Imported Fruit and Vegetable Commodities* (PPQ, 2012).

The appropriate risk management strategy for a particular pest depends on the risk posed by that pest. Identification of appropriate phytosanitary measures to mitigate pest risk is undertaken in Stage 3 (Risk Management) and is not covered in this risk assessment. Risk management will be specified in a separate document.

1.2. Initiating event

The Chinese General Administration of Quality Supervision, Inspection and Quarantine (GAQSIQ) submitted a market access request for citrus fruit to be approved for import into the continental United States. The importation of fruits and vegetables for consumption into the United States is regulated under Title 7, Part 319.56 of the Code of Federal Regulations. Currently, under this regulation, the entry of citrus from China into the continental United States is not authorized. We prepared this assessment in response to a request by GAQSIQ to change the Federal regulation to allow entry (GAQSIQ, 2011).

1.3. Determination of the necessity of a weed risk assessment for the commodity

Weed risk assessments do not need to be conducted for plant species that are widely established (native or naturalized) or cultivated in the pest risk analysis (PRA) area, for commodities that are already enterable into the PRA area from other countries, or when the plant part(s) cannot easily propagate on their own or be propagated. We determined that a weed risk assessment is not needed for citrus because it is naturalized (APHIS, 2017; Kartesz, 2017) and cultivated in the United States (NASS, 2016); moreover, importation of citrus fruit is permitted entry to the continental United States from multiple countries (APHIS, 2017; NRCS, 2017).

1.4. Description of the pathway

The IPPC (2016a) defines a pathway as "any means that allows the entry or spread of a pest." In the context of commodity pest risk assessments, the *pathway* is the commodity to be imported, together with all the processes the commodity undergoes that may have an impact on pest risk. In this risk assessment, the specific pathway of concern is the importation of fresh fruit of citrus (*Citrus* spp.) for consumption from China into the continental United States; the movement of this commodity provides a potential pathway for the introduction and/or spread of plant pests.

The following description of this pathway focuses on the conditions that may affect plant pest risk, including morphological and physiological characteristics of the commodity, as well as processes the commodity will undergo from production in China through importation and distribution in the continental United States. These conditions provided the basis for creating the pest list and assessing the likelihood of introduction of the pests selected for further analysis. All components of the pathway, as they are described below define the conditions of the commodity. This risk assessment does not apply to any fruit that falls outside of this scope. Hence, the risk ratings in this risk assessment are contingent upon the application of all components of the pathway.

1.4.1. Description of the commodity

The commodity to be imported is citrus fruits, including *Citrus sinensis* (sweet orange), *C. poonensis* (ponkan), *C. grandis* (= *C. maxima*) cv. *guanximiyou* (pomelo), *C. kinokuni* (Nanfeng honey mandarin), and *C. unshiu* (Satsuma mandarin).

1.4.2. Production and harvest procedures in the exporting area

Planted citrus acreage in China now exceeds 2 million hectares (five million acres). Citrus is produced in the southern area of China in Sichuan, Chongqing, Hubei, Hunan, Guanxi, Jiangxi, Guangdong, Fujian, and Zhejiang provinces (Spreen et al., 2012). Production and harvesting procedures in China have not been specified, so they are not being considered as part of the assessment.

1.4.3. Post-harvest procedures in the exporting area

Post-harvest procedures were not specified. However, the United States has stipulated requirements for the interstate movement of citrus within the United States from areas where *Phyllosticta citricarpa,* the causal agent for citrus black spot, is present, and also from areas where *Xanthomonas citri* subsp. *citri,* the causal agent for citrus canker, is present. Because *P. citricarpa* and *X. citri* subsp. *citri* are present in China, the same precautions would be required for citrus originating there. Therefore we consider the conditions of the commodity to be washing, brushing, and disinfecting. We also considered that fruit other than pomelo could be waxed.

Packinghouse procedures for citrus canker are similar and require fruit to be free of leaves, twigs, and other plant parts, except for stems that are less than 1 inch long and attached to the fruit.

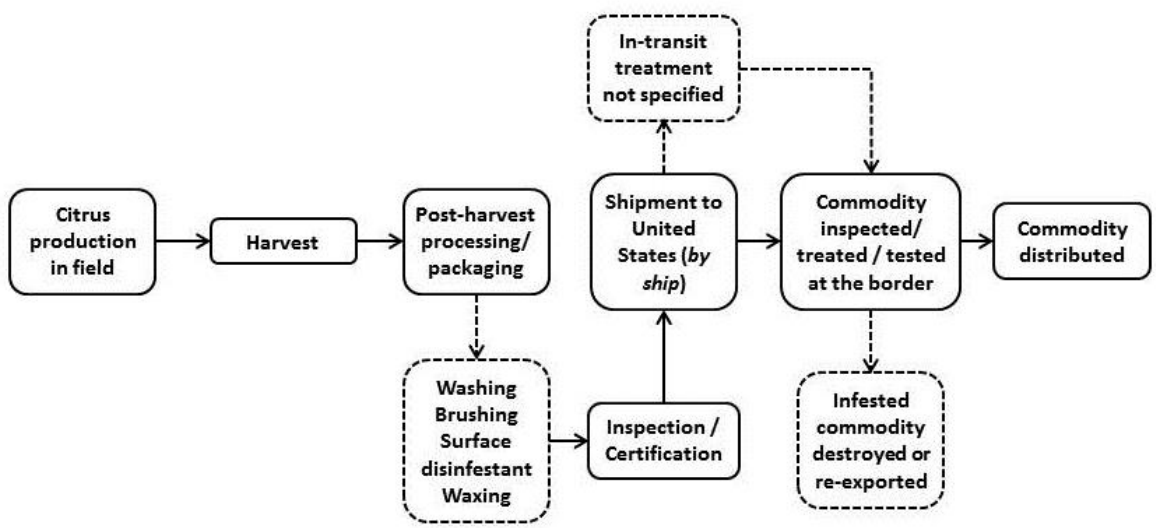
1.4.4. Shipping and storage conditions

Shipping and storage conditions have not been specified, but citrus is typically shipped at temperatures between 0-9 °C, depending on species and variety. Lower temperatures cause injury to fruit (McGregor, 1987).

1.4.5. Summary of the pathway

Figure 1 summarizes the pathway of concern: the importation of fresh fruit of citrus fruit, including *Citrus sinensis* (sweet orange), *C. poonensis* (p33onkan), *C. grandis* (= *C. maxima*) cv. *guanximiyou* (pomelo), *C. kinokuni* (cherry orange), and *C. unshiu* (Satsuma mandarin) for consumption from China into the continental United States.

Figure 1. Pathway diagram for imports of *Citrus* spp. fruit from China into the continental United States.



2. Pest List and Pest Categorization

In this section, we identify the plant pests with actionable regulatory status for the continental United States that could potentially become established in the continental United States as a result of the importation of citrus fruit from China, and we determine which of these pests meet the criteria for further analysis. Pests are considered to be of regulatory significance if they are actionable at U.S. ports-of-entry. Actionable pests include quarantine pests, pests considered for or under official control, and pests that require evaluation for regulatory action.

2.1. Pests considered but not included on the pest list

2.1.1. Pests with weak evidence for association with the commodity or for presence in the export area

Pests in arthropod families with low association with fruit were considered, and only representative species were listed in the pest list. In such cases, a limited number of representatives will be listed with a note in either the Remarks section of the pest list or in section 2.3 ("Notes on pests included in the pest list") explaining how the biology of that group of pests is not likely to be associated with harvested fruit. Representative species were not used for groups where member species are likely to be associated with harvested fruit.

Botryosphaeria berengeriana f. sp. ***pyricola*** (Nose) W. Yamam. The anamorph, *Macrophoma kuwatsukai* Hara, was reported in China (Tai, 1979). However, this is the only record of this pest infecting citrus (Tai, 1979), and no additional records were found to confirm citrus as a host (from China or anywhere else in the world). Therefore, this fungus was not included in the pest list. This pest is known to primarily infect Rosaceous plants such as apples and pears (Farr and Rossman, 2017).

Colletotrichum henanense F. Liu & L. Cai and ***Colletotrichum jiangxiense*** F. Liu & L. Cai have been mentioned as infecting citrus by De Silva et al. (2017). This information is erroneous, as the isolates used by De Silva et al. (2017) correspond to *Camellia sinensis*, not *Citrus sinensis* as indicated by Liu et al. (2015). Therefore, these two pests were not included in the pest list.

Dimerium citricola Saw. et Yamam. is reported from China on citrus in one book (Tai, 1979). No subsequent records of the pathogen were found, nor is the fungus listed as an accepted name in any global fungal databases (e.g., Mycobank, Index Fungorum, USDA Systematic Mycology, and Microbiology Laboratory's Fungal Database). Citrus is a widely cultivated plant. Any impacts of *D. citricola* in citrus would likely be reported in some capacity if citrus were a typical host for this pathogen. There is an overall lack of evidence that this fungus is associated with citrus; therefore, it was not included in the pest list.

Diplodiella oospora (Berk.) Sacc. is reported from citrus (CASI, 1994). However, reports of this infrequent pest originate from Taiwan and not mainland China (CASI, 1994; Sawada, 1959). Since Taiwan is not part of the export area, *D. oospora* was not be included in the pest list.

Elsinoe australis Bitanc. & Jenkins is listed as occurring in China on citrus (CASI, 1994); however, we could not corroborate this record with any additional reports of this pathogen occurring in China. We believe that the citation by CASI (1994) may be erroneous, as *Elsinoe australis* rarely affects leaves of its host (a differentiating factor between it and closely related species) (Timmer et al., 1996) and CASI (1994) lists leaves as being affected. It is likely a confused identification with the related species *E. fawcettii*, which is known to occur in China (Farr and Rossman, 2017). For these reasons, *E. australis* was not included in the pest list.

Eriomycopsis citrifolia (K. Sawada) U. Braun comb. Nov. The basionym *Ramularia citrifolia* Sawada has been associated with citrus species. This is a hyperparasitic fungi living on *Meliola butleri* (Braun, 1993; Crous et al., 2016); therefore, this fungi was not included in the pest list.

Heterochaete tenuicula (Durieu & Lév.) Pat., synonym: *Hydnum tenuiculum* Durieu & Lév and ***Coriolus fibula*** (Fr.) Quél., syonym *Polystictus fibula* var. *fibula* Bres., are Basidiomycetes that grow on dead branches or trunks and are considered wood decay fungi (Iqbal et al., 2017; Roberts, 2008; Murrill, 1905); therefore, these fungi were not included in the pest list.

Irpex lacteus (Fr.) Fr., synonym: *Hirschioporus lacteus* (Fr.) Teng, is present in China and the United States and is reported from citrus (Farr and Rossman, 2017); however, *I. lacteus* is considered a wood decay fungi (Glaeser and Smith, 2010) and therefore was not included in the pest list.

Massaria citricola Syd. has been reported in China (on leaves) (CASI, 1994). This is the only record of this pest on citrus. No additional records have been found under *M. citricola*. Citrus is a widely cultivated plant. Any impacts of *M. citricola* in citrus would likely be reported in some capacity if citrus were a typical host for this pathogen. There is an overall lack of evidence that this fungus is associated with citrus; therefore, it was not included in the pest list.

Microcera larvarum (Fuckel) Gräfenhan, Seifert & Schroers, synonym: *Fusarium larvarum* Fuckel, is present in China and associated with citrus (Tai, 1979). This fungus is entomoparasitic (Gräfenhan et al., 2011; Bills, 2009) and therefore was not included in the pest list.

Multipatina citricola Sawada has been reported in China (Tai, 1979). This is the only other record of this pest on citrus since its description by Sawada in 1926. Moreover, *Multipatina* spp. as well as *Septobasidium* spp. are a group of fungi that cause felt disease on citrus, which does not cause damage the plant because the fungi grow on the surface of the plant without penetrating the plant tissue (NPCS Board of Consultants & Engineers, 2009; Hawksworth et al., 1995); therefore, this fungus was not included in the pest list.

Passalora loranthi is reported from China (Huang et al., 2015a) and with citrus (Huang et al., 2015a; Arzanlou et al., 2008); however, the taxonomy and nomenclature of *Passalora loranthi* is not well defined (Romberg, 2017). *Passalora loranthi* is an invalid name; *Cercospora loranthi* was described in 1903 and invalidly transferred to *Pseudocercospora loranthi* in a Ph.D. thesis, and then an unconfirmed ITS sequence from a culture of the epitype for *P. loranthi* was deposited in GenBank under the name *Passalora loranthi*, but there is no valid publication of this name (Romberg, 2017). As mentioned before the names *Passalora loranthi* and *Pseudocercospora loranthi* were never validly published, so the name associated with the GenBank entry should have been *Cercospora loranthi*. All of the reports of *Passalora loranthi* on various hosts refer back to the original GenBank ITS entry or its derivatives. The ITS region does not have enough resolution in this group for species-level identification, so these are not well-supported identifications. Moreover, it would represent a fungus that typically infects mistletoe in a group that is generally relatively host-specific jumping to a number of new hosts. Based on this information, we do not consider there to be sufficient evidence at this time that *C. loranthi* is a citrus pathogen, or even necessarily a fungus associated with citrus except maybe as an incidental if the citrus is infected with a parasitic mistletoe (Loranthaceae family). We did not include this pest in the pest list because there is high uncertainty on the host association status with *Citrus* spp.

Peroneutypa scoparia (Schwein.) Carmarán & A.I. Romero, synonym: *Peroneutypa heteracantha* (Sacc.) Berl., synonym: *Valsa heteracantha* Sacc., is reported in China with citrus (CASI, 1994). Species in this family (Diatrypaceae, Xylariales) are described mostly as saprotrophic on dead wood, and only few species are characterized as pathogens (Trouillas and Gubler, 2010). This fungus has also been reported from decaying branches in the United States

(California) (Millspaugh and Nuttall, 1923). Previous reports indicate that members of this group are able to grow in living trees as endophytes (de Errasti et al., 2014). *Peroneutypa scoparia* has primary access to the substrate as an endophyte and then this organism may change its use of the available resources and grow saprophytically (de Errasti et al., 2014); therefore, this fungus was not included in the pest list.

Phytophthora boehmeriae (Sawada) was only recorded from citrus once in 1941 (Frezzi, 1941), and we found no subsequent records in the literature linking this pathogen to citrus, either in the field or in trade. Citrus is a widely cultivated plant. Any association of *P. boehmeriae* in citrus would likely be reported in some capacity if citrus were a typical host for this pathogen; therefore, this fungus was not included in the pest list.

2.1.2. Organisms with non-actionable regulatory status

We found evidence of the organisms listed in the appendix being associated with citrus fruit and being present in China; however, because these organisms have non-actionable regulatory status for the continental United States, we did not include them in Table 2 of this risk assessment.

Armored scales (Hemiptera: Diaspididae) are considered non-actionable at U.S. ports-of-entry on fruit and vegetables intended for consumption. For this reason, armored scales were not included in Table 2 but were included in the appendix.

2.1.3. Organisms identified only to the genus level

In commodity import risk assessments, the taxonomic unit for pests selected for evaluation beyond the pest categorization stage is usually the species (IPPC, 2013), as assessments focus on organisms for which biological information is available. Therefore, generally, we do not assess risk for organisms identified only to the genus level, in particular if the genus in question is reported in the import area. Often there are many species within a genus, and we cannot know if the unidentified species occurs in the import area and, consequently, whether it has actionable regulatory status for the import area. On the other hand, if the genus in question is absent from the import area, any unidentified organisms in the genus can have actionable status; however, because such an organism has not been fully identified, we cannot properly analyze its likelihood and consequences of introduction.

In light of these issues, we usually do not include organisms identified only to the genus level in the main pest list. Instead, we address them separately in this sub-section. The information here can be used by risk managers to determine if measures beyond those intended to mitigate fully identified pests are warranted. Often, however, the development of detailed assessments for known pests that inhabit a variety of ecological niches, such as internal fruit feeders or foliage pests, allows effective mitigation measures to eliminate the known organisms as well as similar but incompletely identified organisms that inhabit the same niche.

Table 1. Organisms identified to the genus level that are reported on citrus in China and that have actionable or undetermined regulatory status.

Pest name	Evidence of presence on *Citrus* sp. in China	Genus present in continental U.S.?	Regulatory status[1]	Plant part(s) association[2]	On harvested fruit?[3]	Remarks
Acrocercops sp.	CASI, 1994	Yes (Opler, 1974)	U	Leaf (see Remarks)	No	Plant part association is based on Gracillariidae in general (Borror et al., 1989).
Anomis sp.	CASI, 1994	Yes (Lafontaine and Schmidt, 2013)	U	Fruit (Hattori, 1969)	No	Fruit-piercing adult moth, only feeds briefly (Hattori, 1969).
Autoserica sp.	CASI, 1994	Yes (Britton, 1935)	U	Flower (Britton, 1935)	No	
Cacoecia sp.	CASI, 1994	Yes (Obraztsov, 1962)	U	Leaf (see Remarks)	No	Leaf-roller. See section 2.3.
Calandra sp.	CASI, 1994	Yes (Cotton, 1920)	U	Grain seeds (Cotton, 1920)	No	
Contarinia sp.	CASI, 1994	Yes (Chen et al., 2009b)	U	Flower bud, leaf, stem (see Remarks)	No	Plant part association is based on Cecidomyiidae in general (Borror et al., 1989) and *C. citri* (see Table 2).
Diplodia sp.	Farr and Rossman, 2013	Yes (Farr and Rossman, 2013)	U	Leaf, fruit (Farr and Rossman, 2013)	Yes	
Homona sp.	CASI, 1994	No	A	Leaf (see Remarks)	No	Leaf-roller. See section 2.3.
Hoplia sp.	CASI, 1994	Yes (Blatchley, 1929)	U	Leaf, flower (Borror et al., 1989)	No	

[1] A=Actionable, U=Undetermined. If the genus does not occur in the continental United States, the organism has actionable status. If the genus occurs in the continental United States, the organism has undetermined regulatory status, because we cannot know if the unidentified species is one that occurs in the continental United States.

[2] The plant part(s) listed are those for the plant species under analysis. If the information is extrapolated, such as from plant part association on other plant species, this is noted.

[3] "Yes" indicates the pest has a reasonable likelihood of being associated with the harvested fruit.

Pest name	Evidence of presence on *Citrus* sp. in China	Genus present in continental U.S.?	Regulatory status[1]	Plant part(s) association[2]	On harvested fruit?[3]	Remarks
Hypera sp.	CASI, 1994	Yes (Radcliffe and Flanders, 1998)	U	Stem (Puttler, 1967)	No	
Lucanus sp.	CASI, 1994	Yes (Staines, 2001)	U	Decaying wood (Borror et al., 1989)	No	Stag beetle.
Oidium sp.	Farr and Rossman, 2013	Yes (Farr and Rossman, 2013)	U	Leaf (Farr and Rossman, 2013)	Yes	
Pachydiplosis sp.	CASI, 1994	No	A	Stem (Hidaka et al., 1988)	No	All references found refer to the rice gall midge: *Pachdiplosis oryzae*.
Parandra sp.	CASI, 1994	Yes (Hovore and Giesbert, 1976)	U	Stem (Hovore and Giesbert, 1976)	No	Wood-boring beetle.
Phoma sp.	Farr and Rossman, 2013	Yes (Farr and Rossman, 2013)	U	Leaf, fruit (Farr and Rossman, 2013)	Yes	
Serica sp.	CASI, 1994	Yes (McPeak et al., 2006)	U	Leaf, flower (Borror et al., 1989)	No	
Sympiezomias sp.	CASI, 1994	No	A	Leaf (Wang et al., 2009)	No	
Tetranychus sp.	CASI, 1994	Yes (Baker, 1979)	U	Leaf (Jeppson et al., 1975)	No	

2.2. Pest list

In Table 2, we list the actionable pests potentially associated with harvested citrus that occur in China. The list comprises those actionable pests that occur in China on any host and are reported to be associated with *Citrus* spp., whether in China or elsewhere in the world. For each pest, we indicate 1) the part of the imported plant species with which the pest is generally associated, and 2) whether the pest has a reasonable likelihood of being associated, in viable form, with the commodity following harvesting from the field and prior to any post-harvest packinghouse procedures. We developed this pest list based on the scientific literature, port-of-entry pest interception data, and information provided by the government of China. Pests in shaded rows are pests considered for further evaluation, as we consider them reasonably likely to be associated with the harvested commodity (see section 2.4).

Table 2. Actionable pests reported on *Citrus* spp. (in any country) and present in China (on any host).

Pest name	Evidence of presence in China	Association with *Citrus* spp.[4]	Plant part(s) association[5]	On harvested fruit?[6]	Remarks
ACARI					
Eriophyidae					
Aculops suzhouensis Xin & Ding	CASI, 1994	CASI, 1994	Leaf, fruit (Xin and Ding, 1982, in Vacante, 2010a)	Yes	
Tenuipalpidae					
Brevipalpus junicus Ma & Yuan	CASI, 1994	CASI, 1994	Leaf, fruit, stems (see Remarks)	Yes	Plant part associations are based on closely related species of *Brevipalpus* [*B. californicus* (Banks) and *B. obovatus* Donnadieu] (Childers, 1994; Jeppson et al., 1975). According to Mesa et al. (2009), this name is suspected to be a junior synonym of *B. californicus* (Banks), which occurs in the United States.
Tetranychidae					
Acanthonychus jianfengensis Wang	CASI, 1994	CASI, 1994	Leaf, fruit (see Remarks)	Yes	Plant part association is based on other members of Tetranychidae (Borror et al., 1989).
Bryobia graminum (Schrank)	Bolland et al., 1998	Bolland et al., 1998	Leaf (Vacante, 2010a)	No	
Eotetranychus cendanai Rimando	Migeon and Dorkeld, 2006-2017	Bolland et al., 1998	Leaf, fruit (Thongtab et al., 2002)	Yes	

[4] If the pest occurs on the commodity and where appropriate, the host status is indicated. Host types are explained in *Guidelines for Plant Pest Risk Assessment of Imported Fruit and Vegetable Commodities* (PPQ, 2012).
[5] The plant part(s) listed are those for the plant species under analysis. If the information is extrapolated, such as from plant part association on other plant species, this is noted.
[6] "Yes" indicates simply that the pest has a reasonable likelihood of being associated with the harvested commodity; the level of pest prevalence on the harvested commodity (low, medium, or high) is qualitatively assessed in Risk Element A1 as part of the likelihood of introduction assessment (section 3).

Eotetranychus kankitus Ehara	CASI, 1994; Gao et al., 2012	CASI, 1994; Gao et al., 2012	Leaf (Zhou et al., 1999)	No	
Eutetranychus orientalis (Klein)	CASI, 1994	Migeon and Dorkeld, 2006-2017	Leaf (Vacante, 2010a); leaf, fruit (Smith Meyer, 1998)	Yes	Primarily a leaf feeder causing leaf drop and resulting in stem dieback (Vacante, 2010b). Fruit is damaged only when populations are heavy after leaf drop [Childers, (n.d.); Smith et al., 1997].
Mixonychus ganjuis Qian,Yuan & Ma	CASI, 1994	CASI, 1994	Leaf, fruit (see Remarks)	Yes	Plant part association is based on other members of Tetranychidae (Borror et al., 1989).
Oligonychus biharensis (Hirst)	Bolland et al., 1998	Bolland et al., 1998	Leaf (Kaimal and Ramani, 2011)	No	
Panonychus elongatus Manson	Migeon and Dorkeld, 2013	Migeon and Dorkeld, 2006-2017	Leaf (Shih et al., 1993)	No	
Schizotetranychus baltazarae Rimando	Bolland et al., 1998	Bolland et al., 1998	Leaf, fruit (Jeppson et al., 1975)	Yes	
Tetranychus fijiensis Hirst	CASI, 1994	CASI, 1994	Leaf (Wongsiri, 1991)	No	
Tetranychus taiwanicus Ehara	CASI, 1994	Wongsiri, 1991	Leaf (Wongsiri, 1991)	No	
Tuckerellidae					
Tuckerella knorri Baker & Tuttle	Lin, 1982	Ochoa, 1989	Fruit, stem (Ochoa, 1989)	Yes	May be found in the crevice of the epidermis of the citrus fruit (Ochoa, 1989).
INSECTA					
Coleoptera: Anthribidae					
Phloeobius alternans Wiedemann syn.: *P. alternatus* (Wiedemann)	Hua, 2002; CASI, 1994	Hua, 2002; CASI, 1994	Twig (see Remarks)	No	Most anthribids are associated with dead wood and fungi, and some feed on seeds (Hill, 1994).
Coleoptera: Attelabidae					
Apoderus nigroapicatus Jekel	Li et al., 1997; CASI, 1994	CASI, 1994; Li et al., 1997	Leaf (see Remarks)	No	Species in this family typically feed on and roll leaves (Hill, 1994).

Paroplapoderus pardalis (Vollenhoven)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Apoderus nigroapicatus*.
Coleoptera: Buprestidae					
Agrilus auriventris (Saunders)	Cheng et al., 2015; Li et al., 1997	Cheng et al., 2015; Li et al., 1997	Stem (Jeppson, 1989)	No	Bore into trunk or twig (Ohgushi, 1967).
Agrilus citri Thery	GAQSIQ, 2011	GAQSIQ, 2011	Trunk (Singh and Kaur, 2016)	No	
Agriolima agrestis L.	GAQSIQ, 2011	GAQSIQ, 2011	Growing point, leaf, root (GAQSIQ, 2011)	No	
Chalcophora japonica Gory	CASI, 1994	CASI, 1994	Stem, trunk (Hill, 2002)	No	
Chalcophorella amabilis Snellen Van Vollenhoven	CASI, 1994	CASI, 1994	Branches, trunk (see Remarks)	No	Larval buprestids generally feed on woody material or are leaf miners. See section 2.3 for more details.
Chrysobothris succedanea Saunders	GAQSIQ, 2011	GAQSIQ, 2011	Branch (GAQSIQ, 2011)	No	
Chrysochroa fulgidissima Schöenherr	CASI, 1994	CASI, 1994	Stem, trunk (Hill, 2002)	No	
Coroebus quadriundulatus Motschulsky	Hua, 2002	Hua, 2002	Branches, trunk (see Remarks)	No	See remarks for *Chalcophorella amabilis*.
Coroebus sidae Kerremans	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Chalcophorella amabilis*.
Ptosima chinensis Marseul	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Chalcophorella amabilis*.
Trachys niedita Saunders	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Chalcophorella amabilis*.
Coleoptera: Cerambycidae					
Acalolepta permutans (Pascoe)	Hua, 2002	Hua, 2002	See Remarks	No	Cerambycidae generally feed on woody material. See section 2.3 for more details.
Aeolesthes chrysothrix thibetaus (Gressitt)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Acalolepta permutans*.
Aeolesthes induta (Newman)	CASI, 1994	CASI, 1994	Larvae develop in wood	No	

			(Bhawane and Mamlayya, 2013)		
Aeolesthes sinensis Gahan	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Acalolepta permutans*.
Anaesthetobrium lieuae Gressitt	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Acalolepta permutans*.
Anoplophora horsfieldi (Hope)	CASI, 1994	CASI, 1994	Larvae tunnel in the upper part of trees (de Tillesse et al., 2007)	No	
Anoplophora chinensis (Forster)	Niu et al., 2014	Niu et al., 2014	Leaf, stem (Gyeltshen and Hodges, 2005)	No	
Anoplophora chinensis macularia (Thomson)	CASI, 1994	CASI, 1994	Leaf, root, stem (CABI, 2017)	No	
Anoplophora davidis (F.)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	Species of *Anoplophora* typically attack stems (Lingafelter and Hoebeke, 2002).
Anoplophora elegans (Gahan)	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	Species of *Anoplophora* typically attack stems (Lingafelter and Hoebeke, 2002).
Anoplophora imitatrix (White)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	Species of *Anoplophora* typically attack stems (Lingafelter and Hoebeke, 2002).
Anoplophora malasiaca (Thomson)	GAQSIQ, 2011	GAQSIQ, 2011	Trunk (Fujiwara-Tsujii et al., 2016)	No	
Aphrodisium gibbicolle White	CASI, 1994	CASI, 1994	Stem, trunk (see Remarks)	No	Plant part association is based on other species in the genus (Hill, 1987).
Apomecyna excavaticeps Pic syn: *Apomecyna saltator* (F.)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	*Apomecyna excavaticeps* is a synonym of *A. saltator* (F.)

					(Barsevskis et al., 2017). Plant part association is based on Cerambycidae in general (Evans et al., 2004).
Apriona germarii (Hope)	Li et al., 1997	Li et al., 1997	Stem, trunk (see Remarks)	No	Plant part association is based on other species in the genus (Hill, 1987).
Aristobia approximator (Thomson)	Hua, 2002	Hua, 2002	Bark (Bijalwan et al., 2014)	No	
Aristobia hispida Saunders	CASI, 1994	CASI, 1994	Stem, bark (see Remarks)	No	Plant part association is based on other species in the genus (Hutacharern and Tubtim, 1995; Ho et al., 1990)
Aristobia horridula (Hope)	Hua, 2002	Hua, 2002	Stem (larvae), bark (adult) (Hutacharern and Tubtim, 1995)	No	
Aristobia testudo (Voet)	CASI, 1994	CASI, 1994	Twig (larvae), bark (adult) (Ho et al., 1990)	No	
Aromia bungii (Faldermann)	Li et al., 1997	Li et al., 1997	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Batocera numitor Newman	Hua, 2002	Hua, 2002	Stem (Sudhi-Aromna et al., 2007)	No	
Batocera rubus L.	CASI, 1994	CASI, 1994	Leaf, stem (CABI, 2017)	No	
Blepephaeus succinctor (Chevrolat)	CASI, 1994	CASI, 1994	Stem (see Remarks	No	See remarks for *Acalolepta permutans*.
Ceresium flavipes (F.)	CASI, 1994	CASI, 1994	Larvae under bark (Sudre and Téocchi, 2000)	No	
Ceresium sculpticolle Gressitt	Hua, 2002	Hua, 2002	Stem (see Remarks	No	See remarks for *Acalolepta permutans*.
Ceresium sinicum White	Li et al., 1997	Li et al., 1997	Stem (Kojima, 1931)	No	
Ceresium zegentatum longicorne Pic	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.

Chelidonium argentatum (Dalman)	Niu et al., 2014; CASI, 1994	Niu et al., 2014; CASI, 1994	Stem (Wang, 2017)	No	
Chelidonium cinctum Guérin-Méneville	CASI, 1994	CASI, 1994	Stem (Alam, 1975)	No	
Chelidonium cirri Gressitt	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Chelidonium citri Gressitt	CASI, 1994	CASI, 1994	Stem (Liu, 2003)	No	
Chelidonium gibbicolle (White)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	Bores under bark (Sabbatini Peverieri and Roversi, 2012).
Chelidonium sinense (Hope)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Chlorophorus annularis F.	CASI, 1994	CASI, 1994	Stem, trunk (Duffy, 1968)	No	
Chlorophorus signxticollis (Castelnau et Gory)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Coptops szechuanica Gressitt	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Dihammus cervinus (Hope)	CASI, 1994	CASI, 1994	Wood (Hanks, 1999)	No	
Dihammus permutans permutans (Pascae)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Dorysthenes granulosus Thomson	CASI, 1994	CASI, 1994	Root (Wickham et al., 2016)	No	
Dorysthenes walkeri (Waterhouse)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Eurypoda antennata Saunders	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Margites auratonotatus Pic	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Margites fulvidus (Pascoe)	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Massicus raddei (Blessig)	Li et al., 1997	Li et al., 1997	Trunk (Tang et al., 2011)	No	

Mesosa japonica Bates	CASI, 1994	CASI, 1994	Stem (Cherepanov, 1990)	No	
Mesosa myops (Dalman)	Yang et al., 2013	Anonymous, 1990	Stem (see Remarks)	No	Larvae feed on stems, felled trees, weak and dying trees, and exposed roots (Cherepanov, 1990).
Mesosa perplexa Pascoe	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Nadezhdiella cantori (Hope)	GAQSIQ, 2011; Niu et al., 2014	GAQSIQ, 2011; Niu et al., 2014	Stem (Wang and Zeng, 2004); branches (GAQSIQ, 2011)	No	
Niphona hookeri Gahan	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Oberea formosana Pic	Li et al., 1997	Li et al., 1997	Stem (see Remarks)	No	Species of *Oberea* typically attack stems (Hill, 1983).
Oberea fuscipennis Chevrolat	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Oberea formosana*.
Phaula gracilis Matsumura et Shiraki	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Philus antennatus Gyllenhaal	CASI, 1994	CASI, 1994	Root (Chiu, 2006)	No	
Philus pallescens pallescens Bates	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Polyzonus sinense (Hope)	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Prionus insularis Motschulsky	Li et al., 1997	Li et al., 1997	Stem (Kojima, 1929)	No	
Priotyrranus closteroides (Thomson)	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Psacothea hilaris (Pascoe)	Li et al., 1997	Li et al., 1997	Stem (Jucker et al., 2006)	No	
Pseudaeolesthes chrysothrix tibetanus Gressitt	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Pseudonemophas versteegi (Ritsema) syn.: *Annamanum versteegi*	Gao et al., 2012; Hua, 2002; CASI, 1994	Gao et al., 2012; Hua, 2002; CASI, 1994	Stem (Jeppson, 1989); trunk (Kumawat et al., 2015)	No	*Annamanum versteegi* and *Anoplophor versteegi* are synonyms of *P.*

(Ritsema), *Anoplophora versteegi* (Ritsema)					*versteegi* (Barsevskis et al., 2017).
Rondibilis chengtuensis Gressitt	Hua, 2002	Hua, 2002	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Sybra punctatostriata Bates	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Trachylophus sinensis Gahan	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Trichoferus campestris (Faldermann)	Li et al., 1997	Li et al., 1997	Branches, trunk (see Remarks)	No	Larvae under bark of healthy or distressed trees (Dascălu et al., 2013).
Trirachys orientalis Hipe	CASI, 1994	CASI, 1994	Stem (see Remarks)	No	See remarks for *Acalolepta permutans*.
Xylotrechus chinensis Chevrolat	CASI, 1994	CASI, 1994	Branches, trunk (see Remarks)	No	Larvae develop in wood (Cherepanov, 1990).
Xylotrechus grayii grayii (White)	Hua, 2002	Hua, 2002	Species of *Xylotrechus* typically attack stems (Baker, 1972)	No	
Xystrocera globosa (Olivier)	Hua, 2002	Hua, 2002	Borer (Kumawat et al., 2015)	No	
Coleoptera: Chrysomelidae					
Argopus nigrifrons Chen	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	Species of Chrysomelidae typically feed on leaves (Baker, 1972). See section 2.3 for more details.
Aspidomorpha difformis (Motschulsky)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Aspidomorpha miliaris (F.)	Hua, 2002	Hua, 2002	Leaf (Nakamura and Abbas, 1987)	No	
Aulacophora cattigarensis Weise	CASI, 1994	CASI, 1994	Leaf (Kong et al., 2005)	No	

Aulacophora femoralis chinensis Weise	CASI, 1994	CASI, 1994	Leaf (Abe and Matsuda, 2005)	No	
Aulacophora lewisi Baly	Hua, 2002	Hua, 2002	Leaf (Abe and Matsuda, 2005)	No	
Aulacophora nigripennis Motschulsky	Aston, 2009	Anonymous, 1990	Leaf (Livia, 2006)	No	
Basiprionota bisignata (Boheman)	Li et al., 1997	Li et al., 1997	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Cassida circumdata Herbst	Li et al., 1997	Li et al., 1997	Leaf (Ghate et al., 2003)	No	
Cassida concha Solsly	Hua, 2002	Hua, 2002	Leaf (Hill, 1987)	No	
Cassida obtusata Boheman	Hua, 2002	Hua, 2002	Leaf (Gomes et al., 2012)	No	
Cleoporus variabilis (Baly)	Li et al., 1997	Li et al., 1997	Leaf (Yuasa, 1934)	No	
Clitea metallica Chen	Niu et al., 2014; CASI, 1994	Niu et al., 2014; CASI, 1994	Fruit, inflorescence, leaf (Jeppson, 1989; Nguyen, 2008)	No	Larvae may graze on the surface of developing fruit (Nguyen, 2008), but are considered unlikely to be present on mature fruit at harvest.
Coptocephala pallens F.	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Dactylispa angulosa (Solsky)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Dactylispa* typically feed on leaf (Hill, 1983).
Dactylispa excisa (Kraatz)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Dactylispa* typically feed on leaf (Hill, 1983).
Dactylispa excisa repanda Weise	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Dactylispa* typically feed on leaf (Hill, 1983).
Exosoma flaviventre (Motschulsky)	Kimoto, 1965	Anonymous, 1990	Leaf (Livia, 2006)	No	
Gonioctena rubripennis Baly	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Gonioctena* feed on leaves (Takizawa, 1976).
Haplosomoides costata (Baly)	CASI, 1994	CASI, 1994	Shoot, Leaf (Liu et al., 2012)	No	

Lema coromandeliana (F.)	Gao et al., 2012	Gao et al., 2012	Leaf (Kalaichelvan and Verma, 2005)	No	
Lema fortunei Baly	Li et al., 1997	Li et al., 1997	Leaf (Cho and Lee, 2005)	No	
Lema honorata Baly	Gao et al., 2012	Gao et al., 2012	Leaf (Kuwayama, 1932)	No	
Medythia nigrobilineata (Motschulsky)	Li et al., 1997	Li et al., 1997	Leaf, root (Toepfer et al., 2014)	No	
Metriona thais Boheman	CASI, 1994	CASI, 1994	Leaf (Yuasa, 1931)	No	
Mimastra cyanura Hope	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Mimastra* feed on leaves (Ding et al., 2004).
Mimastra grahami Gressitt et Kimoto	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	Species of *Mimastra* feed on leaves (Ding et al., 2004).
Morphosphaera japonica (Hornstedt)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Nodina punctostriolata (Fairmaire)	Gao et al., 2012; Hua, 2002	Gao et al., 2012; Hua, 2002	Leaf (Chen et al., 2010)	No	
Oides decempunctata (Billberg)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Oulema oryzae (Kuwayama)	CASI, 1994	CASI, 1994	Leaf (Kidokoro, 1983)	No	
Paraluperodes sututalis nigrobilineatus (Motschulsky)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Phratora laticollis (Suffrian)	Gao et al., 2012	Gao et al., 2012	Leaf (Alford, 2012)	No	
Phratora rubripennis Baly	Hua, 2002	Hua, 2002	Leaf (Takizawa, 1976)	No	
Physauchenia bifasciata Jacoby	Hua, 2002	Hua, 2002	Leaf (Livia, 2006)	No	
Plagiodera versicolora (Laicharting)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Plagiodera* typically feed on leaf (Baker, 1972).
Platycorynus costipennis (Chen)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.

Podagricomela nigricollis Chen	Cheng et al., 2015	Cheng et al., 2015	Leaf (Wang, 1937)	No	
Podagricomela weise Heikerringer	Li et al., 1997	Li et al., 1997	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Podagricomela weisei weisei Heikerringer	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Podontia lutea (Olivier)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Podentia* feed on the leaf (Prathapan and Chaboo, 2011).
Prodagricomela nigricollis	Hill, 2008	Hill, 2008	Leaf (Hill, 2008)	No	
Sagra femorata purpurea Iichtenstein	Hua, 2002	Hua, 2002	Stem borer (Maulik, 1941)	No	
Taiwania circumdata (Herbst)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Taiwania* feed on the leaf (Ding et al., 2004).
Taiwania obtusata (Boheman)	CASI, 1994; Hua, 2002	CASI, 1994; Hua, 2002	Leaf (see Remarks)	No	See remark for *Taiwania circumdata*.
Taiwania imparata (Gressitt)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	See remark for *Taiwania circumdata*.
Taiwania versicolor (Boheman)	Li et al., 1997	Li et al., 1997	Leaf (Kawabe et al., 2006)	No	
Thlaspida biramosa japonica Spaeth	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See remark for *Argopus nigrifrons*.
Throscoryssa citri Maulik	CASI, 1994	CASI, 1994	Leaf miner (Zaka-ur-Rab, 1991)	No	
Coleoptera: Coccinellidae					
Henosepilachna vigintioctomaculata Motschulsky	CASI, 1994	CASI, 1994	Leaf (Hoshikawa, 1983)	No	
Coleoptera: Curculionidae					
Aclees cribratus Gyllenhal	Hua, 2002	Hua, 2002	Leaf, stem (Ciampolini et al., 2005)	No	
Alcidodes trifidus (Pascoe)	CASI, 1994	CASI, 1994	Stem (Britton et al., 2001)	No	
Anthonomus pomorum (L.)	Hua, 2002	Hua, 2002	Flower bud, leaf (CABI, 2013)	No	

Atactogaster orientalis Chevrolat	Hua, 2002	Hua, 2002	Root, stem (see Remarks)	No	Lixinae (subfamily) species typically feed on roots and stems (Arnett et al., 2002).
Calomycterus obcoinicus Chao	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Calomycterus* typically feed on the leaf (Hartzell, 1953).
Chlorophanus grandis Roelofs	Li et al., 1997; CASI, 1994	Li et al., 1997; CASI, 1994	Leaf (see Remarks)	No	Species of *Chlorophanus* typically feed on the leaf (Maisner, 1969).
Chlorophanus lineolus Motschulsky	Li et al., 1997; CASI, 1994	Li et al., 1997; CASI, 1994	Leaf (see Remarks)	No	Species of *Chlorophanus* typically feed on the leaf (Maisner, 1969).
Corigetus sieversi Reitter syn.: *Platymycterus sieversi* (Reitter)	Hua, 2002	Hua, 2002	Leaf, roots (Arnett et al., 2002)	No	Entiminae (subfamily) species typically feed on foliage, roots, flowers, or buds (Arnett et al., 2002).
Echinocnemus bipunctatus Roeloff syn.: *Echinocnemus squameus* (Billberg)	Li et al., 1997; CASI, 1994	CASI, 1994; Li et al., 1997	Leaf (Heinrichs, 1994)	No	*Echinocnemus* are typically associated with aquatic grasses in the Old World (Oberprierler and Boyd, 2008).
Euwallacea fornicatus Wood & Bright	CABI, 2013	CABI, 2013	Bark, stem, wood (CABI, 2013); trunk, branch, fruit, seed (Wang and Yuan, 2003)	No	Reference on fruit and seed was for *Litchi chinensis* (Sapindaceae) and has not been corroborated (Li et al., 2016). This species is in the United States (CA, FL, and HI) (CABI, 2017).
Hypomeces squamosus Fabricius	CABI, 2013; GAQSIQ, 2011; Li et al., 1997; CASI, 1994	CABI, 2013; GAQSIQ, 2011; Li et al., 1997; CASI, 1994	Leaf, root (GAQSIQ, 2011)	No	

Hypothenemus eruditus Westwood	Hua, 2002	Hua, 2002	Bark, stems (see Remarks)	No	Host association is based on plant parts typically associated with *Hypothenemus* (Arnett et al., 2002).
Lepropus flavovittatus Pascoe	CASI, 1994; Hua, 2002	CASI, 1994; Hua, 2002	Leaf, roots (see Remarks)	No	Entiminae (subfamily) species typically feed on foliage, roots, flowers, or buds (Arnett et al., 2002).
Lixus ochraceus (Boheman)	Gao et al., 2012	Gao et al., 2012	Stem (Gültekin, 2007)	No	
Ornatalcides trifidus (Pascoe) syn.: *Mesalcidodes trifidus* Pascoe	CASI, 1994; Hua, 2002	CASI, 1994; Hua, 2002	Leaf, stem (Frye et al., 2007)	No	
Phyllobius longicornis Roelofs	CASI, 1994	CASI, 1994	Leaf, inflorescence (see Remarks)	No	Host association is based on plant parts typically associated with *Phyllobius* (Alford, 2012).
Piazomias lewisi Roelofs	Hua, 2002	Hua, 2002	Leaf, roots (Arnett et al., 2002)	No	See remark for *Lepropus flavovittatus.*
Platymycteropsis mandarinus (F.)	GAQSIQ, 2011; Li et al., 1997	GAQSIQ, 2011; Li et al., 1997	Leaf (GAQSIQ, 2011)	No	
Scepticus insularis Roelofs	CASI, 1994	CASI, 1994	Leaf (Kaneno, 1927)	No	
Scepticus tigrinus (Roelofs)	Hua, 2002	Hua, 2002	Leaf, roots (Arnett et al., 2002)	No	See remark for *Lepropus flavovittatus.*
Sympiezomias citri Chao	CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Gao et al., 2012	CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Gao et al., 2012	Leaf (GAQSIQ, 2011; Xiang et al., 2012)	No	
Sympiezomias cribricollis Kono	Hua, 2002; Li et al., 1997	Hua, 2002; Li et al., 1997	Leaf (GAQSIQ, 2011; Remadevi et al., 2005)	No	Species in this genus typically feed on leaf (GAQSIQ, 2011; Remadevi et al., 2005).
Sympiezomias lewisi Roelofs	CASI, 1994; Li et al., 1997	CASI, 1994; Catling et al., 1977; Li et al., 1997	Leaf (GAQSIQ, 2011; Remadevi et al., 2005)	No	See remark for *S. cribricollis.*
Sympiezomias velatus Kôno	GAQSIQ, 2011	GAQSIQ, 2011	Leaf, flower (GAQSIQ, 2011)	No	

Xyleborus interjectus Blandford	GAQSIQ, 2011	GAQSIQ, 2011	Branches (GAQSIQ, 2011)	No	
Coleoptera: Elateridae					
Agriotes sericeus Candèze	CASI, 1994	CASI, 1994	Soil (Kuwayama et al., 1960)		
Anthracalaus moricei Fairmaire	CASI, 1994	CASI, 1994	Seed, root (see Remarks)	No	Species of Elateridae feed on planted seeds and roots (Metcalf and Metcalf, 1993). See section 2.3 for more details on Elateridae.
Campsosternus gemma Candèze	CASI, 1994	CASI, 1994	Seed, root (see Remarks)	No	See remark for *Anthracalaus moricei*.
Ectinus sericeus (Candèze)	Hua, 2002	Hua, 2002	Root (Jedlicka and Frouz., 2007)	No	
Hemiops nigripes Lapoto de Cast	CASI, 1994	CASI, 1994	Seed, root (see Remarks)	No	See remark for *Anthracalaus moricei*.
Hemiops sinensis Candèze	Hua, 2002	Hua, 2002	Seed, root (see Remarks)	No	See remark for *Anthracalaus moricei*.
Melanotus tanmsuyensis Bates	CASI, 1994	CASI, 1994	Seed, root (see Remarks)	No	Species of *Melanotus* are reported to feed on inflorescence and roots (Hill, 1983).
Thamnastullus fulthallus Flund	CASI, 1994	CASI, 1994	Seed, root (see Remarks)	No	See remark for *Anthracalaus moricei*.
Coleoptera: Lampyridae					
Luciola chinensis (L.)	Hua, 2002	Hua, 2002	Leaf (see Remarks)	No	In general, larval lampyrids are predaceous, and adult lampyrids feed on vegetation (Borror et al., 1989).
Coleoptera: Lucanidae					
Calcocles sinensis Westw.	CASI, 1994	CASI, 1994	See Remarks	No	Larvae in rotting wood; adults eat nectar or sap (Hill, 1994). See section 2.3 for more details on Lucanidae.

Dorcus antaeus Hope	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Eurytrachelus platymelus Saunders	CASI, 1994	CASI, 1994	See Remarks	No	See remark for *Calcocles sinensis*.
Lucanus fortueni Saunders	Hua, 2002	Hua, 2002	See Remarks	No	Species of *Lucanus* typically feed on stems (Baker, 1972).
Neolucanus championi Pany	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Neolucanus sinicus Saunders	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Odontolabis cuvera Hope	CASI, 1994	CASI, 1994	See Remarks	No	See remark for *Calcocles sinensis*.
Odontolabis siva Hope and Westwood	CASI, 1994	CASI, 1994	See Remarks	No	See remark for *Calcocles sinensis*.
Prismognathus angularis Waterhouse	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Prosopocoilus astacoides astacoides (Hope)	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Prosopocoilus cilipes Thomson	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Prosopocoilus ovatus melli Kriesche	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Prosopocoilus oweni oweni (Hope and Westwood)	Hua, 2002	Hua, 2002	See Remarks	No	See remark for *Calcocles sinensis*.
Serrognathus titanus Boisduval	CASI, 1994	CASI, 1994	See Remarks	No	See remark for *Calcocles sinensis*.
Coleoptera: Lycidae					
Plateros tuberculatus Pic	Hua, 2002	Hua, 2002	Flower, leaf (Hill, 1994)	No	
Coleoptera: Meloidae					
Epicauta aptera Kaszab	Hua, 2002	Hua, 2002	Pollen (adults) (see Remarks)	No	Meloidae adults eat pollen, and larvae are in the ground (Hill, 1994).

Mylabris phalerata (Pallas)	Hua, 2002	Hua, 2002	Pollen (adults) (see Remarks)	No	Meloidae adults eat pollen, and larvae are in the ground (Hill, 1994).
Coleoptera: Melolonthidae					
Apogonia cribricollis Burmeister	CASI, 1994	CASI, 1994	Leaf (Yunus and Hua, 1980)	No	
Coleoptera: Nitidulidae					
Carpophilus humeralis (F.)	CABI, 2017	CABI, 2017	See Remarks	No	Nitidulidae feed on flowers, decaying fruits, sap, fungi, decaying plant material, dead animal tissue, cereals, and dried fruit (Hayashi, 1978; Borror et al., 1989).
Librodor japonicas Molschulsky	CASI, 1994	CASI, 1994	See Remarks	No	See remark for *Carpophilus humeralis.*
Coleoptera: Prionoceridae					
Idgia deusta Fairmaire	CASI, 1994	CASI, 1994	See Remarks	No	Some adult Prionoceridae feed on pollen; larvae are under bark, in soil, and in leaf litter; are predaceous or saprophagous (Yang et al., 2013).
Coleoptera: Scarabaeidae					
Adoretus capripes Hope	CASI, 1994	CASI, 1994	Leaf, fruit (adults); roots (larvae) (see Remarks)	No	Adult *Adoretus* feed on leaves and fruit (Hill, 1983); larvae feed on roots (Hill, 1987). Adults may feed on the fruit surface, causing damage. Adults are mobile and are unlikely to follow the pathway.
Adoretus formosanus Ohaus	CASI, 1994	CASI, 1994	Leaf, fruit (adults); roots	No	See remark for *A. capripes*.

			(larvae) (see Remarks)		
Adoretus sinicus Burmeister	Li et al., 1997	Li et al., 1997	Leaf (Mau and Kessing, 1991)	No	See remark for As for *A. capripes*.
Adoretus tenuimaculatus Waterhouse	Cheng et al., 2015	Cheng et al., 2015	Fruit, leaf (Lee et al., 2002); roots (GAQSIQ, 2011)	No	Attack on citrus fruit is restricted to the calyx (Lee et al., 2002), which is deciduous.
Adoretus umbrosus F.	CASI, 1994	CASI, 1994	Leaf, fruit (adults); roots (larvae) (see Remarks)	No	See remark for *A. capripes*.
Agestrata orichalcea L.	CASI, 1994	CASI, 1994	Roots (see Remarks)	No	Adult Cetoniinae (subfamily) species are principally pollen feeders, and larvae feed in the soil on organic matter and roots (Borror et al., 1989). Adults are mobile and are unlikely to follow the pathway.
Anomala albopilosa Hope	CASI, 1994	CASI, 1994	Leaf, root (Muraji et al., 2008)	No	
Anomala castaneoventris Bates	CASI, 1994	CASI, 1994	Roots, leaves, fruit (see Remarks)	No	In general, larval members of the Rutelinae (subfamily) feed on roots, and the adults feed on leaves and ripe fruit (Borror et al., 1989). Adults are mobile and are unlikely to follow the pathway.
Anomala corpulenta Motschulsky	Li et al., 1997	Li et al., 1997	Leaf (Kuoh and Chang, 1959)	No	
Anomala cuprea Hope	Li et al., 1997	Li et al., 1997	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala cupripes Hope	CASI, 1994	CASI, 1994	Leaf, root (see Remarks)	No	Plant part association is

					based on *Anomala* spp. (Hill, 1987).
Anomala daimiana Harold	Li et al., 1997	Li et al., 1997	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala ebenina Fairmaire	CASI, 1994	CASI, 1994	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala expansa Bates	CASI, 1994	CASI, 1994	Leaf (adult), root (larvae) (Talekar and Nurdin, 1991)	No	
Anomala sauteri Ohaus	Hua, 2002	Hua, 2002	Leaf, root (see Remarks)	No	
Anomala siamensis (Nonfried)	Hua, 2002	Hua, 2002	Leaf, root (see Remarks)	No	
Anomala sieversi Heyden	CASI, 1994	CASI, 1994	Leaf (High, 2008)	No	
Anomala sinica Arrow	CASI, 1994	CASI, 1994	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala siniopyga Ohaus	CASI, 1994	CASI, 1994	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala streptopyga Ohaus	Hua, 2002	Hua, 2002	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomala trachypyga Bates	CASI, 1994	CASI, 1994	Leaf, root (see Remarks)	No	Plant part association is based on *Anomala* spp. (Hill, 1987).
Anomalocera olivacea (Janson)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Anomalocera parryi Westwood	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Aphodius elegans (Motschulsky)	CASI, 1994	CASI, 1994	Adults and larvae in dung (Yasuda, 1987)	No	
Apogonia pilifera Moser	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Species of *Apogonia* typically feed on leaf (Hill, 1983).
Autoserica nigrorubra Bish	CASI, 1994	CASI, 1994	Root (larvae) (Pemberton, 1962)	No	

Campsiura superba (van der Poll)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Campsiura insignis (Gestro)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Campsiura javanica (Gory et Percheron)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Campsiura mirabilis (Faldermann)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Campsiura ochreipennis (Fairmaire)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Campsiura omisiena Heller	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Cetonia speculifera Swartz	Li et al., 1997	Li et al., 1997	Roots (see Remarks)	No	*Cetonia* larvae feed on roots (Hill, 1987).
Coilodera flavofasciata Moser	CASI, 1994	CASI, 1994	Flower, root (White, 1983)	No	
Coilodera penicillata (Hope)	CASI, 1994	CASI, 1994	Larvae in rotten wood (Vendl et al., 2014)	No	
Coilodera quadrilineata Hope	CASI, 1994	CASI, 1994	Flower, root (White, 1983)	No	
Cosmiomorpha modesta Saunders	CASI, 1994	CASI, 1994	See Remarks	No	In general, scarabaeid larvae eat roots (Hill, 1983). For more details, see section 2.3.
Cosmiomorpha setulosa Westwood	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Cosmiomorpha similis Fairmaire	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dasyvalgus formosanus Moser	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dasyvalgus ichangicus Motschusllcy	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dasyvalgus ichengicus Motschulsky	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dasyvalgus latiganti (Fairmaire)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.

Dasyvalgus sellatus Kraatz	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dasyvalgus subglaber Paulian	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Dicranocephalophus dabryi (Auzoux)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Dynastes gideon (L.) syn.: *Xylotrupes gideon* L.	CASI, 1994	CASI, 1994	Fruit (adult); root (larvae) (Waite and Hwang, 2002); branch (Cai and Peng, 2008)	No	In litchi, adults feed on damaged fruit, but can move to undamaged ripe fruit when populations are high (Waite and Hwang, 2002). This is a large beetle that is highly unlikely to be associated with harvested fruit.
Ectinohoplia rufipes (Motschulsky)	Hua, 2002	Hua, 2002	Leaf (adult), root (larvae) (Choo et al., 2002)	No	
Euselates pulchella (Gestro)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Euselates quadrilineata (Hope)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Euselates schoenfeldti Kraatz	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Euselates tonkinensis tonkinensis Moser	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Exolontha umbraculata (Burmeister)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Glycyphana fulvistemma Motschulsky	Li et al., 1997	Li et al., 1997	Flower, leaf, root (Hill, 1987)	No	
Glycyphana horsfieldi Hope	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Gnorimus pictus Moser	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Heteronhina barmanica Gestro	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	

Heterorrhina punctatissima Westwood	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Holotrichia obilita Falderman	GAQSIQ, 2011	GAQSIQ, 2011	Root (larvae) (Guo et al., 2017)	No	
Holotrichia ovata Chang	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Holotrichia parallela (Motschulsky)	Hua, 2002	Hua, 2002	Underground parts (larvae) (Yu et al., 2006)	No	
Holotrichia plumbea Hope	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Holotrichia sauteri Moser	CASI, 1994	CASI, 1994	Flower, leaf (Huang and Lin, 1987)	No	
Holotrichia sinensis Hope	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Holotrichia trichophora (Faimaire)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Hybovalgus bioculatus Kolbe	Hua, 2002	Hua, 2002	Pollinator (adults) (Jin et al., 2005)	No	
Hybovalgus sexdentatus Arrow	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Hybovalgus thoracicus Moser	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Ingrisma femorata Janson	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Ingrisma whiteheadi Waterhouse	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Ixorida mouhoti (Wallace)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Maladera orientalis (Motschulsky)	Cheng et al., 2015	Cheng et al., 2015	Inflorescence (Toepfer et al., 2014)	No	
Melolontha rubiginosa F.	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Meroloba suturalis (Snyllen)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Oreoderus momeitensis Arrow	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.

Oxycetonia bealiae (Gory et Percheron)	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Oxycetonia jucunda (Faldermann)	Gao et al., 2012; CASI, 1994	Gao et al., 2012; CASI, 1994	Inflorescence (Nishino et al., 1970); pollinator (adult) (Suzuki, 2000)	No	
Parapilinurgus variegatus Arrow	Hua, 2002	Hua, 2002	Flower, root (White, 1983)	No	
Paratrichius duplicatus duplicatus Lewis	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Paratrichius pauliani Tesar	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Phyllopertha irregularis Waterhouse	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Poecilophilides rusticola (Burmeister)	CASI, 1994	CASI, 1994	Decaying plant matter (Koshiyama et al., 2012)	No	
Potosia speculifera Swartz	CASI, 1994	CASI, 1994	Adults may feed on soft, over-ripe fruit (Hill, 1987)	No	
Protaetia brevitarsis Lewis syn.: *Potosia brevitarsis* (Lewis)	GAQSIQ, 2011	GAQSIQ, 2011	Flower, leaf, root (Hill, 1987)	No	
Protaetia taiwana Niijima & Kinoshita	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Pseudosinghala dalmanni Gyllamhal	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Ptotaetis andamamarum Janson	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborhina olivacea (Janson)	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina distincta Hope	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina fortunei Saunders	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.

Rhomborrhina fulvopilosa (Moser)	Li et al., 1997	Li et al., 1997	Adults may feed on soft, over-ripe fruit (Hill, 1987)	No	
Rhomborrhina fuscipes Fairmaire	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina heros Gory et Percheron	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina japonica Hope	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina mellyi (Gory et Percheron)	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina melly setschensis Ruter	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina nigra Saunders	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina olivacea Jancon	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina resplendens Swartz	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Rhomborrhina unicolor Motschulsky	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Taeniodera flavofasciata flavofasciata (Moser)	Hua, 2002	Hua, 2002	Scarabaeidae larvae eat roots (Hill, 1983)	No	Some species of *Taeniodera* are associated with rotten dead wood (Vendl et al., 2014).
Taeniodera gamieri (Bourgoin)	Hua, 2002	Hua, 2002	Scarabaeidae larvae eat roots (Hill, 1983)	No	Some species of *Taeniodera* are associated with rotten dead wood (Vendl et al., 2014).
Taeniodera idolica (Janson)	Hua, 2002	Hua, 2002	Scarabaeidae larvae eat roots (Hill, 1983)	No	Some species of *Taeniodera* are associated with rotten dead wood (Vendl et al., 2014).

Taeniodera malabariensis (Gory et Percheron)	Hua, 2002	Hua, 2002	Scarabaeidae larvae eat roots (Hill, 1983)	No	Some species of *Taeniodera* are associated with rotten dead wood (Vendl et al., 2014).
Thaumastopeus nigritus (Frohlich)	Hua, 2002	Hua, 2002	Pollinator (adult) (Zhu et al., 2010)	No	
Thaumastopeus pullus Fairmaire	Hua, 2002	Hua, 2002	Pollinator (adult) (Zhu et al., 2010)	No	
Trichius bowringi Thomson	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Trichius dubernardi Pouillaude	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Trichius kuatunensis Tesar	CASI, 1994	CASI, 1994	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Trigonophorus rothschildi Fairmaire	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Trigonophorus varians Bourgoin	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Trigonophorus xisana Ma	Hua, 2002	Hua, 2002	See Remarks	No	See remarks for *Cosmiomorpha modesta*.
Coleoptera: Tenebrionidae					
Borboresthes hainanensis Pic	Hua, 2002	Hua, 2002	Unknown (see Remarks)	No	Species feeds on fungi, stored grain, and flour (Borror et al., 1989).
Diptera: Cecidomyiidae					
Contarinia citri Barnes	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Gao et al., 2012	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Gao et al., 2012	Flower bud (Avidov and Harpaz, 1969; Cai and Peng, 2008; Prasad and Grover, 1982)	No	
Dasineura citri Rao & Grover	Hill, 2008	Hill, 2008	Inflorescence, leaf (see Remarks)	No	Plant parts are those with which species of *Dasineura* typically are associated (Gagné, 2010).
Dasineura citrigemmia Yang & Tang	Niu et al., 2014	Niu et al., 2014	Inflorescence, leaf (see Remarks)	No	See *Dasineura citri*.

Resseliella citrifrugis Jiang	GAQSIQ, 2011; Huang et al., 2001	GAQSIQ, 2011; Huang et al., 2001; Yang, 2010	Fruit (GAQSIQ, 2011; Lu, 2002a; Wu et al., 1999; Yang, 2010)	Yes	
Diptera: Tephritidae					
Bactrocera caudata (F.) syn.: *Zeugodacus caudatus* (F.)	Drew and Romig, 2013	Kapoor and Agarwal, 1983	Flowers (CABI, 2017; Drew and Romig, 2013; White and Elson-Harris, 1992)	No	See section 2.3.
Bactrocera correcta (Bezzi) syn.: *Dacus correctus* (Bezzi)	Liu et al., 2013	Allwood et al., 1999	Fruit (CABI, 2013)	Yes	
Bactrocera cucurbitae (Coquillett)	GAQSIQ, 2011	GAQSIQ, 2011; Tan and Lee, 1982	Fruit (CABI, 2013)	Yes	
Bactrocera diversa (Coquillett)	Liang et al., 1993	Hua, 2006	Fruit (CABI, 2013)	No	See section 2.3.
Bactrocera dorsalis (Hendel)	GAQSIQ, 2011; Niu et al., 2014	GAQSIQ, 2011; Niu et al., 2014	Fruit (GAQSIQ, 2011)	Yes	
Bactrocera minax (Enderlein) syn.: *Tetradacus citri* Chen	GAQSIQ, 2011; Lin et al., 2011	GAQSIQ, 2011; Lin et al., 2011; Zhang, 1989	Fruit (Lin et al., 2011)	Yes	
Bactrocera occipitalis (Bezzi)	Li et al., 1997	Li et al., 1997	Fruit (CABI, 2013)	Yes	
Bactrocera pedestris (Bezzi)	Li et al., 1997	Li et al., 1997	Fruit (see Remarks)	Yes	Plant part association is based on the pest being a member of the *B. dorsalis* complex (Clark et al., 2005; Drew and Hancock, 1994).
Bactrocera scutellata (Hendel) syn.: *Dacus bezzii* Miyake	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Fruit (GAQSIQ, 2011), flowers (Kim et al., 2010; Ohno et al., 2006)	No	Primarily a pest of Cucurbitaceae. See section 2.3.
Bactrocera tau (Walker) syn.: *Dacus tau* (Walker)	CASI, 1994; GAQSIQ, 2011; Kapoor, 1988	CASI, 1994; GAQSIQ, 2011	Fruit (GAQSIQ, 2011)	Yes	

Bactrocera tsuneonis (Miyake) syn.: *Tetradacus tsuneonis* (Miyake)	Li et al., 1997; Zhang, 1989	Li et al., 1997; Zhang, 1989	Fruit (Zhang, 1989)	Yes	
Hemiptera: Acanthosomatidae					
Acanthosoma spinicolle Jakovlev	CASI, 1994; Hua, 2000	Hua, 2000	Leaf, fruit (Alford, 2014; Soerum, 1977)	No	Plant part association is based on *Acanthosoma haemorrhoidale*. The insects in the family Acanthosomatidae are medium to large insects (Alford, 2014; Panizzi and Grazia, 2015) that feed externally on their hosts and would therefore be unlikely to remain with harvested fruit.
Hemiptera: Aleyrodidae					
Africaleurodes citri (Takahashi) syn.: *Aleurolobus citri* Takahashi, *Aleurocanthus citri* Takahashi	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (Alford, 2014; Atwal, 1976; Bassiri, 2003; Hill, 1983, 1987)	No	*Aleurocanthus citri* is a synonym of *Aleurolobus citri* (Li et al., 1997), which is a synonym of *Africaleurodes citri* (Evans, 2008). Plant part association is based on behavior of the closely related genus *Aleurolobus* (Evans, 2008).
Aleurocanthus cheni Young	Ebeling, 1959; Evans, 2008	Ebeling, 1959; Evans, 2008	Leaf (Bose et al., 2001; CABI, 2017; Hill, 1983; Nair, 1975; van den Berg et al., 2001)	No	Plant part association is based on other species in the genus.
Aleurocanthus citriperdus Quaintance & Baker	CASI, 1994; Evans, 2008; Li et al., 1997	CASI, 1994; Evans, 2008; Li et al., 1997	Leaf (Nath, 1970; Yunus and Ho, 1980)	No	
Aleurocanthus cocois Corbett	Evans, 2008	Evans, 2008	Leaf (Walker, 2008; Yunus and Ho, 1980)	No	Plant part association is based on its behavior on hosts in general.

Aleurocanthus delottoi Cohic	Evans, 2008	Evans, 2008	Leaf (Bose et al., 2001; CABI, 2017; Hill, 1983; Nair, 1975; van den Berg et al., 2001)	No	Plant part association is based on other species in the genus.
Aleurocanthus euginae Takahashi	CASI, 1994	CASI, 1994	Leaf (Bose et al., 2001; CABI, 2017; Hill, 1983; Nair, 1975; van den Berg et al., 2001)	No	Plant part association is based on other species in the genus.
Aleurocanthus inceratus Silvestri	CASI, 1994; Evans, 2008	CASI, 1994; Evans, 2008	Leaf (Bose et al., 2001; CABI, 2017; Hill, 1983; Nair, 1975; van den Berg et al., 2001)	No	Plant part association is based on other species in the genus.
Aleurocanthus spiniferus (Quianance)	CABI, 2017; Evans, 2008; GAQSIQ, 2011; Li et al., 1997	CABI, 2017; Evans, 2008; GAQSIQ, 2011; Li et al., 1997	Leaf (Hill, 1983; Nair, 1975; van den Berg et al., 2001; Yunus and Ho, 1980)	No	Gyeltshen et al. (2011) state that this species is spread through infested fruits; however, this is likely an error, according to one of the co-authors (Hodges, 2017).
Aleurocanthus spinosus (Kuwana)	Evans, 2008; Li et al., 1997	Evans, 2008; Li et al., 1997	Leaf (Bose et al., 2001; CABI, 2017; Hill, 1983; Nair, 1975; van den Berg et al., 2001)	No	Plant part association is based on other species in the genus.
Aleurocanthus woglumi Ashby	CABI, 2017; CASI, 1994; Evans, 2008	CABI, 2017; CASI, 1994; Evans, 2008	Leaf (Hill, 1983; Nguyen et al., 2016; Pena et al., 2009; van den Berg et al., 2001)	No	This pest present is in the United States (AZ, CA, FL, LA, MS, and TX) (Evans, 2008; Hodges and Evans, 2005; Meagher and French, 2004; Nguyen et al., 2016).
Aleurolobus marlatti (Quaintance)	Evans, 2008; GAQSIQ, 2011; Li et al., 1997	Evans, 2008; GAQSIQ, 2011; Li et al., 1997	Leaf (Gerson and Applebaum, 2016)	No	
Aleurolobus setigerus Quaintance & Baker	Evans, 2008	Evans, 2008	Leaf (Alford, 2014; Atwal, 1976; Bassiri,	No	Plant part association is based on other species in the genus.

			2003; Hill, 1983, 1987)		
Aleurolobus subrotundus Silvestri	Evans, 2008; Hua, 2000; Luo and Zhou, 2001	Evans, 2008; Hua, 2000; Luo and Zhou, 2001	Leaf (Alford, 2014; Atwal, 1976; Bassiri, 2003; Hill, 1983, 1987)	No	Plant part association is based on other species in the genus.
Aleurolobus szechwanensis Young	CASI, 1994; Evans, 2008; Li et al., 1997	CASI, 1994; Evans, 2008; Li et al., 1997	Leaf (Alford, 2014; Atwal, 1976; Bassiri, 2003; Hill, 1983, 1987)	No	Plant part association is based on other species in the genus.
Apobemisia kuwanai (Takahashi) syn.: *Bemisia kuwanai* Takahaski	CASI, 1994; Hua, 2000	CASI, 1994; Hua, 2000	Leaf (CABI, 2017)	No	*Bemisia kuwanai* Takahaski is a synonym (Evans, 2008). Plant part association is based on the closely related genus *Parabemisia* (Takahashi, 1954).
Bemisia afer (Priesner & Hosny)	Evans, 2008; Hua, 2000; Luo and Zhou, 2001	Abd-Rabou and Ahmed, 2008; Evans, 2008; Luo and Zhou, 2001	Leaf (Abd-Rabou and Ahmed, 2008)	No	
Bemisia giffardi (Kotinsky)	CASI, 1994; Evans, 2008; Li et al., 1997; Luo and Zhou, 2001	CASI, 1994; Evans, 2008; Li et al., 1997; Luo and Zhou, 2001	Leaf (Kuwana, 1927, 1928)	No	
Dialeurodes citricola Young	CASI, 1994; Evans, 2008; Li et al., 1997; Luo and Zhou, 2001	CASI, 1994; Evans, 2008; Li et al., 1997; Luo and Zhou, 2001	Leaf (CABI, 2017; Yunus and Ho, 1980)	No	Plant part association is based on other species in the genus.
Dialeurolobus erythrinae (Corbett)	Hong Kong (Evans, 2008)	Evans, 2008	Leaf (Gerling and Ben-Ari, 2010)	No	Plant part association is based on the biology of the related species *Dialeurolobus rhamni*.
Dialeurolonga elongata Dozier syn.: *Dialeurodes elongata* Dozier	Evans, 2008	Dubey and Sundararaj, 2006; Evans, 2008; Nair, 1975	Leaf (Nair, 1975)	No	*Dialeurodes elongata* Dozier is a synonym (Evans, 2008).
Paraleyrodes pseudonaranjae Martin	Evans, 2008	Evans, 2008	Leaf (Jesu and Iaccarino, 2011; Stocks, 2012; Ulusoy and Uygun, 1996)	No	This pest is present in Florida (Evans, 2008). Plant part association is based on other species in the genus.

Hemiptera: Alydidae					
Leptocorisa acuta (Thunberg)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, fruit (Yunus and Ho, 1980); leaf (Lal and Mukharji, 1975); seed, leaf (CABI, 2017)	No	Plant part association is based on hosts in general. Rice is the preferred host of this species (CABI, 2017; Schaefer and Panizzi, 2000). It is a relatively large (up to 17 mm long), mobile, externally feeding insect that sucks fluids from host tissue (CABI, 2017); therefore, it would be unlikely to remain with harvested fruit. See section 2.3.
Hemiptera: Aphididae					
Aulacorthum magnoliae (Essig and Kuwana)	Hua, 2000	Blackman and Eastop, 2000	Leaf, stem (Barbagallo et al., 2007)	No	
Ceratovacuna lanigera Zehntner	Li et al., 1997	Li et al., 1997	Leaf (Joshi and Viraktamath, 2004)	No	
Sinomegoura citricola (van der Goot)	Hua, 2000	Blackman and Eastop, 2000	Leaf, stem (Barbagallo et al., 2007)	No	
Sitobion ibarae (Matsumura) syn.: *Macrosiphum ibarae* Matsumura	Hua, 2000	Lee et al., 1992	Flower, leaf (Blackman and Eastop, 2000)	No	*Macrosiphum ibarae* Matsumura is a synomym (Remaudière and Remaudière, 1997).
Toxoptera celtis (Shinji)	GAQSIQ, 2011	GAQSIQ, 2011	Flower, stem (GAQSIQ, 2011)	No	
Toxoptera odinae (van der Goot)	Li et al., 1997	Li et al., 1997	Flower, leaf, stem (Lokeshwari et al., 2014)	No	
Hemiptera: Aphrophoridae					

Ptyelus costalis Walker	CASI, 1994	CASI, 1994	Leaf, branch (Forsyth, 1966); leaf (Hill, 1983; Nair, 1975)	No	Plant part association is based on other species in the genus. See section 2.3.
Hemiptera: Carsidaridae					
Tenaphalara mangiferae Yang et Li	CASI, 1994; Hua, 2000	CASI, 1994	Leaf (Saen, 1991; Yunus and Ho, 1980)	No	Plant part association is based on other species in the genus. See section 2.3.
Hemiptera: Cercopidae					
Obiphora intermedia (Uhler) syn.: *Aphrophora intermedia* Uhler	CASI, 1994; Hua, 2000; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, stem (Johnson and Lyon, 1991); stem (Mead, 1963); shoot, root (Nair, 1975)	No	*Aphrophora intermedia* is a synonym (Hua, 2000). Plant part association is based on other species in the genus *Aphrophora*. See section 2.3.
Hemiptera: Cerococcidae					
Antecerococcus bryoides (Maskell)	García Morales et al., 2017	García Morales et al., 2017	Stem, twig (Miller et al., 2014)	No	Plant part association is based on family level; stems and twigs are typical feeding sites for species of Cerococcidae (Miller et al., 2014).
Antecerococcus citri (Lambdin)	García Morales et al., 2017	García Morales et al., 2017	Stem, twig (Miller et al., 2014)	No	Plant part association is based on family level; stems and twigs are typical feeding sites for species of Cerococcidae (Miller et al., 2014).
Asterococcus muratae (Kuwana) syn.: *Cerococcus muratae* Kuwana	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Stem, twig (Miller et al., 2014)	No	Plant part association is based on family level; stems and twigs are typical feeding sites for species of Cerococcidae (Miller et al., 2014).

Hemiptera: Cicadellidae					
Bothrogonia ferruginea (F.)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Leaf (GAQSIQ, 2011)	No	See section 2.3.
Empoasca vitis (Gothe) syn.: *Chlorita flavescens* F.	CABI, 2017; GAQSIQ, 2011	GAQSIQ, 2011	Stem, branch, bud, leaf (GAQSIQ, 2011)	No	*Chlorita flavescens* is a synonym (CABI, 2017). See section 2.3.
Jassargus infirmus (Melichar)	Gao et al., 2012	Gao et al., 2012	See Remarks	No	Species of Paralimnini, the tribe to which *J. infirmus* belongs, feed on grasses or sedges (Webb and Heller, 1990; Zahniser and Dietrich, 2013). Association with citrus probably is incidental, records pertaining perhaps to cases in which leafhoppers drifted into trees from understory vegetation.
Nephotettix nigropictus (Stål)	Gao et al., 2012	Gao et al., 2012	Leaf (Begum et al., 2014)	No	
Hemiptera: Cicadidae					
Cryptotympana atrata (F.) syn.: *C. pustulata* F.	Cheng et al., 2015	Cheng et al., 2015	Stem (Zhang et al., 2014)	No	*Cryptotympana pustulata* is a synonym (Sanborn, 2014). See section 2.3.
Platypleura kaempferi (F.)	Cheng et al., 2015	Cheng et al., 2015	Stem (Shiraki, 1934)	No	
Hemiptera: Cixiidae					
Oliarus apicalis (Uhler)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (Pantoja et al., 2002; Wongsiri, 1991); root (immatures) (Mead, 1979); stem, root (Le Pelley, 1959)	No	Plant part association is based on biology of the family and other species in the genus. See section 2.3.

Hemiptera: Coccidae					
Ceroplastes centroroseus Chen	CASI, 1994; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	CASI, 1994; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	Stem (Liao et al., 2015)	No	
Ceroplastes japonicus Green syn.: *Paracerostegia japonica* (Green)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Leaf, stem (Itioka et al., 1992)	No	
Ceroplastes pseudoceriferus Green	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Leaf, flower, twig (Ali, 1980); branch (Anupunt, 2003)	No	Plant part association is based on hosts in general.
Ceroplastes rubens Maskell	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	Fruit, leaf, shoot (GAQSIQ, 2011)	Yes	This pest is present in Florida (García Morales et al., 2017).
Ceroplastes rusci (L.)	CASI, 1994	CASI, 1994; García Morales et al., 2017	Fruit, leaf, stem (CABI, 2017)	Yes	This pest is present in Florida (García Morales et al., 2017). Plant part association is based on hosts in general.
Coccus diacopeis Anderson	CASI, 1994; Hua, 2000	CASI, 1994; Hua, 2000	Fruit, leaf, stem (CABI, 2017)	Yes	Plant part association is based on other species in the genus, as we found no information for the species.
Coccus discrepans (Green)	Hua, 2000	García Morales et al., 2017; Hua, 2000	Leaf (Hill, 1983; Yunus and Ho, 1980); leaf, fruit, trunk (Pantoja et al., 2002)	Yes	Plant part association is based on hosts in general.

Coccus formicarii (Green)	García Morales et al., 2017	García Morales et al., 2017	Fruit, leaf, stem (CABI, 2017)	Yes	Plant part association is based on other species in the genus, as we found no information for the species.
Drepanococcus chiton (Green)	García Morales et al., 2017	García Morales et al., 2017	Leaf, fruit, trunk (Pantoja and Peña, 2007); leaf, flower, fruit (Anupunt, 2003)	Yes	Plant part association is based on hosts in general.
Eulecanium albodermis Chen	CASI, 1994; García Morales et al., 2017; Hua, 2000	CASI, 1994; García Morales et al., 2017; Hua, 2000	Leaf, stem (Hill, 1983, 1987; Johnson and Lyon, 1991)	No	Plant part association is based on other species in the genus, as we found no information for the species.
Maacoccus bicruciatus (Green)	García Morales et al., 2017; Hua, 2000	García Morales et al., 2017; Hua, 2000	Leaf (García Morales et al., 2017)	No	Plant part association is based on hosts in general.
Metaceronema japonica (Maskell)	García Morales et al., 2017; Hua, 2000	Hua, 2000	Leaf, stem (Joshi and Rai, 1987)	No	Plant part association is based on another host (olive), as no information found for citrus.
Pseudocribrolecanium andersoni (Newstead)	García Morales et al., 2017	García Morales et al., 2017	Leaf, shoot (Kondo, 2006)	No	
Pulvinaria aurantii Cockerell syn.: *Chloropulvinaria aurantii* (Cockerell)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	Leaf, shoot (GAQSIQ, 2011); fruit, stem (Maleki and Damavandian, 2015)	No	At high scale densities, infestations may result in premature fruit drop (Maleki and Damavandian, 2015). The pest is considered unlikely to be associated with mature fruit at harvest.
Pulvinaria okitsuensis Kuwana	García Morales et al., 2017; Hua, 2000	García Morales et al., 2017; Hua, 2000	Leaf, shoot, flower, stem (CABI, 2017; GAQSIQ, 2011; Hill, 1983)	No	Plant part association is based on other species in the genus because of lack of information on the species.

Pulvinaria peregrina (Borchsenius)	García Morales et al., 2017	García Morales et al., 2017	Leaf, shoot, flower, stem (CABI, 2017; GAQSIQ, 2011; Hill, 1983)	No	Plant part association is based on other species in the genus because of lack of information on the species.
Pulvinaria polygonata Cockerell syn.: *Chloropulvinaria polygonata* Cockerell	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Cheng et al., 2015	Leaf, shoot (GAQSIQ, 2011); leaf, stem (Takahashi, 1939)	No	
Takahashia japonica Cockerell	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, shoot, flower, stem (CABI, 2017; GAQSIQ, 2011; Hill, 1983)	No	Plant part association is based on species of the related genus *Pulvinaria* because of lack of information on the genus or species.
Hemiptera: Coreidae					
Cletus graminis Hsiao & Cheng	Gao et al., 2012	Gao et al., 2012	Inflorescence, leaf (see Remarks)	No	These are plant parts with which species of *Cletus* typically are associated (e.g., *C. signatus* Walker, *C. punctiger* [Dallas]; Agarwal et al., 2009; Meng et al., 2015). See section 2.3.
Leptocorisa acuta (Thunberg)	Gao et al., 2012	Gao et al., 2012	Inflorescence (Painkra et al., 2015; Thapa, 2006)	No	
Hemiptera: Delphacidae					
Terthron albovittatum (Matsumura)	Gao et al., 2012	Gao et al., 2012	See Remarks	No	Preferred hosts appear to be rice, *Oryza sativa*, and other grasses (Chantarasa-ard et al., 1984; Dupo and Barrion, 2009; Satoh et al., 2010; Subba Rao and Chalam, 2007). Association with citrus probably is incidental. See section 2.3.
Hemiptera: Derbidae					

Diostrombus politus Uhler	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, shoot (Forsyth, 1966)	No	Plant part association is based on other species in the family Derbidae. See section 2.3.
Hemiptera: Dictyopharidae					
Dictyophara patruelis (Stål)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Leaf (Hill, 1983)	No	Plant part association is based on genus-level information. See section 2.3.
Hemiptera: Dinidoridae					
Megymenum brevicorne (F.)	CABI, 2017; Li et al., 1997	CABI, 2017	Leaf (Yunus and Ho, 1980); fruit, leaf, stem (CABI, 2017)	No	Plant part association is based on behavior on hosts in general. See section 2.3.
Hemiptera: Flatidae					
Geisha distinctissima Walker	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Stem, branch, bud (GAQSIQ, 2011)	No	See section 2.3.
Lawana imitata (Melichar)	Cheng et al., 2015	Cheng et al., 2015	Stem (Zhang et al., 2016)	No	
Salurnis marginella (Guérin-Méneville)	Cheng et al., 2015	Cheng et al., 2015	Leaf, stem (Lee et al., 2016)	No	
Hemiptera: Fulgoridae					
Pyrops candelaria (L.) syn.: *Fulgora candaleria* (L.)	CASI, 1994; Hua, 2000; Hill, 2008	CASI, 1994; Hua, 2000	Leaf, trunk (Hill, 1983; Hill, 2008); branch (Hill, 1983)	No	*Fulgora candaleria* is a synonym (Constant, 2015). Plant part association is based on hosts in general. See section 2.3.
Hemiptera: Kerridae					
Kerria (*Laccifer*) *citrina* (Coq)	CASI, 1994	CASI, 1994	Stem, twig (Hill, 1983); stem (Wen et al., 2002)	No	Plant part association is based on other species in the genus on hosts in general, as no information was found for the species.
Kerria lacca Kerr	García Morales et al., 2017	García Morales et al., 2017	Stem, twig (Hill, 1983); stem (Wen et al., 2002)	No	Plant part association is based on hosts in general.
Paratachardina theae (Green in Green & Mann) syn.: *Tachardina theae* (Green in Green & Mann)	García Morales et al., 2017; Hua, 2000	Hua, 2000	Branch, twig (Miller et al., 2014); stem (Hara, 2014); branch (Pemberton, 2003)	No	Plant part association is based on other species in the genus, as no information was found for the species.

Hemiptera: Kuwaniidae					
Kuwania bipora Borchsenius	García Morales et al., 2017; Hua, 2000	Hua, 2000	Stem, branch, bark (García Morales et al., 2017)	No	Plant part association is based on other species in the genus, as no information was found for the species.
Hemiptera: Largidae					
Physopelta gutta (Burmeister)	CASI, 1994; Li et al., 1997	CASI, 1994; Choi et al., 2000	Fruit (Choi et al., 2000)	No	This is an external fruit-piercing insect (Choi et al., 2000) that would be unlikely to remain with harvested fruit. See section 2.3.
Hemiptera: Lygaeidae					
Nysius ericae (Schilling)	Gao et al., 2012	Gao et al., 2012	Leaf, stem (del Rivero and García Marí, 1983)	No	See section 2.3.
Hemiptera: Meenoplidae					
Nisia atrovenosa (Lethierry)	CASI, 1994; Hua, 2000; Li et al., 1997	CASI, 1994; Hua, 2000; Li et al., 1997	Leaf, stem (Hanson, 1963); leaf (Yunus and Ho, 1980)	No	Plant part association is based on hosts in general. See section 2.3.
Hemiptera: Membracidae					
Orthobelus flavipes Uhler	CASI, 1994; Hua, 2000	CASI, 1994; Hua, 2000	Twig (Hill, 1983), leaf (Yunus and Ho, 1980)	No	Plant part association is based on other species in the family Membracidae on citrus. See section 2.3.
Hemiptera: Miridae					
Charagochilus angusticollis Linnavuori	Hua, 2000; Zheng, 1990	Hua, 2000; Zheng, 1990	Leaf (Rafeeq and Ranjini, 2013)	No	Plant part association is based on behavior of genus on mango. See section 2.3.
Hemiptera: Monophlebidae					
Drosicha contrahens (Walker)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; Li et al., 1997	Trunk, twig, bud (Chu, 1934)	No	
Drosicha corpulenta (Kuwana)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; Li et al., 1997	Branch, bud, bark, trunk (Xu et al., 1999); twig (Hill, 1987)	No	Plant part association is based on hosts in general.
Drosicha howardi (Kuwana)	García Morales et al., 2017	García Morales et al., 2017	Leaf, twig, bud (cited in Biosecurity Australia, 2002)	No	

Drosicha mangiferae (Stebbing)	Butani, 1993; Hill, 2008	Butani, 1993	Leaf, twig, stem, flower (Bose et al., 2001); trunk, shoot, leaf (Butani, 1993); leaf (Hill, 2008)	No	Plant part association is based on hosts in general.
Drosicha maskelli Morrison	CASI, 1994; Hua, 2000	CASI, 1994; García Morales et al., 2017	Leaf, stem (Hill, 1987); bud (Xu et al., 1999); leaf, twig, stem, flower (Bose et al., 2001); trunk, shoot, leaf (Butani, 1993)	No	Plant part association is based on other species in the genus, as no information was found for the species.
Icerya aegyptiaca (Douglas)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Leaf, stem, fruit (CABI, 2017); leaf (Hill, 1983)	Yes	Plant part association is based on hosts in general.
Icerya formicarum (Newstead)	García Morales et al., 2017	García Morales et al., 2017	Leaf, stem, fruit (CABI, 2017); leaf, stem, fruit (Hill, 1983)	Yes	Plant part association is based on other species in the genus, as no information was found for the species.
Icerya jacobsoni Green	CASI, 1994; García Morales et al., 2017	CASI, 1994; García Morales et al., 2017	Leaf, stem, fruit (CABI, 2017); leaf, stem, fruit (Hill, 1983)	Yes	Plant part association is based on other species in the genus, as no information was found for the species.
Icerya seychellarum (Westwood)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Leaf (Hill, 1983); fruit (occasionally), stem, leaf, trunk, branch (Guerrero et al., 2012)	Yes	
Hemiptera: Pentatomidae					
Cappaea taprobanensis (Dallas)	Cheng et al., 2015	Cheng et al., 2015	Stem (Distant, 1902)	No	
Erthesina fullo (Thunberg)	Cheng et al., 2015	Cheng et al., 2015	Leaf, stem (Tara et al., 2011)	No	
Eysarcoris parvus (Uhler)	Gao et al., 2012	Gao et al., 2012	Leaf (Ding et al., 2004)	No	
Rhynchocoris humeralis (Thunberg)	Gao et al., 2012	Gao et al., 2012	Fruit, leaf, stem (Takahashi, 1940)	No	Damage to fruit results from external feeding by adults and nymphs, which are large, conspicuous insects (Chang and

					Bay-Petersen, 2003) that are unlikely to remain with fruit through harvest and post-harvest processing. See section 2.3.
Hemiptera: Plataspidae					
Megacopta cribrariella Hsiao et Jen	Hua, 2000	Hua, 2000	Stem, leaf (Tayutivutikul and Yano, 1990); stem, leaf, shoot, flower (Thippeswamy and Rajagopal, 2005)	No	Plant part association is based on behavior of other species in the genus.
Hemiptera: Pseudococcidae					
Geococcus citrinus Kuwana	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	Root (Ben-Dov, 1994)	No	
Geococcus coffeae Green	García Morales et al., 2017	García Morales et al., 2017	Root (García Morales et al., 2017)	No	This pest is present in the United States (FL) (García Morales et al., 2017). Plant part association is based on hosts in general.
Maconellicoccus hirsutus (Green)	García Morales et al., 2017; Hua, 2000	García Morales et al., 2017; Hua, 2000	Fruit, flower, leaf, stem (CABI, 2017)	Yes	This pest is present in the United States (CA, FL, GA, LA, SC, TX) (García Morales et al., 2017). Plant part association is based on hosts in general.
Nipaecoccus filamentosus (Cockerell) syn.: *Pseudococcus filamentosus* (Cockerell)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997; Pruthi and Batra, 1960	Leaf, branch, fruit (Pruthi and Batra, 1960)	Yes	
Nipaecoccus viridis (Newstead) syn.: *N. vastator* (Maskell)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997	Fruit, leaf, shoot (GAQSIQ, 2011)	Yes	

Paracoccus marginatus Williams & Granara De Willink	García Morales et al., 2017	García Morales et al., 2017	Fruit, flower, leaf, stem (CABI, 2017)	Yes	The pest is present in the United States (FL) (García Morales et al., 2017). Plant part association is based on hosts in general.
Paraputo citricola Tang	GAQSIQ, 2011; García Morales et al., 2017	GAQSIQ, 2011; García Morales et al., 2017	Leaf, shoot (GAQSIQ, 2011)	No	
Phenacoccus pergandei Cockerell	Ben-Dov, 1994; García Morales et al., 2017; Hua, 2000	Lee et al., 1992	Leaf (Hill, 1987)	No	Plant part association is based on hosts in general.
Planococcus kraunhiae (Kuwana)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Leaf (García Morales et al., 2017); leaf, stem (McKenzie, 1967); leaf, fruit (Thuy et al., 2011); fruit (Morishita, 2005; Park and Hong, 1992)	Yes	This pest is present in the United States (CA) (García Morales et al., 2017). Plant part association is based on hosts in general.
Planococcus lilacinus (Cockerell)	CASI, 1994; García Morales et al., 2017; Li et al., 1997	CASI, 1994; García Morales et al., 2017; Li et al., 1997	Fruit, stem (CABI, 2017); fruit (Mani, 1995); leaf (Hill, 1983)	Yes	Plant part association is based on hosts in general.
Pseudococcus baliteus Lit	He et al., 2011	García Morales et al., 2017	Root (García Morales et al., 2017); fruit (He et al., 2011); fruit, root (Miller et al., 2014)	Yes	Plant part association is based on hosts in general.
Pseudococcus cryptus (Hempel) syn.: *P. citriculus* Green	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Gao et al., 2012	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997; Gao et al., 2012	Root, fruit, flower, stem, bud, leaf (GAQSIQ, 2011); all parts (Avidov and Harpaz, 1969)	Yes	
Rastrococcus iceryoides (Green)	García Morales et al., 2017	CABI, 2017; García Morales et al., 2017	Leaf, shoot, flower, fruit (CABI, 2017)	Yes	Plant part association is based on hosts in general.

Rastrococcus invadens Williams	CABI, 2017; García Morales et al., 2017; Hua, 2000	CABI, 2017; García Morales et al., 2017	Leaf, twig (García Morales et al., 2017); fruit, flower, leaf, stem (CABI, 2017)	Yes	Plant part association is based on hosts in general.
Rastrococcus mangiferae (Green)	García Morales et al., 2017	García Morales et al., 2017	Leaf, twig (García Morales et al., 2017)	No	
Rastrococcus spinosus (Robinson) syn.: *Phenacoccus spinosus* Robinson, *Puto spinosus* (Robinson)	CASI, 1994	CASI, 1994; Clausen, 1933; García Morales et al., 2017; Khoo et al., 1991	Leaf (Khoo et al., 1991; Ullah et al., 1992); flower, fruit (Otanes, 1936); fruit, stem, leaf (PestID, 2017)	Yes	Plant part association is based on hosts in general.
Ripersiella kondonis (Kuwana) syn.: *Rhizoecus kondonis* Kuwana	GAQSIQ, 2011; García Morales et al., 2017	GAQSIQ, 2011; García Morales et al., 2017	Root (GAQSIQ, 2011)	No	This pest is present in the United States (CA) (García Morales et al., 2017; McKenzie, 1967).
Hemiptera: Psyllidae					
Cacopsylla citricola (Yang and Li) syn.: *Psylla citricola* Yang and Li	Hua, 2000; Li et al., 1997	Hua, 2000; Li et al., 1997	Flower bud, leaf bud, flower, leaf, stem, shoot (Alford, 2014)	No	*Psylla citricola* is a synonym (Ouvrard, 2017). Plant part association is based on biology of other species in the genus.
Cacopsylla citrisuga (Yang & Li)	Guo et al., 2012	Guo et al., 2012	Leaf (Guo et al., 2012)	No	
Diaphorina citri Kuwayama	Fang et al., 2013	Fang et al., 2013	Leaf, stem (Hall, 2008)	No	This pest is present in the United States (AL, AZ, CA, FL, GA, HI, LA, MS, SC, and TX) (CABI, 2017).
Diaphorina truncata Crawford	CASI, 1994; Hua, 2000	CASI, 1994; Hua, 2000	Leaf (Balakrishna and Raman, 1992); shoot (Crawford, 1924)	No	Plant part association is based on its behavior on non-citrus hosts.
Psylla citriauga Yang et Li	Hua, 2000	Hua, 2000	Leaf, flower, stem, developing fruit buds (Hill,	No	Plant part association is based on biology of other species in the genus.

			1987); leaf, stem (Talhouk, 1969)		
Hemiptera: Pyrrhocoridae					
Dysdercus cingulatus (F.)	CABI, 2017; CASI, 1994; Li et al., 1997	CABI, 2017; CASI, 1994; Li et al., 1997	Flower, fruit, seed (CABI, 2017); leaf, seed (Nair, 1975; Wongsiri, 1991); fruit, seed (Hill, 1983)	No	Plant part association is based on its behavior on hosts in general. This insect is a relatively large (up to 18 mm length), mobile, external feeder (CABI, 2017) that may suck sap from fruit (Meshram and Shalini, 2006); it therefore is unlikely to remain with harvested fruit. See section 2.3.
Hemiptera: Ricaniidae					
Euricania ocellus (Walker)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Leaf, branch (GAQSIQ, 2011)	No	See section 2.3.
Pochazia guttifera Walker	GAQSIQ, 2011; Hua, 2000	GAQSIQ, 2011	Leaf, branch (GAQSIQ, 2011)	No	See section 2.3.
Ricania marginalis (Walker)	CASI, 1994; GAQSIQ, 2011	CASI, 1994; GAQSIQ, 2011		No	See section 2.3.
Ricania speculum (Walker)	Rossi and Lucchi, 2015	Rossi and Lucchi, 2015	Leaf (Rossi and Lucchi, 2015)	No	
Ricania sublimbata Jacobi	Cheng et al., 2015	Cheng et al., 2015	Stem (Liu et al., 2007b)	No	
Hemiptera: Scutelleridae					
Scutellera perplexa (Westwood)	CASI, 1994; Hua, 2000; Li et al., 1997	CASI, 1994; Hua, 2000; Li et al., 1997	Developing fruit (Sahai et al., 2011); developing fruit, leaf (Parveen et al., 2010); trunk, leaf, fruit (Sandeep and Gurlaz, 2015); fruit (Kavadia et al., 1971)	No	Plant part association is based on its behavior on hosts in general. It is a relatively large, mobile, external feeder that sucks sap from fruit (Parveen et al., 2010; Sahai et al., 2011; Sandeep and Gurlaz, 2015); it therefore is unlikely to remain with harvested fruit. See section 2.3.
Hemiptera: Tessaratomidae					

Tessaratoma papillosa (Drury)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit, flower, stem, leaf (CABI, 2017)	No	Plant part association is based on its behavior on hosts in general. It is a relatively large mobile external feeder that sucks sap from plant parts (CABI, 2017); therefore, it is unlikely to remain with harvested fruit. See section 2.3.
Hemiptera: Triozidae					
Trioza citroimpura Yang et Li	CASI, 1994; Hua, 2000	CASI, 1994; Hua, 2000	Leaf (Bedford, 1978; CABI, 2017; Hill, 2008)	No	Plant part association is based on other species in the genus *Trioza*. See section 2.3.
Hemiptera: Tropiduchidae					
Tambinia debilis Stal	CASI, 1994; Hua, 2000; Li et al., 1997	CASI, 1994; Hua, 2000; Li et al., 1997	Leaf, stem (Wilson et al., 1994)	No	Plant part association is based on biology of the family Tropiduchidae. See section 2.3.
Isoptera: Termitidae					
Odontotermes formosanus Shiraki	CASI, 1994; Hua, 2000; Li et al., 1997	CASI, 1994; Hua, 2000; Li et al., 1997	Root, trunk (Cai and Peng, 2008; Cheng et al., 2007)	No	
Lepidoptera: Arctiidae					
Aglaomorpha histrio (Walker) syn.: *Callimorpha histrio* (Walker)	Hua, 2005	Hua, 2005	Leaf (Chen et al., 2003)	No	*Callimorpha histrio* (Walker) is a synonym (Murzin, 2003).
Aloa lactinea (Cramer) syn.: *Amsacta lactinea* Cramer	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Amata germana (Felder & Felder)	Hua, 2005	Hua, 2005	Leaf (Sun et al., 2006)	No	
Amata perixanthia (Hampson) syn.: *Syntomis perixanthia* Hampson	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Amata* (Robinson et al., 2001). *Syntomis perixanthia* is a synonym (Lu et al., 2012).

Amata persimilis Leech	Hua, 2005	Hua, 2005	Leaf (Muraleedharan, 1992)	No	
Asura dharma (Moore)	Hua, 2005	Tanaka, 1929	Leaf (Tanaka, 1929)	No	
Asura strigipennis (Herrich-Schäffer)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Asura*, e.g., *A. conferta* Walker, *A. calamaria* [Moore]; Gowda et al., 1974; Robinson et al., 2001).
Carcinopyga lichenigera Felder syn.: *Euarctia lichenigera* (Felder)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Although nothing is known of the biology of *C. lichenigera* (Thomas, 1989), the leaf typically is the feeding site of species of Arctiinae (Borror et al., 1989), the subfamily to which *C. lichenigera* belongs. *Euarctia lichenigera* is a synonym (Murzin, 2003).
Creatonotus gangis (L.)	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Creatonotus transiens (Walker) syn.: *Phisama transiens vacillans* (Walker)	CASI, 1994; Hua, 2005	CASI, 1994; Hua, 2005	Leaf (Robinson et al., 2001)	No	*Phisama transiens vacillans* is a synonym (Černý, 2011).
Cyana hamata (Walker)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Cyana* (Robinson et al., 2001).
Eilema affineola (Bremer)	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Eilema* (e.g., *E. brevipennis* [Walker]; Robinson et al., 2001).

Eilema vicaria (Walker)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	See remarks for *E. affineola*.
Lemyra flammeola (Moore)	Hua, 2005	Choi, 2010	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Lemyra* (e.g., *L. alikangensis* [Strand], *L. imparilis* [Butler]; Su et al., 2013; Sugiura and Yamazaki, 2017).
Melanographia flexilineata (Hampson)	CASI, 1994	CASI, 1994	Flower, leaf, stem (Wang et al., 2016)	No	
Nyctemera adversata (Schaller) syn.: *N. plagifera* (Walker)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, stem (Murakami et al., 2000)	No	*Nyctemera plagifera* is a synonym (Holloway, 1988).
Spilarctia subcarnea (Walker)	Li et al., 1997	Li et al., 1997	Leaf (Yi et al., 1993)	No	
Lepidoptera: Carposinidae					
Carposina niponensis Walsingham	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Anonymous, 1988)	Yes	The species *C. niponensis* and *C. sasakii* have a confused literary history, making the distribution and host associations unclear. We recognize that they are not synonyms and are distinct species (Diakonoff, 1989). See section 3.2.8 for more information.
Carposina sasakii Matsumura	See *C. niponensis*	See *C. niponensis*	See *C. niponensis*	Yes	See *C. niponensis*.
Lepidoptera: Choreutidae					
Hemerophila subplagiata Walker	CASI, 1994	CASI, 1994	Leaf (Howard and Buswell, 1925; Yunus and Ho, 1980)	No	Plant part association is based on the species' and the genus' feeding behavior on hosts.
Lepidoptera: Cossidae					
Cossus cossus (L.)	Hua, 2005	Mineo, 1986	Stem (Mineo, 1986)	No	

Squamura dea (Swinhoe) syn.: *Arbela dea* Swinhoe, *Indarbela dea* (Swinhoe), *Lepidarbela dea* (Swinhoe)	Hua, 2005; Li et al., 1997	Hua, 2005; Li et al., 1997	Stem (Chien, 1964)	No	*Arbela dea*, *Indarbela dea*, and *Lepidarbela dea* are synonyms (Heppner and Inoue, 1992).
Squamura discipuncta (Wileman) syn.: *Indarbela baibarana* (Matsumura), *Lepidarbela discipuncta* (Wileman)	CASI, 1994	CASI, 1994	Stem (Chien, 1964)	No	*Indarbela baibarana* and *Lepidarbela discipuncta* are synonyms (Heppner and Inoue, 1992).
Squamura tetraonis (Moore) syn.: *Indarbela tetraonis* (Moore)	Hua, 2005	Fletcher, 1920	Stem (Fletcher, 1920)	No	*Indarbela tetraonis* is a synonym (Heppner and Inoue, 1992).
Zeuzera coffeae Nietner	GAQSIQ, 2011	GAQSIQ, 2011	Stem (GAQSIQ, 2011)	No	
Lepidoptera: Crambidae					
Ostrinia furnacalis (Guenée)	Cai and Peng, 2008	Cai and Peng, 2008	Fruit (Cai and Peng, 2008)	Yes	Larvae mainly infest maize and sweetcorn (CABI, 2013). If maize grows near citrus groves, *O. furnacalis* can become a problem, with larvae boring into citrus fruit (Cai and Peng, 2008).
Lepidoptera: Elachistidae					
Exaeretia culcitella (Herrich-Schaffer) syn.: *Depressaria culcitella* Herrich-Schaffer	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Based on the typical feeding site of species of *Depressaria* (Robinson et al., 2001).
Lepidoptera: Geometridae					
Alcis velularia Warren	Hua, 2005	Hua, 2005	See Remarks	No	Possibly a misspelling. The species epithet does not apply to any Geometridae as currently catalogued (Scoble, 1999a, 1999b).

Ascotis selenaria (Denis & Schiffermüller)	Cheng et al., 2015	Cheng et al., 2015	Fruit, leaf (Choi et al., 2011)	No	Depending on larval age, feeding may produce shallow or deeper scars in fruit (Choi et al., 2011). Fruit thus damaged is unmarketable and likely to be culled in the packinghouse.
Biston panterinaria (Bremer & Grey) syn.: *Culcula panterinaria* (Bremer & Grey)	Hua, 2005	Choi et al., 2011	Leaf (Choi et al., 2011)	No	*Culcula panterinaria* is a synonym (Jiang et al., 2011).
Biston suppressaria Guenée syn.: *Buzura suppressaria* (Guenée)	Gao et al., 2012	Gao et al., 2012	Leaf (Sarker et al., 2007)	No	*Buzura suppressaria* is a synonym (Jiang et al., 2011).
Biston thibetaria (Oberthür) syn.: *Buzura thibetaria* (Oberthür)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Biston* (Robinson et al., 2001). *Buzura thibetaria* is a synonym (Scoble, 1999a).
Cleora acaciaria (Boisduval) syn.: *Alcis acaciaria* (Boisduval), *Boarmia acaciaria* Boisduval	CASI, 1994; Hua, 2005	CASI, 1994; Hua	Leaf (Robinson et al., 2001)	No	*Alcis acaciaria* and *Boarmia acaciaria* are synonyms (Scoble, 1999a).
Ectropis excellens (Butler)	Hua, 2005	Choi et al., 2011	Leaf (Choi et al., 2011)	No	
Hemerophila subplagiata Walker	Hua, 2005	Hua, 2005	Leaf (Anonymous, 1925)	No	
Hemithea tritonaria (Walker)	CASI, 1994	CASI, 1994	Flower, leaf (Robinson et al., 2001)	No	
Hypomecis pseudopunctinalis (Wehrli) syn.: *Boarmia pseudopunctinalis* Wehrli	Hua, 2005	Hua, 2005	Flower, leaf (see Remarks)	No	Plant parts are those typically attacked by species of *Hypomecis* (e.g., *H. infixaria* [Walker], *H. transcissa* [Walker]; Robinson et al.,

					2001). *Boarmia pseudopunctinalis* is a synonym (Scoble, 1999a).
Hypomecis punctinalis (Scopoli)	Hua, 2005	Choi et al., 2011	Leaf (Choi et al., 2011)	No	
Hyposidra talaca (Walker)	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Menophra senilis (Butler)	Hua, 2005	Choi et al., 2011	Leaf (Choi et al., 2011)	No	
Menophra subplagiata (Walker)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Menophra* (e.g., *M. abruptaria* [Thunberg], *M. senilis* [Butler]; Dodok, 2006).
Ophthalmitis irrorataria (Bremer & Grey)	Hua, 2005	Hua, 2005	Leaf (Tsukiji, 2017c)	No	
Orothalassodes falsaria (Prout) syn.: *Thalassodes falsaria* Prout	Han and Xue, 2011	Robinson et al., 2001	Flower, leaf (Robinson et al., 2001)	No	*Thalassodes falsaria* is a synonym (Han and Xue, 2011).
Ourapteryx nivea Butler	Hua, 2005	Choi et al., 2011	Leaf (Choi et al., 2011)	No	
Pylargosceles steganioides (Butler)	Hua, 2005	Robinson et al., 2010	Leaf (Tsukiji, 2017a)	No	
Lepidoptera: Gracillaridae					
Phyllocnistis citrella Stainton	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Leaf (Cai and Peng, 2008)	No	Present in the United States (AL, CA, FL, HI, LA, TX) (CABI, 2013). Larvae prefer to feed on leaves and only rarely mine on the surface of fruit (CABI, 2013; Heppner and Dixon, 1995). The mines are very conspicuous (CABI, 2013), and infested fruit are highly unlikely to be harvested.
Phyllocnistis saligna (Zeller)	Hua, 2005	Hua, 2005	Leaf (Clausen, 1927; Hering, 1951)	No	
Lepidoptera: Hepialidae					

Endoclyta excrescens (Butler)	Hua, 2005	Lee et al., 1992	Stem (Nishi and Yoshii, 1979; Nasu et al., 2004)	No	
Lepidoptera: Lasiocampidae					
Estigena pardalis (Walker)	Hua, 2005	Hua, 2005	Leaf (Nair, 2007)	No	
Gastropacha pardale (Walker)	Hua, 2005	Hua, 2005	Leaf (Haseeb et al., 2006)	No	
Gastropacha philippinensis Tams	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Gastropacha* (e.g. *G. quercifolia* [L.], *G. pardale* [Walker]; Georgiev and Beshkov, 2000; Haseeb et al., 2006).
Paralebeda plagifera (Walker)	Hua, 2005	Robinson et al., 2001	Leaf (Mukherjee and Nath, 1971)	No	
Poecilocampa populi (L.)	Hua, 2005	Hua, 2005	Leaf (Alford, 2014)	No	
Trabala vishnou (Lefebure)	CASI, 1994	CASI, 1994	Leaf (Cheng et al., 2002)	No	
Lepidotpera: Limacodidae					
Apoda dentatus Oberthür	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part is that typically attacked by species of *Apoda* (e.g., *A. limacodes* [Hufnagel] [= *Cochlidion avellana* [L.], *A. y-inversum* [Packard]; Dyar, 1899; Murphy et al., 2011).
Cania bilinea (Walker)	Hua, 2005	Hua, 2005	Leaf (Muraleedharan, 1992)	No	
Cania siamensis Tams	Wu and Fang, 2009	Hua, 2005	Leaf (Holloway et al., 1987)	No	Specific epithet misspelled (as *sinensis*) by Hua (2005). Preferred host appears to be coconut, *Cocos nucifera* (Holloway et al., 1987; Robinson et al., 2001).
Ceratonema bilineata (Hering)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Ceratonema*

					(e.g., *C. christophi* [Graeser]; Lee and Choi, 2014).
Chalcocelis albiguttata (Snellen)	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Chalcoscelides castaneipars (Moore)	Hua, 2005	Robinson et al., 2001	Leaf (Anonymous, 2010)	No	
Cheromettia lohor (Moore)	CASI, 1994	CASI, 1994	Leaf (Hill, 2008)	No	
Darna ochracea (Moore) syn.: *Oxyplax ochracea* (Moore)	Li et al., 1997	Li et al., 1997	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Darna* (Robinson et al., 2001). *Oxyplax ochracea* is a synonym (Holloway, 1986).
Darna trima (Moore) syn.: *Orthocraspeda trima* Moore	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	*Orthocraspeda trima* is a synonym (Holloway et al., 1987).
Monema flavescens Walker	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	
Narosa nitobei Shiraki	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Narosa* (Robinson et al., 2001).
Narosoideus flavidorsalis (Staudinger)	Hua, 2005	Hua, 2005	Leaf (Tsukiji, 2017b)	No	
Parasa consocia Walker	Cheng et al., 2015	Cheng et al., 2015	Leaf (Wang et al., 2008a)	No	
Parasa lepida (Cramer)	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Parasa ostia (Swinhoe)	Hua, 2005	Hua, 2005	Leaf (Liu, 1984)	No	
Parasa sinica (Moore)	Hua, 2005	Hua, 2005	Leaf (EPPO, 2005)	No	
Phlossa conjuncta (Walker)	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Phrixolepia sericea Butler	Hua, 2005	CASI, 1994; Hua 2005	Leaf (Robinson et al., 2010)	No	
Setora nitens (Walker)	Hua, 2005	CASI, 1994	Leaf (Yunus and Ho, 1980)	No	

Setora postornata (Hampson) syn.: *S. sinensis* Moore	Li et al., 1997; Cheng et al., 2015	Li et al., 1997; Cheng et al., 2015	Leaf (see Remarks)	No	Plant part list is that with which species of *Setora* typically are associated (e.g., *S. fletcheri* Holloway, *S. nitens* Walker; Robinson et al., 2001). *Setora sinensis* is a synonym (Solovyev and Witt, 2009).
Thosea bicolor Shiraki	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Thosea* (Robinson et al., 2001).
Thosea sinensis (Walker)	Cheng et al., 2015	Cheng et al., 2015	Leaf (Robinson et al., 2001)	No	
Lepidotpera: Lycaenidae					
Chilades lajus (Stoll)	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Chilades pandava (Horsfield)	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Lepidotpera: Lymantriidae					
Arctornis alba (Bremer) syn.: *Redoa alba* (nec Bremer)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Arctornis* (Robinson et al., 2001). *Redoa alba* is a synonym (Beccaloni et al., 2017b; Inoue, 1956).
Arna bipunctapex (Hampson) syn.: *Euproctis bipunctapex* (Hampson)	CASI, 1994	CASI, 1994	Leaf (Robinson et al., 2001)	No	*Euproctis bipunctapex* is a synonym (Holloway, 1999).
Dasychira glaucinoptera Collenette	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Dasychira* (Robinson et al., 2001).
Dasychira grotei Moore	Hua, 2005	Hua, 2005	Leaf (Nair, 2007)	No	
Dasychira mendosa (Hübner)	Hua, 2005	Hua, 2005	Leaf (Yunus and Ho, 1980)	No	
Euproctis conspersa (Butler) syn.: *Nygmia conspersa* (Butler)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Euproctis* (Robinson et al., 2001). *Nygmia*

					conspersa is a synonym (Heppner and Inoue, 1992).
Euproctis flava (Bremer)	CASI, 1994	CASI, 1994	Leaf (Robinson et al., 2001)	No	
Euproctis flavinata (Walker)	Hua, 2005	Hua, 2005	Leaf (Clausen, 1931)	No	
Euproctis fraterna (Moore)	Hua, 2005	Robinson et al., 2001	Leaf, stem (Robinson et al., 2001)	No	
Euproctis kurosawai Inoue syn.: *Porthesia kurosawai* (Inoue)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Euproctis* (Robinson et al., 2001). *Porthesia kurosawai* is a synonym (Pitkin and Jenkins, 2017b).
Euproctis latifascia Walker	Hua, 2005	CASI, 1994	Leaf (Robinson et al., 2001)	No	
Euproctis montis (Leech)	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Euproctis* (Robinson et al., 2001).
Euproctis piperita Oberthür syn.: *Porthesia piperita* (Oberthür)	Li et al., 1997; Hua, 2005	Li et al., 1997; Hua, 2005	Leaf (see Remarks)	No	Plant part listed is that typically attacked by species of *Euproctis* (Robinson et al., 2001). *Porthesia piperita* is a synonym (Pitkin and Jenkins, 2017b).
Euproctis pseudoconspersa (Strand)	Cheng et al., 2015	Cheng et al., 2015	Leaf (Wakamura et al., 1996)	No	
Euproctis pulverea Leech	Li et al., 1997	Li et al., 1997	Leaf (Robinson et al., 2010; Wakamura et al., 2001)	No	
Euproctis subnotata Walker	Hua, 2005	Kuroko and Lewvanich, 1993	Flower (Kuroko and Lewvanich, 1993)	No	Distribution in China is apparently restricted to Hong Kong (Tong et al., 2006; Hua, 2005).
Euproctis taiwana (Shiraki) syn.: *Porthesia taiwana* Shiraki	Lei and Zang, 2000	CASI, 1994	Flower, leaf, root (Wen et al., 2006)	No	*Porthesia taiwana* is a synonym (Pitkin and Jenkins, 2017b).

Euproctis varians (Walker) syn.: *Nygmia varians* (Walker)	Hua, 2005	Hua, 2005	Leaf (Yunus and Ho, 1980)	No	*Nygmia varians* is a synonym (Heppner and Inoue, 1992).
Lymantria dispar (L.)	Hua, 2005	Zhang, 1994	Leaf (Bess, 1961)	No	Citrus was not recorded as a host in China by various observers (Schaefer et al., 1984), and was found to be a poor host, based on results of laboratory tests (Miller et al., 1987).
Orgyia australis Walker syn.: *Notolophus australis* (Walker)	CASI, 1994	CASI, 1994	Leaf (Wu, 1977)	No	*Notolophus australis* is a synonym (Heppner and Inoue, 1992).
Orgyia postica (Walker)	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Orgyia turbata Butler	CASI, 1994	CASI, 1994	Leaf (Kuroko and Lewvanich, 1993)	No	
Euproctis scintillans (Walker); syn.: *Porthesia scintillans* (Walker)	Cheng et al., 2015	Cheng et al., 2015	Leaf (Hill, 2008)	No	*Porthesia scintillans* is a synonym (Pitkin and Jenkins, 2017b)
Sphrageidus similis (Fuessly) syn.: *Arctornis chrysorrhoea* (L.), *Euproctis similis* (Fuessly), *Porthesia similis* (Fuessly)	CASI, 1994; Hua, 2005	CASI, 1994; Hua, 2005	Leaf (Alford, 2012)	No	*Arctornis chrysorrhoea*, *Euproctis similis*, and *Porthesia similis* are synonyms (EPPO, 2017).
Lepidoptera: Noctuidae					
Achaea janata (L.)	CABI, 2013; CASI, 1994; Li et al., 1997; Wu and Chou, 1985	CABI, 2013; CASI, 1994; Li et al., 1997; Ngampongsai et al., 2005; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Achaea oedipodina Mabille	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Achaea serva (Fabricius)	Hua, 2005	Ngampongsai et al., 2005	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Acronicta major (Bremer) syn.: *Acronycta major* Bremer	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Acronycta major* is a synonym (Poole, 1989a).
Acronicta rumicis (L.) syn.: *Acronycta rumicis* (L.)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Acronycta rumicis* is a synonym (Poole, 1989a).
Actinotia intermediata (Bremer) syn.: *Delta intermedia* Hampson	CASI, 1994; Li et al., 1997; Liu and Zhang, 2001	CASI, 1994; Li et al., 1997; Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Delta intermedia* is a synonym (Poole, 1989a).
Agrapha agnata (Staudinger) syn.: *Ctenoplusia agnata* (Staudinger), *Plusia agnata* Staudinger	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Ctenoplusia agnata* and *Plusia agnata* are synonyms (Poole, 1989a).
Agrapha albostriata (Bremer & Grey) syn.: *Ctenoplusia albostriata* (Bremer & Grey), *Plusia albostriata* Bremer & Grey	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Ctenoplusia albostriata* and *Plusia albostriata* are synonyms (Poole, 1989a).
Anomis flava (F.)	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Anomis fulvida (Guenée) syn.: *A. guttanivis* (Walker)	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Anomis guttanivis* is a synonym (Poole, 1989a).
Anomis mesogona (Walker)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Wu and Chou, 1985	Fruit (GAQSIQ, 2011; Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Anomis sabulifera (Guenée) syn.: *Cosmophila sabulifera* Guenée	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (Atwal, 1976; Hill, 1983; Robinson et al., 2001); fruit (see Remarks)	No	Fruit-piercing moth (see notes on pest list; section 2.3). Plant part association is based on other *Anomis* spp.
Anticarsia irrorata (F.)	Li et al., 1997	Li et al., 1997	Leaf (Robinson et al., 2001)	No	
Arcte coerula (Guenée) syn.: *Cocytodes coerula* Guenée	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Cocytodes coerula* is a synonym (Poole, 1989a).
Artena dotata (F.) syn.: *Lagoptera dotata* (F.)	Hua, 2005; Li et al., 1997; GAQSIQ, 2011	Hua, 2005; Li et al., 1997; GAQSIQ, 2011	Leaf (larvae) (Robinson et al., 2010); fruit (adults) (GAQSIQ, 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Lagoptera dotata* is a synonym (Poole, 1989a).
Asota tortuosa Moore	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Leaf (see Remarks)	No	*Asota* species feed on leaf of various host plants (e.g., Golding, 1937).
Bastilla analis (Guenée) syn.: *Parallelia analis* (Guenée)	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth on ripe fruit (see notes on pest list; section 2.3). *Parallelia analis* (Guenée) is a synonym (Holloway and Miller, 2003).
Bastilla crameri (Moore) syn.: *Parallelia crameri* Moore	CASI, 1994	CASI, 1994	Leaf (Holloway and Miller, 2003)	No	
Bastilla fulvotaenia (Guenée) syn.: *Parallelia fulvotaenia* (Guenée)	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia fulvotaenia* is a synonym (Holloway and Miller, 2003).

Bastilla joviana (Stoll) syn.: *Parallelia joviana* (Stoll)	CASI, 1994; Wu and Chou, 1985	CASI, 1994; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia joviana* is a synonym (Holloway and Miller, 2003).
Bastilla maturata (Walker) syn.: *Parallelia maturata* (Walker)	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia maturata* is a synonym (Holloway and Miller, 2003).
Bastilla onelia (Guenée) syn.: *Parallelia onelia* (Guenée)	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia onelia* is a synonym (Holloway and Miller, 2003).
Bastilla praetermissa (Warren) syn.: *Parallelia praetermissa* (Warren)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia praetermissa* is a synonym (Holloway and Miller, 2003).
Bastilla simillima (Guenée) syn.: *Parallelia simillima* (Guenée)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia simillima* is a synonym (Holloway and Miller, 2003).
Brevipecten consanguis Leech	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Callopistria duplicans Walker syn.: *Eriopus duplicans* (Walker)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Eriopus duplicans* is a synonym (Poole, 1989a).

Calyptra lata (Butler) syn.: *Oraesia lata* Butler	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Zhang, 1994)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Oraesia lata* is a synonym (Zhang, 1994).
Calyptra minuticornis (Guenée) syn.: *Calpe minuticornis* (Guenée)	CASI, 1994; Hua, 2005; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Hua, 2005; Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Calpe minuticornis* is a synonym (Poole, 1989a).
Calyptra thalictri (Borkhausen) syn.: *Calpe capucina* (Esper)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Calpe capucina* is a synonym (Poole, 1989a).
Catocala abamita Bremer & Grey syn.: *Mormonia abamita* (Bremer & Grey)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Mormonia abamita* is a synonym (Poole, 1989a).
Chalciope mygdon (Cramer)	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Chaliciope stolida (F.)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (see Remarks)	No	Fruit-piercing moth. Plant part association is based on other members of the genus (see notes on pest list; section 2.3).
Cocytodes caerulea Guenée	CASI, 1994; Hua, 2005	CASI, 1994; Hua, 2005	Fruit (Hargreaves, 1936)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Corgatha dictaria Walker	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Bark, trunk (Robinson et al., 2001); stem, bark, leaf (Yunus and Ho, 1980)	No	Plant part association is based on the general feeding behavior of other species in the genus.
Craniophora fasciata (Moore)	CASI, 1994	CASI, 1994	Leaf (Robinson et al., 2001)	No	Plant part association is based on its general feeding behavior.
Cymatophoropsis trimaculata (Bremer)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Dierna strigata Moore	CASI, 1994	CASI, 1994	Fruit (BugGuide, 2013; Zaspel et al., 2011)	No	This species is in the subfamily Calpinae (Pitkin and Jenkins, 2017a), of which phytophagous members are fruit-piercing moths (Zaspel et al., 2011) (see notes on pest list; section 2.3).
Dysgonia arctotaenia (Guenée) syn.: *Ophiusa arctotaenia* Guenée, *Parallelia arctotaenia* (Guenée)	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	Fruit (Holloway and Miller, 2003)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Dysgonia curvata (Leech) syn.: *Parallelia curvata* (Leech)	CASI, 1994; Hua, 2005; Liu and Zhang, 2001	CASI, 1994; Hua, 2005; Liu and Zhang, 2001	Leaf (larvae) (Robinson et al., 2010); fruit (adults) (Holloway and Miller, 2003; Liu and Zhang 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia curvata* is a synonym (Poole, 1989a).
Dysgonia dulcis (Butler) syn.: *Parallelia dulcis* (Butler)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia dulcis* is a synonym (Poole, 1989a).
Dysgonia maturata (Walker) syn.: *Parallelia maturata* Hampson	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Holloway and Miller, 2003)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Dysgonia stuposa (F.) syn.: *Parallelia stuposa* (F.)	Hua, 2005; Wu and Chou, 1985	Hua, 2005; Wu and Chou, 1985	Fruit (Holloway and Miller, 2003; Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia stuposa* is a synonym (Holloway and Miller, 2003).
Enmonodia feniseca (Guenée)	CASI, 1994	CASI, 1994	Fruit (Atachi et al., 1989; Forsyth, 1966)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Entomogramma torsa Guenée	CASI, 1994	CASI, 1994	Adults in the subfamily Catocalinae may affect fruit or leaf (Holloway, 2013).	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Ercheia cyllaria (Cramer)	CASI, 1994	CASI, 1994; Ngampongsai et al., 2005	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Erebus crepuscularis (L.) syn.: *Nyctipao crepuscularis* (L.)	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Li et al., 1997; Wu and Chou, 1985	Fruit (Ngampongsai et al., 2005; Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Erebus hieroglyphica (Drury) syn.: *Nyctipao hieroglyphica* (Drury)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997; Ngampongsai et al., 2005	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Erebus caprimulgus (F.) syn.: *Nyctipao caprimulgus* (F.)	CASI, 1994	CASI, 1994	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Ericeia inangulata (Guenée)	CASI, 1994; Wu and Chou, 1985	CASI, 1994; Robinson et al., 2001	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Eudocima fullonia (Clerck) syn.: *Ophideres fullonica* L.	Cai and Geng, 1997; CASI, 1994; Hua, 2005; Li et al., 1997	Cai and Geng, 1997; CASI, 1994; Hua, 2005; Li et al., 1997; Robinson et al., 2001	Fruit (Cai and Geng, 1997)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Ophideres fullonica* is a synonym (Poole, 1989a).
Eudocima hypermnestra (Cramer) syn.: *Ophideres hypermnestra* Cramer	CASI, 1994	CASI, 1994	Fruit (Robinson et al., 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Eudocima salaminia Cramer	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997; Ngampongsai et al., 2005	Fruit (Ngampongsai et al., 2005; Robinson et al., 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Eudocima tyrannus (Guenée) syn.: *Adris tyrannus* Warren	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	Fruit, leaf (Zhang, 1994)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Adris tyrannus* is a synonym (Hua, 2005b; Poole, 1989a).

Grammodes geometrica (F.)	Hua, 2005; Li et al., 1997	Hua, 2005; Li et al., 1997; Ngampongsai et al., 2005	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Helicoverpa armigera (Hübner) syn.: *Heliothis armigera* Hübner	CASI, 1994	Annecke and Moran, 1982; CASI, 1994	Fruit, inflorescence, leaf, stems (Barnes, 1978)	No	Larvae may attack developing citrus fruit (Annecke and Moran, 1982; Nair, 1975) and cause fruit drop (Cai and Peng, 2008), but are highly unlikely to be associated with mature fruit at harvest.
Helicoverpa assulta (Guenée)	Li et al., 1997; Xia et al., 2009	Li et al., 1997	Leaf, fruit, flowers (not specific to citrus) (Xia et al., 2009)	No	*Helicoverpa assulta* feeds almost exclusively on solanaceous plants (Bedford, 1978; Xia et al., 2009), although it has been reported on citrus (Li et al., 1997). Larvae may attack developing fruit (Xia et al., 2009), but are highly unlikely to be associated with mature fruit at harvest.
Heliothis viriplaca (Hufnagel) syn.: *H. dipsacea* L., *Chloridea dipsacea* L.	CASI, 1994	CASI, 1994	Flower (FES, 2013)	No	We found only one source indicating that citrus is a host (CASI, 1994) and no information on plant part association for citrus. The plant part information is based on other host species.
Hulodes caranea Cramer	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Hypersypnoides astrigera (Butler) syn.: *Sypna astrigera* Butler	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Sypna astrigera* is a synonym (Poole, 1989b).

Hypocala subsatura Guenée	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Hypopyra vespertilio (F.) syn.: *Enmonodia vespertilio* (F.)	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Ischyja manlia Cramer	CASI, 1994	CASI, 1994	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Lacera alope (Cramer)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Lagoptera dotata (F.) syn.: *Artena dotata* F.	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; GAQSIQ, 2011; Li et al., 1997	Fruit (GAQSIQ, 2011; Kuroko and Lewvanich, 1993; Nair, 1975)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Leucania loreyi (Duponchel) syn.: *Mythimna loreyi* (Duponchel)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Mythimna loreyi* is a synonym (Poole, 1989b).
Leucania separata Walker syn.: *Mythimna separata* (Walker)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Mythimna separata* is a synonym (Poole, 1989b).
Lygniodes hypoleuca Guenée syn.: *Agonista hypoleuca* (Guenée)	CASI, 1994	CASI, 1994	Fruit, leaf (Holloway, 2013)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Macaldenia palumba (Guenée) syn.: *Parallelia palumba* (Guenée)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Holloway and Miller, 2003; Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia palumba* is a synonym (Holloway and Miller, 2003).
Mamestra brassicae (L.)	Hua, 2005; Li et al., 1997	Hua, 2005; Li et al., 1997	Leaf (Alford, 2012)	No	
Metopta rectifasciata (Ménétriés)	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Mocis ancilla (Warren)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Mocis dalosa (Butler)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (see Remarks)	No	Plant part affected is based on typical feeding sites of *Mocis* spp. (e.g., *M. fruglis* and *M. undata*). Fruit-piercing moth (see notes on pest list; section 2.3).
Mocis frugalis (F.) syn.: *Remigia fruglis* (F.)	CASI, 1994	CASI, 1994	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Remigia fruglis* is a synonym (Zhang, 1994).
Mocis undata Fabricius	CASI, 1994; Hua, 2005; Li et al., 1997; Zhang, 1994	CASI, 1994; Hua, 2005; Li et al., 1997; Ngampongsai et al., 2005; Robinson et al., 2001; Zhang, 1994	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Ophisma gravata Guenée syn.: *Parallelia gravata* (Chen)	Wu and Chou, 1985	Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Parallelia gravata* is a synonym (Anonymous, 2008).
Ophisua cantonensis (F.) syn.: *Anua cantonensis* F.	CASI, 1994	CASI, 1994	Fruit (see Remarks)	No	Plant part association is based on other *Ophisua* spp. (e.g., *O. coronata*) (Ngampongsai et al., 2005). Fruit-piercing moth (see notes on pest list; section 2.3).
Ophiusa coronata (F.) syn.: *Anua coronata* (F.)	Hua, 2005	Hua, 2005; Ngampongsai et al., 2005; Robinson et al., 2001	Fruit (Ngampongsai et al., 2005; Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Anua coronata* is a synonym (Poole, 1989b).

Ophiusa disjungens Walker syn.: *Anua indiscriminata* Hampson	CASI, 1994	CASI, 1994	Fruit (see Remarks)	No	Plant part association is based on other *Ophisua* spp. (e.g., *O. coronata*) (Ngampongsai et al., 2005). Fruit-piercing moth (see notes on pest list; section 2.3).
Ophiusa tirhaca (Cramer) syn.: *Anua separans* (Walker)	CASI, 1994; Li et al., 1997	CABI, 2013; CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Anua separans* is a synonym (Poole, 1989b).
Ophiusa trapezium (Guenée) syn.: *Anua trapezium* (Guenée)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Anua trapezium* is a synonym (Poole, 1989b).
Ophiusa triphaenoides (Walker) syn.: *Anua triphaenoides* (Walker)	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Anua triphaenoides* is a synonym (Poole, 1989b).
Oraesia emarginata F.	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997; Cheng et al., 2015	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997; Cheng et al., 2015	Fruit (Hattori, 1969)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Oraesia excavata Butler	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	Fruit (Haines et al., 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Oxyodes scrobiculata (F.)	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Parallelia arctotaenia (Guenée)	GAQSIQ, 2011	GAQSIQ, 2011	Fruit (GAQSIQ, 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Parallelia gravata (Guenée) syn.: *Ophisma gravata* (Guenée)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Holloway and Miller, 2003)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Parallelia illibata (F.)	CASI, 1994	CASI, 1994	Fruit (Holloway and Miller, 2003)	No	Fruit-piercing moth (see notes on pest list; section 2.3).

Patula macrops (L.) syn.: *Eupatula macrops* (L.)	CASI, 1994	CASI, 1994	Fruit (Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Phyllodes consobrina Westwood	CASI, 1994	CASI, 1994	Fruit (Zaspel et al., 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Phyllodes eyndhovi Vollenhoven	CASI, 1994	CASI, 1994	Fruit (Zaspel et al., 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Phyllodes punctifascia (Leech)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Zaspel et al., 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Platyja umminea (Cramer)	CASI, 1994; Hua, 2005	CASI, 1994; Hua, 2005	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Plusiodonta casta (Butler)	Liu and Zhang, 2001	Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Plusiodonta coelonota Kollar	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Serrodes campana Guenée	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Spirama retorta (Clerck) syn.: *Speiredonia retorta* (Clerck)	CASI, 1994; GAQSIQ, 2011; Hua, 2005; Li et al., 1997	GAQSIQ, 2011	Fruit (GAQSIQ, 2011)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Speiredonia retorta* is a synonym (Poole, 1989b).
Spodoptera litura (F.)	CASI, 1994; Li et al., 1997; Cheng et al., 2015	CASI, 1994; Li et al., 1997; Cheng et al., 2015	Leaf (Cai and Peng, 2008; Nagalingam and Savithri, 1980)	No	
Sympis rufibasis Guenée	Li et al., 1997; Wu and Chou, 1985	Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3).
Sypnoides simplex (Leech) syn.: *Sypna simplex* (Leech)	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (see Remarks)	No	Typical feeding site of species of *Sypnoides* (Robinson et al., 2010).
Thyas juno (Dalman) syn.: *Dermaleipa juno* (Dalman), *Lagoptera juno* (Dalman)	CASI, 1994; Holloway, 2013; Hua, 2005; Li et al., 1997; Wu and Chou, 1985	CASI, 1994; Hua, 2005; Li et al., 1997; Wu and Chou, 1985	Fruit (Wu and Chou, 1985)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Dermaleipa juno* and *Lagoptera juno* are synonyms (Poole, 1989b).

Tiracola plagiata (Walker)	CABI, 2013; CASI, 1994; Hua, 2005; Li et al., 1997	CABI, 2013; CASI, 1994; Hua, 2005; Li et al., 1997; Zhang, 1994	Leaf, fruit (Hill, 2008)	No	Larvae destroy fruit (Hill, 2008), making it highly unlikely to be packed.
Trigonodes hyppasia (Cramer) syn.: *Chalciope hyppasia* (Cramer)	CASI, 1994; Liu and Zhang, 2001	CASI, 1994; Liu and Zhang, 2001	Fruit (Liu and Zhang, 2001; Ngampongsai et al., 2005)	No	Fruit-piercing moth (see notes on pest list; section 2.3). *Chalciope hyppasia* is a synonym (Poole, 1989b).
Lepidoptera: Notodontidae					
Neostauropus alternus (Walker) syn.: *Stauropus alternus* Walker	Zhang, 1994	Zhang, 1994	Leaf (Robinson et al., 2001)	No	
Phalera assimilis Bremer & Grey	Robinson et al., 2010	Lee et al., 1992	Leaf (Kagata and Ohgushi, 2012)	No	
Phalera bucephala (L.)	CASI, 1994	CASI, 1994	Leaf (Alford, 2012)	No	
Stauropus fagi (L.) syn.: *S. persimilis* Butler	CASI, 1994	CASI, 1994	Leaf (Savela, 2017b)	No	
Nymphalidae					
Melanitis leda L.	CASI, 1994	CASI, 1994	Leaf (Heinrichs, 1994)	No	
Polygonia c-aureum L.	CASI, 1994	CASI, 1994	Many species of Nymphalinae larvae feed on the foliage (Hill, 1994)	No	
Lepidoptera: Oecophoridae					
Athrypsiastis salva Meyrick	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, inflorescence, stem (see Remarks)	No	Plant part association for *A. salvia* is based on data for the family (Borror et al., 1989).
Depressaria culcitella Treitschke	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	*Depressaria* spp. feed on leaves (Robinson et al., 2010).
Epimactis talantias (Meyrick) syn.: *Epimactis tolantas* Meyrick	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf (Tang, 1987)	No	
Psorosticha zizyphi Stephens	CASI, 1994	CASI, 1994	Leaf (Devaki et al., 2013)	No	

Stathmopoda auriferella Walker	van der Gaag and van der Straten, 2009	Badr et al., 1986	Flower, twig, fruit, dead plant material (Robinson et al., 2001); fruit (Park et al., 1988); flower bud, fruit (newly set) (Ma et al., 2013); leaf (EPPO, 2010)	No	Plant part association is based on its general feeding behavior on hosts; we found no specific evidence for citrus. Larvae feed on the surface of fruits (Ma et al., 2013; Yang et al., 2013) and are highly unlikely to remain with fruit through harvest. Since 1985, this genus has not been intercepted at a U.S. port-of-entry (PestID, 2013).
Lepidoptera: Papilionidae					
Papilio bianor Cramer	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	
Papilio bootes Westwood	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Species of *Papilio* feed on foliage (Jeppson, 1989).
Papilio chaon Westwood	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio demetrius liukiuensis Fruhstorfer	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio demoleus L.	Cheng et al., 2015	Cheng et al., 2015	Leaf (Sarada et al., 2014)	No	
Papilio dialis Leech	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio helenus L.	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	
Papilio maackii Ménétriés	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio machaon L.	Li et al., 1997	Li et al., 1997	Leaf (Jeppson, 1989)	No	
Papilio macilentus Janson	Li et al., 1997	Li et al., 1997	Leaf (Reuther et al., 1989)	No	
Papilio mencius Fldr	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio memnon L.	Zhou et al., 2009	Zhou et al., 2009	Leaf (Zhou et al., 2009)	No	
Papilio nephelus Boisduval	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio paris L.	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	

Papilio polytes L.	Gao et al., 2012	Gao et al., 2012	Leaf (Chen and Ou-Yang, 2007)	No	
Papilio protenor Cramer	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	
Papilio thaiwanus Rothschild	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	See *Papilio bootes*.
Papilio xuthus L.	Gao et al., 2012	Gao et al., 2012	Leaf (Cai and Peng, 2008; Murata et al., 2011)	No	
Lepidoptera: Pieridae					
Delias aglaia porsenna Cramer	Hua, 2005	Hua, 2005	Leaf (see Remarks)	No	Larvae of species of *Delias* feed on leaves (Robinson et al., 2001)
Delias belladonna taiwana Wileman	Hua, 2005	CASI, 1994	Leaf (see Remarks)	No	See *Delias aglaia*.
Delias pasithoe L.	Hua, 2005	Robinson et al., 2001	Leaf (Robinson et al., 2001)	No	
Eurema andersoni godana Fruhstorfer	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Larvae of species of *Eurema* feed on leaves (Roychoudhury et al., 2015)
Eurema hecabe L.	CASI, 1994	CASI, 1994	Leaf (Roychoudhury et al., 2015)	No	
Lepidoptera: Psychidae					
Acanthoecia larminati (Heylaerts)	Li et al., 1997	Li et al., 1997	Leaf (Tong et al., 2006)	No	
Acanthopsyche nigriplaga (Wileman)	Hua, 2005	Hua, 2005	Leaf (Hori, 1927)	No	
Acanthopsyche subteralbata Hampson	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Amatissa snelleni (Heylaerts) syn.: *Kophene snelleni* Heylaerts	Hua, 2005	Hua, 2005	Stem (Robinson et al., 2001)	No	*Kophene snelleni* is a synonym (Sobczyk, 2011).
Canephora asiatica (Staudinger)	Hua, 2005	Hua, 2005	Leaf (Nakayama et al., 1973)	No	
Canephora unicolor (Hübner)	CASI, 1994	CASI, 1994	Leaf (Robinson et al., 2010)	No	
Chalioides kondonis Kondo	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011; Nakashima and Shimizu, 1972)	No	

Clania crameri (Westwood) syn.: *Eumeta crameri* (Westwood)	Hua, 2005	Hua, 2005	Leaf (Ameen and Sultana, 1977)	No	*Eumeta crameri* is a synonym (Hampson, 1892).
Clania minuscula (Butler) syn.: *Cryptothelea minuscula* Butler	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	*Cryptothelea minuscula* is a synonym (Derwent Publications Ltd., 1990).
Clania variegata Snellen	Cheng et al., 2015	Cheng et al., 2015	Inflorescence, leaf, stem (Pujiastuti, 2010)	No	
Dappula tertia (Templeton)	Hua, 2005	Hua, 2005	Leaf (Robinson et al., 2001)	No	
Eumeta crameri Westwood	Hua, 2005	Hua, 2005	Leaf (Ameen and Sultana, 1977)	No	
Eumeta variegata (Snellen)	Hua, 2005	Hua, 2005	Leaf (Watt, 1898)	No	
Lepidopsyche unicolor (Hufnagel)	Li et al., 1997	Li et al., 1997	Leaf (Carter, 1984)	No	
Mahasena oolona Sonan	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	Specific epithet incorrectly spelled as *colona* in GAQSIQ (2011) (Sobczyk, 2011).
Oiketicoides larminati Heylearts	CASI, 1994	CASI, 1994	Leaf (see Remarks)	No	Larval Psychidae feed on leaves (Rhainds et al., 2009).
Lepidoptera: Pyralidae					
Conogethes punctiferalis (Guenée) syn.: *Dichocrocis punctiferalis* (Guenée)	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Hua, 2005; Cheng et al., 2015	Cai and Mu, 1993; CASI, 1994; GAQSIQ, 2011; Hua, 2005; MAFF, 1990; Cheng et al., 2015	Fruit, leaf, stem, growing point (GAQSIQ, 2011); fruit (boring) (Smith et al., 1997); fruit (Ooi et al., 2002)	No	Larvae bore into the fruit, leaves, and stem of the host, causing discoloration and splitting of fruit, and fruit drop (Cai and Peng, 2008). Affected fruit are highly unlikely to be harvested or packed.

Cryptoblabes gnidiella (Millière)	CASI, 1994; Hua, 2005	CASI, 1994; Ebeling, 1959; Hua, 2005; Robinson et al., 2001; Silva and Mexia, 1999	Fruit, leaf, stem (Carter, 1984; Avidov and Gothilf, 1960; Silva and Mexia, 1999), fruit (Moore, 2003)	Yes	This pest is present in the United States (HI) (CABI, 2013)
Hypsipyla robusta (Moore) syn.: *Crociomera robusta* (Moore)	Chen and Cha, 1998	Robinson et al., 2001; Yunus and Ho, 1980	Leaf (Yunus and Ho, 1980), stem (Chen and Cha, 1998)	No	
Orybina flaviplaga (Walker)	Hua, 2005	Hua, 2005	Presumed leaf (see Remarks)	No	We found no evidence that this genus is a pest in China.
Orybina regalis (Leech)	Hua, 2005	Hua, 2005	Presumed leaf (see Remarks)	No	See remark for *Orybina flaviplaga*.
Lepidoptera: Tineidae					
Hapsifera barbata (Christoph)	Hua, 2005	Hua, 2005	Stem (Sun and Zhang, 1989)	No	
Lepidoptera: Tortricidae					
Adoxophyes cyrtosema Meyrick	CASI, 1994; 2012; GAQSIQ, 2011; Li et al., 1997	CASI, 1994; 2012; GAQSIQ, 2011; Li et al., 1997	Leaf (GAQSIQ, 2011); fruit, inflorescence, leaf (Liu, 1958)	No	Developing fruit may be attacked, causing it to drop prematurely (Liu, 1958). The pest is not expected to be associated with mature fruit at harvest. Also, see note in section 2.3.
Adoxophyes fasciculana Walker	Bruun, 2006	Brown et al., 2008; Nafus, 1997; Robinson et al., 2010	Fruit, leaf (Pantoja et al., 2002); leaf (Bruun, 2006)	No	Plant part association is based on behavior on papaya (Pantoja et al., 2002) and rose (Bruun, 2006). See note in section 2.3.
Adoxophyes orana Fischer von Röeslerstamm	GAQSIQ, 2011; Hua, 2005	Hua, 2005; MAFF, 1990; Robinson et al., 2001	Leaf (GAQSIQ, 2011); fruit (Gilligan and Epstein, 2014)	No	See note in section 2.3.
Adoxophyes privatana (Walker)	Hua, 2005; Meijerman and Ulenberg, 2000	Hua, 2005; Kuroko and Lewvanich, 1993; Meijerman and Ulenberg, 2000; Robinson et al., 2001	Leaf, young fruit, flower, bud (Meijerman and Ulenberg, 2000); flower buds, young fruit (Cai and Peng, 2008)	No	Causes fruit to drop (Cai and Peng, 2008). See note in section 2.3.
Ancylis unculana (Haworth)	Hua, 2005	Hua, 2005	Leaf (Kimber, 2013)	No	

Archips asiaticus (Walsingham) syn.: *Cacoecia asiatica* Walsingham	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Leaf, fruit (Byun et al., 2003)	No	*Archips* is the current valid genus name for *Cacoecia* (Beccaloni et al., 2017a). Plant parts are based on behavior on hosts in general. See note in section 2.3.
Archips ingentana (Christoph) syn.: *Archippus ingentanus*, *Cacoecia ingentana* Christoph	CASI, 1994; Hua, 2005	Brown et al., 2008; Shiraki, 1952	Leaf, fruit, flower (Byun et al., 2003; Meijerman and Ulenberg, 2000; Tuck, 1990; Waterhouse, 1993)	No	*Archippus ingentanus* and *Cacoecia ingentana* are synonyms (Hua, 2005). Plant part association is based on the behavior of other species in the genus on hosts in general. See note in section 2.3.
Archips machlopis (Meyrick) syn.: *Archips seminubila* (Meyrick)	Hua, 2005; Tuck, 1990	Hua, 2005; Robinson et al., 2001; Tuck, 1990; Waterhouse, 1993	Leaf (Tuck, 1990; Waterhouse, 1993)	No	*Archips seminubila* is a synonym (Brown, 2005).
Archips micaceana (Walker) syn.: *Cacoecia eucroca* Diakonoff	Brown, 2005; CASI, 1994; Hua, 2005	CASI, 1994; Robinson et al., 2001; Waterhouse, 1993	Leaf (Robinson et al., 2001; Waterhouse, 1993)	No	*Cacoecia eucroca* is a synonym (Brown, 2005).
Archips xylosteana (Linnaeus) syn.: *Cacoecia xylosteana* Linnaeus, *Archips xylosteanus* (Linnaeus)	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Leaf, flower, young fruit (Byun et al., 2003)	No	*Cacoecia xylosteana* and *Archips xylosteanus* are synonyms (Savela, 2017a). Plant part association is based on hosts in general. See note in section 2.3.
Cerace stipatana Walker	CASI, 1994; Li et al., 1997	CASI, 1994	Leaf (Robinson et al., 2001)	No	Plant part association is based on information for *Cerace sardias* Meyrick.
Cryptophlebia ombrodelta (Lower)	Hua, 2005	Brown et al., 2008; Hua, 2005; Meijerman and Ulenberg, 2000; Robinson et al., 2001	Fruit (Gilligan and Epstein, 2014; Robinson et al., 2001)	No	Plant part association is based on hosts in general. See note in section 2.3.

Gatesclarkeana erotias (Meyrick)	Robinson et al., 2010	Brown et al., 2008	Leaf, shoot (Butani, 1993); leaf (Brown et al., 2008); leaf, shoot, fruit, flower (Robinson et al., 2001)	No	Plant part association is based on hosts in general. We found only one report of citrus as a host, suggesting that it is not a primary host. Moreover, we found only reports on fruit for litchi, not citrus or other hosts.
Homona coffearia (Nietner)	CABI, 2013; CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Gao et al., 2012	CASI, 1994; GAQSIQ, 2011; Li et al., 1997; Meijerman and Ulenberg, 2000; Gao et al., 2012	Leaf (GAQSIQ, 2011); fruit (Cai and Peng, 2008; Liu, 1964)	No	Surface feeding damage; deeper scarring causes fruit drop (Cai and Peng, 2008). Predominantly reported as a leaf feeder of its hosts (e.g., CABI, 2017; Meijerman and Ulenberg, 2000; Robinson et al., 2001). Also, see note in section 2.3.
Homona magnanima Diakonoff	CASI, 1994; Hua, 2005; Li et al., 1997	CASI, 1994; Hua, 2005; Li et al., 1997	Leaf (CABI, 2013; Meijerman and Ulenberg, 2000)	No	
Homona tabescens (Meyrick) syn.: *Archips tabescens* Meyrick, *Cacoecia tabescens* Meyrick	CASI, 1994; Li et al., 1997; Zhang, 1994; Gao et al., 2012	CASI, 1994; Li et al., 1997; Zhang, 1994; Gao et al., 2012	Leaf (Zhou and Deng, 2004); fruit (Liu, 1964)	No	*Cacoecia tabescens* (Brown, 2005; Gilligan et al., 2014) and *Archips tabescens* (Zhang, 1994) are synonyms. Predominantly reported as a leaf feeder of its hosts (e.g., Robinson et al., 2001; Waterhouse, 1993; Yunus and Ho, 1980). Also, see note in section 2.3.

Olethreutes metallicana Hübner syn.: *Argyroploce metallicana* (Hübner)	Hua, 2005	Hua, 2005	Leaf (Georghiou, 1977; Hill, 1983; Yunus and Ho, 1980; Hill, 2008); stem, shoot, leaf (Robinson et al., 2001); leaf, shout, flower (Carter, 1984)	No	*Argyroploce metallicana* is a synonym (Brown, 2005). Plant part association is based on other species in the genus on hosts in general.
Pandemis chlorograpta Meyrick	Hua, 2005	Hua, 2005	Leaf (Yasuda, 1972)	No	
Spatalistis christophana Walsingham	Hua, 2005	Hua, 2005	Leaf (Heckford, 2010)	No	Plant part association is based on *Spatalistis bifasciana.*
Ulodemis trigrapha Meyrick	Razowski, 2006; Zhang, 1994	Zhang, 1994 Brown et al., 2008	Leaf (Nair, 1975)	No	
Lepidoptera: Xylorictidae					
Athrypsiastis salva Meyrick	CASI, 1994; Li et al., 1997	CASI, 1994; Li et al., 1997	Leaf, stem (see Remarks)	No	Plant parts listed are those typically attacked by species of Xyloryctidae (e.g., Hadlington and Johnston, 1998).
Epimactis talantias Meyrick	Hua, 2005	Hua, 2005	Leaf, stem (see Remarks)	No	See remark for *Athrypsiastis salvia*.
Orthoptera: Acrididae					
Atractomorpha psittacina (de Haan)	Gao et al., 2012	Gao et al., 2012	Leaf (Wen et al., 2006)	No	
Oxya chinensis (Thunberg)	Gao et al., 2012	Gao et al., 2012	Leaf (Ahmed et al., 2016)	No	
Orthoptera: Gryllidae					
Brachytrupes portentosus (Lichtenstein)	CASI, 1994; GAQSIQ, 2011	CASI, 1994; GAQSIQ, 2011	Root (GAQSIQ, 2011)	No	
Orthoptera: Gryllotalpidae					
Gryllotalpa africana Palisot de Beauvois	CASI, 1994; GAQSIQ, 2011	CASI, 1994; GAQSIQ, 2011	Root (Sithole, 1986; GAQSIQ, 2011)	No	
Orthoptera: Tettigoniidae					
Holochlora japonica (Brunner von Wattenwyl) syn.: *H. nawae* Matsumura & Shiraki	Gao et al., 2012	Gao et al., 2012	Inflorescence, leaf (Zimmerman, 1948)	No	*Holochlora nawae* is considered a synonym (Ito and Ichikawa, 2003).
Thysanoptera: Phlaeothripidae					

Haplothrips chinensis Priesner	Gao et al., 2012	Gao et al., 2012	Inflorescence (Wang, 1997)	No	
Haplothrips subtilissimus (Haliday)	Qin et al., 2010	Qin et al., 2010	Leaf (Dubovský et al., 2010)	No	
Haplothrips tenuipennis Bagnall	Qin et al., 2010	Qin et al., 2010	Inflorescence (Klein et al., 2007)	No	
Nesothrips lativentris (Karny) syn.: *Rhaebothrips lativentris* Karny	Qin et al., 2010	Qin et al., 2010	Stem (Sen, 1980)	No	On dry twigs; likely a spore-feeder (Eow et al., 2014). *Rhaebothrips lativentris* is considered a synoym (Mound, 2015).
Thysanoptera: Thripidae					
Lefroyothrips lefroyi (Bagnall)	Xu et al., 2012	Xu et al., 2012	Inflorescence (Sartiami and Mound, 2013)	No	
Megalurothrips usitatus (Bagnall)	Xu et al., 2012	Xu et al., 2012	Inflorescence (Tang et al., 2015)	No	
Thrips andrewsi (Bagnall)	Gao et al., 2012	Gao et al., 2012	Inflorescence (Singh and Varatharajan, 2013)	No	
Thrips coloratus Schmutz	Qin et al., 2010	Qin et al., 2010	Inflorescence (Sartiami and Mound, 2013)	No	
Thrips flavidulus (Bagnall)	Xu et al., 2012	Xu et al., 2012	Fruit (Yao et al., 2014)	Yes	
MOLLUSCA					
Bradybaena similaris Ferussae	Cai and Peng, 2008; GAQSIQ, 2011	Cai and Peng, 2008; GAQSIQ, 2011	Leaf, fruit (Cai and Peng, 2008); stem (GAQSIQ, 2011)	No	Large, external feeder. Unlikely to remain on fruit during harvest.
NEMATODES					
Ditylenchus nanus Siddiqi	Bao et al., 2007; Liu and Liu, 2005	Bao et al., 2007	Root (Bao et al., 2007)	No	
Hoplolaimus indicus Sher	CABI, 2017; Chang, 1993	Chang, 1993; SON/APHIS, 2003	Root (Chang, 1993)	No	
Hoplolaimus pararobustus (Schuurmans Stekhoven & Teunissen) Sher in Coomans	CABI, 2017; SON/APHIS, 2003	SON/APHIS, 2003	Root (SON/APHIS, 2003)	No	

Longidorus pisi Edward, Misra, and Singh	Guo et al., 2011	Kleynhans et al., 1996	Root (Guo et al., 2011; Kleynhans et al., 1996)	No	
Meloidogyne citri Zhang, Gao & Weng	SON/APHIS, 2003; Zhang et al., 1990	Zhang et al., 1990	Root (Perry et al., 2009; Zhang et al., 1990)	No	
Meloidogyne donghaiensis Zheng, Lin, & Zheng	SON/APHIS, 2003; Zhang et al., 1990	Zheng et al., 1990	Root (Perry et al., 2009; Zhang et al., 1990)	No	
Meloidogyne exigua Goeldi	Perry et al., 2009	Perry et al., 2009; Stokes, 1978	Root (Perry et al., 2009)	No	
Meloidogyne fujianensis Pan	Pan, 1985; SON/APHIS, 2003	Pan, 1985	Root (Pan, 1985; Perry et al., 2009)	No	
Meloidogyne jianyangensis Yang, Hu, Chen & Zhu	SON/APHIS, 2003; Yang et al., 1990	Yang et al., 1990; Zhu et al., 1991	Root (Perry et al., 2009; Yang et al., 1990)	No	
Meloidogyne kongi Yang, Wang & Feng	SON/APHIS, 2003; Yang et al., 1988	Yang et al., 1988	Root (Perry et al., 2009; Yang et al., 1990)	No	
Meloidogyne mali Itoh, Ohshima & Ichinohe =*Meloidogyne ulmi* Marinari-Palmisano & Ambrogioni	Zhang and Xu, 1994	Zhang and Xu, 1994	Root (Perry et al., 2009; Zhang and Xu, 1994)	No	
Meloidogyne mingnanica Zhang	Chang, 1993; SON/APHIS, 2003; Zhang, 1993	Chang, 1993; Zhang, 1993	Root (Perry et al., 2009; Zhang, 1993)	No	
Ogma hechuanense Kaiji & Weisheng	Hu and Zhu, 1990; Zhu et al., 1991	Hu and Zhu, 1990	Root (Hu and Zhu, 1990)	No	
Rotylenchoides cheni Zhu, Lan, Hu, Yang & Wang	Zhu et al., 1991	Zhu et al., 1991	Root (Zhu et al., 1991)	No	Siddiqi (2000) questioned the validity of this name.
Rotylenchus caudaphasmidius Sher	Hu, 1991	Hu, 1991	Root (Castillo and Volvas, 2005)	No	
Rotylenchus devonensis Van den Berg	Hu, 1991	Hu, 1991	Root (Castillo and Volvas, 2005)	No	
Rotylenchus incultus Sher	Chang, 1993	Chang, 1993	Root (Castillo and Volvas, 2005)	No	

Scutellonema clathricaudatum Whitehead	CABI, 2017; Wang et al., 1991	Caveness, 1967	Root (Caveness, 1967)	No	Present in the United States in Florida (Lehman, 2002). Citrus is a poor host of this nematode (Caveness, 1967).
Xiphinema hunaniense Wang & Wu	Luo et al., 2003; Xu et al., 1995	Wu et al., 2007	Root (Wu et al., 2007; Xu et al., 1995)	No	
Xiphinema insigne Loos	Hu, 1991; Luo et al., 2003; Xu et al., 1995	Hu, 1991	Root (Hu, 1991)	No	
VIRUSES and VIROIDS					
Citrus bent leaf viroid (CBLVd) (also called CVd-Ib)	Wang et al., 2008b	Wang et al., 2008b	Moves within phloem of plant, systemic (Bani-Hashemian et al., 2015)	Yes	
Satsuma dwarf virus (SDV)	Cui et al., 1991	Cui et al., 1991	Whole plant-systemic (Koizumi, 2001)	Yes	
BACTERIA and PHYTOPLASMAS					
'*Candidatus* Phytoplasma aurantifolia' 16SrII	Arocha et al., 2006; Lou et al., 2014	Faghihi et al., 2011; Zreik et al., 1995	Whole plant (found within plant phloem) (IRPCM, 2004)	Yes	
'*Candidatus* Liberibacter asiaticus' Jagoueix et al. (Huanglongbing)	Ding et al., 2008	Ding et al., 2008	Whole plant (Ding et al., 2008)	Yes	Observed in the United States (GA, FL, SC, AL, LA, TX, PR, USVI, AZ, MI, HI) (evidence of the vector in other states—CA, etc.) (APHIS, 2010).
Xanthomonas citri subsp. *citri* (ex Hasse) Gabriel et al.	CABI, 2017	CABI, 2017	Leaf, stem, fruit (Gottwald and Graham, 2005)	Yes	Actionable, under official control. The transportation of fruit is regulated by 7 CFR 301.75-7.
FUNGI					
Anthina brunnea Sawada	Tai, 1979	Farr and Rossman, 2017	Root (Petrak, 1930)	No	
Anthina citri Sawada	Tai, 1979	Farr and Rossman, 2017	Root (Petrak, 1930)	No	
Ascochyta citri Penz.	CASI, 1994	CASI, 1994	Leaf (CASI, 1994)	No	
Colletotrichum boninense Moriwaki, Toy. Sato & Tsukib.	Farr and Rossman, 2017; Peng et al., 2012	Peng et al., 2012	Leaf (Peng et al., 2012)	No	

Colletotrichum brevispora Phoulivong, Noireung, L. Cai & K.D. Hyde	Paul et al., 2014; Peng et al., 2012	Peng et al., 2012	Leaf (Peng et al., 2012)	No	
Colletotrichum citri F. Huang, L. Cai, K.D. Hyde & H.Y. Li	Farr and Rossman, 2017; Huang et al., 2013a	Farr and Rossman, 2017; Huang et al., 2013a	Shoot (Huang et al., 2013a)	No	
Colletotrichum citricola Y.L. Yang, Z.Y. Liu, K.D. Hyde & L. Cai	Farr and Rossman, 2017; Huang et al., 2013a	Farr and Rossman, 2017; Huang et al., 2013a	Leaf (Farr and Rossman, 2017; Huang et al., 2013a)	No	Considered a saprobe on leaf of *Citrus unshiu* (Huang et al., 2013a).
Coniothyrium paulense Henn.	CASI, 1994	CASI, 1994	Leaf (CASI, 1994)	No	
Corynespora citricola M.B. Ellis	GAQSIQ, 2011	GAQSIQ, 2011	Leaf (GAQSIQ, 2011)	No	Endophytic (Dixon et al., 2009; Smith, 2008).
Cryptosporiopsis citricarpa Zhu et al. = *Pseudofabraea citricarpa* Zhu et al.	CABI, 2017; Farr and Rossman, 2017; Zhu et al., 2012	CABI, 2017; Farr and Rossman, 2017; Zhu et al., 2012	Leaf, branch (Zhu et al., 2012)	No	
Diaporthe arecae (H.C. Srivast., Zakia & Govindar.) R.R. Gomes, C. Glienke & Crous)	Huang et al., 2015b; Yang et al., 2017	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stems of citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe biconispora F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stems of citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe biguttulata F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stems of citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe citriasiana Huang et al.	Farr and Rossman, 2017; Huang et al., 2013b	Farr and Rossman, 2017 Huang et al., 2013b	Stem, leaf, fruit (Huang et al., 2013b)	No	See section 2.3.

Diaporthe citrichinensis Huang et al.	Farr and Rossman, 2017; Huang et al., 2013b	Farr and Rossman, 2017; Huang et al., 2013b	Stem (Huang et al., 2013b)	No	This fungus was isolated from dead wood of citrus species (Huang et al., 2013b; Huang et al., 2015b).
Diaporthe discoidispora F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stem from a citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe endophytica R.R. Gomes, C. Glienke & Crous	Huang et al., 2015b	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stem from a citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe hongkongensis R.R. Gomes, C. Glienke & Crous	Huang et al., 2015b	Huang et al., 2015b	Leaf, stem (Huang et al., 2015b)	No	This fungus was isolated from leaves and stem from a citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe multigutullata F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Stem (Huang et al., 2015b)	No	This fungus was isolated from the stem of a citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe ovalispora F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Stem (Huang et al., 2015b)	No	This fungus was isolated from the stem of a citrus species as an endophyte (without symptoms) (Huang et al., 2015b).
Diaporthe subclavata F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Fruit, leaf (Huang et al., 2015b)	No	See section 2.3.
Diaporthe unshiuensis F. Huang, K.D. Hyde & H.Y. Li	Huang et al., 2015b	Huang et al., 2015b	Stem, fruit (Huang et al., 2015b)	No	See section 2.3.

*Dimerium scheffleri (*Henn.) Sacc. & D. Sacc. = *Dimerosporium scheffleri* Henn.; *Porostigme scheffleri* (Henn.) Syd. & P. Syd	CASI, 1994; Farr and Rossman, 2017	CASI, 1994; Farr and Rossman, 2017	Leaf (CASI, 1994)	No	
Endoxylina citricola S.H. Ou	Farr and Rossman, 2017; Teng, 1988	Farr and Rossman, 2017; Teng, 1988	Leaf (CASI, 1994), stems (Teng, 1988)	No	Found on dead branches of citrus; secondary pathogen.
Helicobasidium mompa Tanaka	Farr and Rossman, 2017; Tai, 1979	Watson, 1971	Root (Farr and Rossman, 2017; Tai, 1979)	No	
*Pallidocercospora crystallina (*Crous & M.J. Wingf.) Crous & M.J. Wingf.	Huang et al., 2015a	Huang et al., 2015a	Fruit, leaf (Huang et al., 2015a)	No	Non-quarantine when destined to HI (Romberg, 2017). See section 2.3.
Pallidocercospora heimioides (Crous & M.J. Wingf.) Crous & M.J. Wingf.	Huang et al., 2015a	Huang et al., 2015a	Fruit, leaf (Huang et al., 2015a)	No	See section 2.3.
Pestalotiopsis citri (Mundk. & Khesw.) Ershad & Roohib.	Farr and Rossman, 2017	Mundkur and Kheswalla, 1942	Leaf (Mundkur and Kheswalla, 1942; Rao, 1969)	No	Endophyte (Liu et al., 2007a).
Pestalotiopsis olivacea (Guba) G.C. Zhao & J. He	Farr and Rossman, 2017	Farr and Rossman, 2017	Stem, leaf (Wei et al., 2007)	No	Endophyte (Maharachchikumbura et al., 2011; Wei et al., 2007).
Phyllosticta beltranii Penz.	Tai, 1979	Tai, 1979	Leaf (Saccardo, 1884; Watson, 1971)	No	
Phyllosticta citricarpa (McAlpine) van der Aa; = *Guignardia citricarpa* Kiely; *Phoma citricarpa var. mikan* Hara; *Phyllosticta citri* Hori; *Phyllosticta citricola* Hori	CABI, 2017; Wang et al., 2012	CABI, 2017; Wang et al., 2012	Leaf, stem, fruit (CABI, 2013, 2017)	Yes	Present in Florida and under official control. Regulated by Federal Order DA-2012-29 (APHIS, 2012). See section 2.4.1.

Phyllosticta citrichinaensis X.H. Wang, K.D. Hyde, and H. Y. Li	Farr and Rossman, 2017; Wang et al., 2012	Farr and Rossman, 2017; Wang et al., 2012	Leaf (Farr and Rossman, 2017); leaf, fruit (Wang et al., 2012)	Yes	See section 2.3.
Phyllosticta citriasiana Wulandari, Crous, and Gruyter	Farr and Rossman, 2017; Wang et al., 2012	Farr and Rossman, 2017; Wang et al., 2012	Fruit (Farr and Rossman, 2017); fruit, leaf (Wang et al., 2012)	Yes	See section 2.3.
Pseudocercospora citri (T. Carvalho & O. Mendes) Crous & U. Braun	Farr and Rossman, 2017; Guo, 2001	Guo, 2001 (as *Citri* sp.); Farr and Rossman, 2017	Leaf (Braun et al., 2003; Guo, 2001)	No	
Pseudofabraea citricarpa (L. Zhu, K.D. Hyde & H.Y. Li) Chen Chen, Verkley & Crous; = *Cryptosporiopsis citricarpa* L. Zhu, H.Y. Li & K.D. Hyde	Chen et al., 2016; Zhu et al., 2012	Zhu et al., 2012	Leaf (Zhu et al., 2012)	No	
Sphaeronaema reinkingii var. *citricola* Sacc.	Tai, 1979	Tai, 1979	Stem (Saccardo, 1931)	No	Dead branches (Saccardo, 1931).
Zasmidium fructicola Crous, F. Huang & Hong Y. Li	Huang et al., 2015a	Huang et al., 2015a	Leaf, fruit (Huang et al., 2015a)	Yes	
Zasmidium fructigenum Crous, F. Huang & Hong Y. Li	Huang et al., 2015a	Huang et al., 2015a	Leaf, fruit (Huang et al., 2015a)	Yes	

2.3. Notes on pests identified in the pest list

Coleoptera:

Buprestidae. Buprestid beetles attack damaged, sickly, stressed, dying, or dead trees; some species attack healthy trees. Adult Buprestidae sometimes visit flowers, where they feed on pollen. Larvae are xylophagous, gallicolous, or mine leaves. Some species are phloeophagous, others are xylophagous; other species bore into the roots of trees (Borror et al., 1989; Hill, 1983, 1994).

Cerambycidae. Some species of Cerambycidae attack moribund or dead trees, with preferences for either dry or moist wood; others attack healthy trees. Adult Cerambycidae often chew patches of tree bark, leaves, and shoots, and sometimes the surface of fruit. In several species, the adults completely girdle stems, ultimately killing the plant. Larvae are xylophagous, some species are phloeophagous, and others are xylem feeders (and feed in the phloem and within the wood); some specialize on the roots or pith of herbaceous plants (Borror et al., 1989; Hill, 1983, 1994; Lingafelter and Hoebeke, 2002).

Chrysomelidae. Chrysomelid beetles typically feed on leaves (Baker, 1972). Adults are phytophagous, consuming leaves, buds, and the surfaces of fruit, or, on occasion, are anthophyllous. Larvae are folivorous, subterranean (feeding on roots and underground stems), leaf miners, saprophagous, myrmecophilous, or gallicolous (Borror et al., 1989; Hill, 1983, 1994).

Elateridae. Adult Elateridae are phytophagous and occur on flowers, on vegetation, or under bark. The larvae are found in the soil, eating plant roots or boring into tubers and rhizomes; others consume wood or are carnivorous (Borror et al., 1989; Hill, 1994).

Lucanidae. Lucanid beetles occur in rotten wood and are not pests. The adults are nectar feeders and can be found on flowers or feeding on sap on tree trunks exuded due to injury. The larvae consume rotting wood of trees or roots (Borror et al., 1989; Hill, 1994).

Scarabaeidae. Adult Scarabaeidae are phytophagous, saprophagous, mycetophagous, anthophilous (consuming pollen, and nectar), or feed on liquids from over-ripe fruit, over-ripe fruits, young fruit, or carrion; species in one tribe in one subfamily are myrmecophilous and termitophilous; species in one subfamily are coprophilous. The larvae eat plant roots or tubers, are saprophagous, mycetophagous, coprophilous, or phytophagous, or feed on carrion (Hill, 1983, 1994).

Diptera:

Bactrocera caudata. This insect feeds on plants in the Cucurbitaceae (Allwood et al., 1999; Drew and Romig, 2013; White and Elson-Harris, 1992). While citrus is noted as a host in some host lists (e.g., Kapoor and Agarwal, 1983), we found no field research to support the host association. Our findings align with White and Elson-Harris (1992) who state that non-cucurbit hosts should be considered doubtful until host status can be confirmed with field research.

Bactrocera diversa. This pest was identified by Coquillett (1904) as bred from orange. This is one of the few references of citrus as a host for this fly. Usually *B. diversa* is associated with flowers of wild and commercial species of Cucurbitaceae, where it causes flower loss (Drew et al., 2007). Batra (1952) apparently did not observe this fly infesting fruit and only described feeding on flowers despite ample host availability and fly populations. Likewise, Allwood et al. (1999) only described *B. diversa* as feeding on flowers of plants. Although a few reports cite citrus as a host for *B. diversa* (NBAIR, 2013), we found no field research to substantiate this host association.

Bactrocera scutellata. This pest typically feeds on flowers (Drew et al., 2007) of cucurbits (Allwood et al., 1999; Ohno et al., 2006) and occasionally on young cucurbit fruit (Kim et al., 2010). Although a few reports list citrus as a host for *B. scutellata* (CASI, 1994; GAQSIQ, 2011; Li et al., 1997), we found no field research to substantiate this host association. The lack of supporting field research leads us to believe that citrus needs to be confirmed as a host.

Hemiptera:

Auchenorrhyncha families (Aphrophoridae, Cercopidae, Cicadellidae, Cicadidae, Cixiidae, Delphacidae, Derbidae, Dictyopharidae, Flatidae, Fulgoridae, Meenoplidae, Membracidae, Ricaniidae, Tropiduchidae). The insects in these families are small to large active insects (being good flyers or jumpers) that feed externally on their hosts (Denno and Perfect, 1994; Hill, 1994; Leung et al., 2017; Schaefer and Panizzi, 2000; Triplehorn and Johnson, 2005). Also, these insects are typically associated with leaves, stems, twigs, branches, and/or roots of their host plants (Denno and Perfect, 1994; GAQSIQ, 2011; Hill, 1983; Hill, 1994; Johnson and Lyon, 1991; Triplehorn and Johnson, 2005; Yunus and Ho, 1980; Hill, 2008), not with fruit. Based on this biology, species in these families are unlikely to be associated with citrus fruit. Even if jumping or flying individuals should land on the fruit, they would be unlikely to remain with harvested fruit. Standard post-harvest processing of the citrus fruit would further decrease the likelihood of these external insects being with exported fruit. Because insects in these families are unlikely to be associated with the exported fruit, we did not include on the pest list all species for which citrus is reported as a host and that are present in China. We did, however, include on the pest list at least one or more representative species of these families to indicate that we did consider these groups, but based on their general biology, listing additional species was not warranted.

Heteroptera families (Alydidae, Coreidae, Dinidoridae, Largidae, Lygaeidae, Miridae, Pentatomidae, Pyrrhocoridae, Scutelleridae, Tessaratomidae). Insects in these families are medium to large mobile insects that feed externally on their hosts (CABI, 2017; Schaefer and Panizzi, 2000; Triplehorn and Johnson, 2005; Hill, 2008); therefore, if any species in these families do feed on citrus fruit, they would be unlikely to remain with harvested fruit. Standard post-harvest processing of the citrus fruit would further decrease the likelihood of these insects being with exported fruit. Because insects in these families are unlikely to be associated with the exported fruit, we did not include on the pest list all species for which citrus is reported as a host and that are present in China. We did, however, include on the pest list one or more representative species of these families to indicate that we did consider these groups, but based on their general biology, listing additional species was not warranted.

Lepidoptera:

Cryptophlebia ombrodelta. Despite a lot of information on this insect in the literature, we only found a limited number of reports of citrus being a host, all of which are non-primary sources that cite either taxonomic sources (Brown et al., 2008; Robinson et al., 2001) or do not cite a source that we could verify (Gilligan and Epstein, 2014; Hua, 2005; Meijerman and Ulenberg, 2000). Based on an extensive literature review and a query of U.S. port-of-entry interception records since 1985, we found no other evidence of this insect being associated with citrus, and no evidence of it being a pest of citrus. *Cryptophlebia ombrodelta* is mainly reported as a pest of macadamia, litchi, and longan (e.g., Gilligan and Epstein, 2014; Hill, 1983; Paull and Duarte, 2011; Waite and Hwang, 2002). If citrus is a host, it appears to be only an incidental or occasional one. Based on this evidence, we estimate this insect is unlikely to be present on the harvested commodity.

Fruit-piercing moths. Many moths in the family Noctuidae are pests of citrus, piercing the fruit as adults, while larvae are generally not associated with citrus (Choi et al., 2000; Forsyth, 1966; Hargreaves, 1936; Hoenisch, 2010; Holloway and Miller, 2003; Jeppson et al., 1975; Kuroko and Lewvanich, 1993; Lee et al., 1970; Nair, 1975; Ngampongsai et al., 2005; Park et al., 1988; Robinson et al., 2001; Walker, 2013; Wongsiri, 1991; Zhang, 1994). Moths in the following genera commonly exhibit this adult fruit-piercing behavior on citrus: *Achaea, Adris, Agonista, Anomis, Anua, Arcte, Artena, Bastilla, Calyptra, Chrysodeixis, Cocytodes, Cosmophila, Dysgonia, Entomogramma, Ercheia, Erebus, Eudocima, Eupatula, Grammodes, Lacera, Lagoptera, Lygniodes, Macaldenia, Metopta, Nyctipao, Ophideres, Ophisma, Ophisua, Oraesia, Othreis, Parallelia, Patula, Phyllodes, Pindara, Speiredonia, Spirama, Trigonodes* and *Xylophylla* (Choi et al., 2000; Forsyth, 1966; Hargreaves, 1936; Hoenisch, 2010; Holloway and Miller, 2003; Jeppson et al., 1975; Kuroko and Lewvanich, 1993; Lee et al., 1970; Nair, 1975; Ngampongsai et al., 2005; Park et al., 1988; Robinson et al., 2001; Walker, 2013; Wongsiri, 1991; Zhang, 1994). The very mobile adult moths also generally feed at night and are therefore highly unlikely to be harvested or packed with fruit. Many of the moth genera names are synonyms, and references in the pest list may refer to any of the synonyms for a particular genus. While we tried to list the pests in the pest list by using the most accepted name, it is beyond the scope of this document to resolve the taxonomy of this group.

Leaf-rolling tortricid moths (*Adoxophyes, Archips,* and *Homona*). These moths are generally leaf-rollers (Hill, 1987; Hill, 1994; Van der Geest and Evenhuis, 1991), but they can also damage the surface of fruit when leaf shelters touch fruit (Alford, 2014; Atkins, 1951; Broadley, 1991; Byun et al., 2003; Gilligan and Epstein, 2014; Hill, 1987; Hill, 1994; Meijerman and Ulenberg, 2000). They are associated with fruit when leaves are present because later instars may feed inside rolled leaves or where they have webbed leaves to the fruit; however, the commodity here consists of fruit only with all leaves removed. Further, moths in the genera *Adoxophyes* and *Archips* usually only affect early stages of fruit (Annecke and Moran, 1982; Atkins, 1951; Byun et al., 2003; Hill, 1987; Hill, 1994; Meijerman and Ulenberg, 2000), which can cause fruit to drop (Cai and Peng, 2008; Liu, 1958; Meijerman and Ulenberg, 2000). If larvae are present during harvest, they would be removed along with the leaves prior to undergoing the required post-harvest washing and brushing of the fruit. Post-harvest processing would further ensure that these pests are eliminated from the pathway.

Plant Pathogens:

Diaporthe citriasiana is reported in China and from citrus (two papers by the same author: Huang et al., 2013b; Huang et al., 2015b); however, it is not commonly found in China (Huang et al., 2013b). This fungus was isolated from dead wood of *C. unshiu*, non-symptomatic leaf of *C. unshiu*, and a stem-end rot of a *C. paradisi* fruit (Huang et al., 2013b). Huang also isolated *D. citriasiana* from leaves with “anonymous spots” from *C. grandis* cv. Shatianyou (Huang et al., 2015b). Molecular techniques and conidial size/shape differences were used to separate this new species from a range of other *Diaporthe* species occurring on citrus in China (Huang et al., 2013b). The 2013 paper by Huang et al. is the only isolation/report of this fungus with citrus fruit. There are currently no reports of field damage, yield losses, or control programs initiated for *D. citriasiana.* This species is closely related to *D. citri*, which is already known to occur with U.S. citrus (Dewdney, 2016). The lifecycle of *D. citriasiana* has not been studied; however, for the closely related species *D. citri*, infected fruit have no significance for reproduction as the reproductive cycle of this species is from infected twig to twig (Mondal et al., 2007). It is possible *D. citriasiana* will behave in a similar way since it was also isolated from dead wood specimens in the 2013 and 2015 collection studies (Huang et al., 2013b; Huang et al., 2015b). Because *D. citriasiana* is considered an uncommon fungus in China, with a single report from fruit, no reported economic impacts, and a low likelihood that fruit for consumption would even serve as a means for the pathogen to be introduced to the United States it was not be analyzed further.

Diaporthe subclavata F. Huang, K.D. Hyde & H.Y. Li. This fungi was isolated from melanose-like fruit symptoms on *Citrus grandis* and a leaf with citrus scab on *C. unshiu* (Huang et al., 2015b). The description of this fungus was based on molecular phylogeny. Symptoms described were from leaves and fruit; however, no pathogenicity tests were conducted. The information presented by these authors represents the only record of association of *D. subclabata* with citrus. Based on this information, it is difficult to ascertain if *D. subclavata* caused the symptoms on fruit. Of all the known *Diaporthe* species from citrus, there are endophytic, pathogenic, and saprobic lifestyles (Huang et al., 2015b). Some pathogenic species live on dead material after host senescence as a source of inoculum for latent infection in favorable conditions (Petrini, 1992). Due to the lack of evidence that this pest is a pathogen, it was not considered for further analysis.

Diaporthe unshiuensis **F. Huang, K.D. Hyde & H.Y. Li.** This fungus was isolated from fruit of *Citrus unshiu* with unidentified symptoms (Huang et al., 2015b). The description of this fungus was based on molecular phylogeny. No pathogenicity tests were conducted. The information presented by the authors (Huang et al., 2015b) represents the only record of association of *D. unshiuensis* with citrus. Due to the lack of evidence of host association and pathogenicity, it was not considered for further analysis.

Pallidocercospora crystallina Crous & M.J. Wingf.) Crous & M.J. Wingf. and ***Pallidocercospora heimioides*** (Crous & M.J. Wingf.) Crous & M.J. Wingf. These two fungal species have been recently isolated from leaf and/or fruit of citrus in China (Huang et al., 2015a). The identification was based on a phylogenetic study using sequence data from the nuclear ribosomal DNA's ITS1-5.8S-ITS2 regions (ITS), and partial actin (act), b-tubulin (tub2), 28S nuclear ribosomal RNA (28S rDNA) and translation elongation factor 1-a (tef1) genes. No morphological description was offered because the isolates grown on the axenic media did not produce spores. The symptoms described by the authors were from leaves and/or fruit; however, no pathogenicity tests were conducted, and therefore it is not possible to conclude if these fungi are the organism causing the lesion on tissues from which they were isolated. In addition, the report by Huang et al. (2015a) is the only record indicating the association of *P. crystallina* and *P. heimioides* with citrus, and no additional reports of the association of these two fungi with citrus have been found. We were able to find a significant amount of information on *P. crystallina* infecting *Eucalyptus* species, where it causes leaf spots (Burgess, 2007; Crous et al., 2013; Crous et al., 2001; Crous and Wingfield, 1996; Hunter et al., 2006; Passador et al., 2013; Quaedvlieg et al., 2014). *Pallidocercospora crystallina* was also molecularly identified as an endophyte in mangrove plants (*Rhizophora stylosa*) (Zhang et al., 2017). All of these reports indicate that *P. crystallina* is a foliar pathogen. Some information was also found on *P. heimioides* infecting *Eucalyptus* spp. leaf (Pérez et al., 2013; Quaedvlieg et al., 2014). Due to the lack of evidence of these two fungi as pathogens of citrus, they are not be considered for further analysis.

2.4. Pests considered for further analysis

2.4.1 Pests *not* selected for further analysis

We identified several quarantine pests that are likely to be associated with the commodity at harvest, but for different reasons were not selected for further analysis in this assessment.

Due to the condition of the commodity (i.e., washing, brushing, and disinfecting), surface-feeding pests are not likely to remain in the pathway. In general, washing with detergent and brushing on the packing line are designed to remove dirt and surface insect pests from the fruit. The physical agitation of brushing alone, with no water, removes surface pests. For example, one study examining the effect of brushing on adult Asian citrus psyllids on oranges found that brushing the fruit without any water removed the majority of adult Asian citrus psyllids. Specifically, out of 132 individuals observed in the study, only one individual survived the brushing process (Dossey et al., 2010). In another study, Hansen et al. (2006) determined that brushing was effective at removing spider mites from pome fruits on the packing line. Washing the fruit with soaps and detergents in addition to brushing removes dirt, sooty mold, scales, spray residues, and most of the fruit's natural wax (Wagner and Sauls, 2007). Soaps are effective in killing or removing most small, soft-bodied arthropods, such as aphids, young scales, whiteflies, psyllids, mealybugs, and spider mites (Cranshaw, 2008). Soaps and detergents may remove the protective waxes that cover the insect, causing death through excess loss of water (Cranshaw, 2008). The principal value of soap lies in its capacity to disrupt the cuticle and break down cell membranes resulting in rapid death of insects and mites. With its surface tension much reduced, water readily penetrates insect spiracles, reducing oxygen availability. Thus, a part of soap's mode of action is the "drowning" of exposed insects (Ware and Whitacre, 2004). Waxing the fruit, should it occur, has also been demonstrated to further reduce the numbers of surface pests that may be introduced via commercial fruit (Gould and McGuire, 2000). Based on this evidence, surface-feeding pests are not likely to follow the pathway of commercially produced fruit that undergoes the packinghouse process described in Section 1.4 (Table 3).

Table 3. Arthropod quarantine pests removed from the pathway due to packinghouse processes.

Pest type	Higher Taxonomy	Scientific name
Acari	Eriophyidae	*Aculops suzhouensis*
	Tetranychidae	*Acanthonychus jianfengensis*
		Eotetranychus cendanai
		Eutetranychus orientalis
		Mixonychus ganjuis

Pest type	Higher Taxonomy	Scientific name
		Schizotetranychus baltazarae
Insecta	Hemiptera: Coccidae	*Ceroplastes rubens*
		Ceroplastes rusci
		Coccus diacopeis
		Coccus discrepans
		Coccus formicarii
		Drepanococcus chiton
	Hemiptera: Monophlebidae	*Icerya aegyptiaca*
		Icerya formicarum
		Icerya jacobsonii
		Icerya seychellarum
	Hemiptera: Pseudococcidae	*Maconellicoccus hirsutus*
		Nipaecoccus filamentosus
		Nipaecoccus viridis
		Paracoccus marginatus
		Planococcus kraunhiae
		Planococcus lilacinus
		Pseudococcus baliteus
		Pseudococcus cryptus
		Rastrococcus iceryoides
		Rastrococcus invadens
		Rastrococcus spinosus
	Thysanoptera: Thripidae	*Thrips flavidulus*

The pathogens *Phyllosticta citricarpa* (the causal agent of citrus black spot) and *Xanthomonas citri* subsp. *citri* (the causal agent of citrus canker) have limited distributions in the United States and are considered quarantine pests. These pests have each been previously analyzed by USDA-APHIS in stand-alone pest risk assessments examining the likelihood that these pathogens will spread through the movement of commercial citrus fruit intended for consumption (USDA/APHIS, 2009; USDA/APHIS, 2010). For *X. citri* subsp. *citri*, the analyses focused on the likelihood that citrus fruit serves as a pathway for introduction under typical commercial citrus production practices, which included washing, brushing, and surface disinfestation. This risk assessment determined that fruit is not epidemiologically significant as a pathway for introduction when the above practices are applied. The *P. citricarpa* risk assessment also analyzed the likelihood that this pathogen will spread through the movement of commercial citrus fruit intended for consumption; however, it did not consider a packinghouse procedure in the analysis. The conclusion of this risk assessment is that fruit is not epidemiologically significant as a pathway for the introduction of *P. citricarpa* or establishment of citrus black spot disease. However, to reduce any lingering uncertainty, USDA-APHIS determined that a fungicide treatment that eliminates any spores present on the fruit at the time of packinghouse processing provides an appropriate additional safeguard for *P. citricarpa*. Based on the above conclusions, these diseases were not further analyzed in the current risk assessment; however, additional import requirements will be specified in the risk management document as a condition of entry for citrus fruit from China to the continental United States.

Phyllosticta citriasiana Wulandari, Crous & Gruyter and *Phyllosticta citrichinaensis* X.H. Wang, K.D. Hyde & H.Y. Li, sp. nov. have been identified infecting citrus in Asia (Wang et al., 2012). *Phyllosticta citrichinaensis* was isolated from leaves and fruits of *Citrus reticulata, C. maxima, C. sinensis,* and *C. limon* causing minor damage, showing irregular spots or freckles (Wang et al., 2012), while *Phyllosticta citriasiana* was associated with tan spot of pomelos and never from lemons, mandarins, or oranges (Wang et al., 2012). Stammler et al. (2013) indicate that several *Phyllosticta* species are known to occur on citrus, which include *P. citricarpa*, *P. citriasiana, P. capitalensis, P. citribraziliensis,* and *P. citrichinaensis*. Stammler et al. (2013) indicate that only *P. citricarpa* is proven to be pathogenic, while the others are non-pathogenic endophytes on citrus, or in the case of *P. citriasiana* there is an association with a lesion described as tan spot. Wulandari et al. (2009) isolated necrotic spots resembling those caused by *P. citricarpa* on intercepted consignments of *C. maxima* exported from Asia; the organism was cultured, morphologically described, and molecularly characterized, but no pathogenicity tests were conducted to determine if this species is pathogenic to citrus or just acting as an endophyte. Description of symptoms by the author, seem to be based on the reports from where the isolates were taken, because no pathogenicity tests were conducted. Therefore, further surveys, pathogenicity studies, and molecular analyses are required to resolve the distribution, host range, and importance of these two species. A survey may also answer the question of whether there is a teleomorph of *P. citriasiana* occurring in Asian orchards. While these species were molecularly separated from *P. citricarpa*, there is a high degree of uncertainty if they are pathogens. Due to this uncertainty, further analysis cannot be conducted at this time.

Satsuma dwarf virus (SDV) and *Citrus bent leaf viroid* (CBLVd) can be associated with the fruit as they are systemic within the host; however, there is a not a viable pathway for these pathogens to spread from commercial fruit to nearby hosts. No insect vector is reported for the virus or viroid (Timmer et al., 2000). There is no evidence in the current literature of SDV or CBLVd being seed transmitted with citrus. Furthermore, discarded seed from fruit for consumption is unlikely to germinate and produce fruit-bearing trees due to specific environmental requirements for germination and growth, as well as little tolerance or resistance to disease, which is usually gained through grafting onto rootstocks (Cui et al., 1991). For these reasons, SDV and CBLVd will not be further considered for analysis.

‘*Candidatus* Phytoplasma aurantifolia’ and ‘*Candidatus* Liberibacter asiaticus’ were not selected for further analysis as the fruit alone is not a pathway for pathogen dissemination. While both pathogens are associated with the seed (Faghihi et al., 2011; Tatineni et al., 2008; Timmer et al., 2000), neither pathogen is considered to be transmitted by seed. While both pathogens are vector transmitted by *Diaphorina citri* (Hall, 2008; Queiroz, 2014) and ‘*Candidatus* Phytoplasma aurantifolia’ is also known to be vectored by *Hishimonus phycitis* (CABI, 2017) and possibly other leaf hoppers, the vectors are unlikely to be associated with harvested fruit.

2.4.2 Pests selected for further analysis

We identified 17 pests for further analysis (Table 4). All of these organisms are actionable pests for the continental United States and have a reasonable likelihood of being associated with the commodity plant part(s) at the time of harvest and remaining with the commodity, in viable form, throughout the harvesting and post-harvest processing process.

Table 4. Pests selected for further analysis.

Pest type	Taxonomy	Scientific name
Arthropod	Acari: Tenuipalpidae	*Brevipalpus junicus*
	Acari: Tuckerellidae	*Tuckerella knorri*
	Diptera: Cecidomyiidae	*Resseliella citrifrugis*
	Diptera: Tephritidae	*Bactrocera correcta*
		Bactrocera cucurbitae
		Bactrocera dorsalis
		Bactrocera minax
		Bactrocera occipitalis
		Bactrocera pedestris
		Bactrocera tau
		Bactrocera tsuneonis
	Lepidoptera: Carposinidae	*Carposina niponensis*
		Carposina sasakii
	Lepidoptera: Crambidae	*Ostrinia furnacalis*
	Lepidoptera: Pyralidae	*Cryptoblabes gnidiella*
Pathogen	Fungi	*Zasmidium fructicola*
		Zasmidium fructigenum

3. Assessing Pest Risk Potential

3.1. Introduction

For each pest selected for further analysis, we estimate its overall pest risk potential. Risk is described by the likelihood of an adverse event, the magnitude of the consequences, and uncertainty. In this risk assessment, we first determine for each pest if there is an endangered area within the import area. The endangered area is defined as the portion of the import area where ecological factors favor the establishment of the pest and where the presence of the pest will result in economically important losses. Once an endangered area has been determined, the overall risk of each pest is then determined by two separate components: 1) the likelihood of its introduction into the endangered area on the imported commodity (i.e., the likelihood of an adverse event), and 2) the consequences of its introduction (i.e., the magnitude of the consequences). In general, we assess both of these components for each pest. However, if we determine that the risk of either of these components is negligible, it is not necessary to assess the other, as the overall pest risk potential would be negligible regardless of the result of the second component. In other words, if we determine that the introduction of a pest is unlikely to have unacceptable consequences, we do not assess its likelihood of being introduced. Likewise, if we determine there is negligible likelihood of a pest being introduced, we do not assess its consequences of introduction.

The likelihood and consequences of introduction are assessed using different approaches. For the consequences of introduction, we determine if the pest meets the threshold (Yes/No) of likely causing unacceptable consequences of introduction. This determination is based on estimating the potential consequences of introduction in terms of physical losses (rather than monetary losses). The threshold is based on a proportion of damage rather than an absolute value or amount. Pests that are likely to impact at least 10 percent of the production of one or more hosts are deemed "threshold pests."

For likelihood of introduction, which is based on the likelihoods of entry and establishment, we qualitatively assess risk using the ratings Negligible, Low, Medium, and High. The risk factors comprising the model for likelihood of introduction are interdependent and, therefore, the model is multiplicative rather than additive. Thus, if any one risk factor is rated as Negligible, then the overall likelihood will be Negligible. For the overall likelihood of introduction risk rating, we define the different categories as follows:

High: Pest introduction is highly likely to occur.

Medium: Pest introduction is possible, but for that to happen, the exact combination of required events needs to occur.

Low: Pest introduction is unlikely to occur because one or more of the required events are unlikely to happen, or the full combination of required events is unlikely to align properly in time and space.

Negligible: Pest introduction is highly unlikely to occur given the exact combination of events required for successful introduction.

In the pest list we determined whether the packinghouse process was likely to prevent a pest from following the pathway. In cases where there was reasonable doubt, pests were chosen for analysis. In the analyses, packing is still considered for its effect on mitigating the likelihood of introduction.

3.2. Assessment results

3.2.1. *Bactrocera correcta*

We determined the overall likelihood of introduction to be High. We present the results of this assessment in the table below.

We determined that the establishment of *B. correcta* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera correcta*

Climatic suitability	*Bactrocera correcta* is primarily distributed in tropical and subtropical areas in Asia. It occurs in Bhutan, southern China, India, Japan, Myanmar, Nepal, Pakistan, Sri Lanka, Thailand, and Vietnam (CABI, 2013; Liu and Ye, 2009). Those areas encompass the global Plant Hardiness Zones 8-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Bactrocera correcta* feeds on numerous hosts in several different plant families, including Myrtaceae (*Psidium guajava*, *Syzygium* spp.), Anacardiaceae (*Anacardium occidentale*, *Spondias purpurea*), Rosaceae (*Prunus* spp.), and Elaeocarpaceae (*Muntingia calabura*) (CABI, 2013). Additional reported hosts are *Citrus* spp., *Eugenia*

	uniflora, *Mangifera indica*, *Prunus persica*, *Ricinus communis*, *Santalum album*, and *Ziziphus* spp., including *Z. jujuba* (Weems and Fasulo, 2002; NRCS, 2014).
Economically important hosts at risk[a]	Economically important hosts of *B. correcta* present in the areas of concern are peaches and citrus (NASS, 2012).
Pest potential on economically important hosts at risk	*Bactrocera correcta* is a serious pest of commercial fruit production in southern Vietnam and Thailand (Drew and Raghu, 2002). It is one of the most destructive pests in the genus *Bactrocera* because it feeds on many economically valuable fruits and vegetables, such as mango and citrus (Liu and Ye, 2009). In Yunnan Province in China, *B. correcta* has become a "dominant pest causing great loss to the local fruit productions" (Liu and Ye, 2009, p. 467).
Defined Endangered Area	The area endangered by *B. correcta* comprises peaches and citrus grown in Plant Hardiness Zones 8-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Bactrocera correcta* into the endangered area via the importation of citrus from China

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MC	This analysis assumes that no integrated pest management practices have been employed. *Bactrocera correcta* feeds on citrus in some citrus-growing provinces (Liu et al., 2013).
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	High	MC	Although puncture marks produced by the female's ovipositor may be visible on the fruit surface, it is often impossible to recognize fruit fly-infested fruit (White and Elson-Harris, 1992), so we did not change the previous rating (see section 1.4).
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	High	MC	We have no indication that standard conditions, under which citrus fruit will be shipped, will impact the survival of *B. correcta* larvae. Thus, we did not change the previous risk rating.
Risk Element A: Overall risk rating for likelihood of entry	High	N/A	

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	*Bactrocera correcta* can disperse to and infest a wide range of host plants, including cultivated and naturalized species (CABI, 2013). Also, multiple fruit fly larvae can infest fruit, increasing the likelihood that hosts will be encountered.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015), suggesting that a potentially large market for imported citrus fruit may exist. The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	High	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera correcta* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	C	Peach and citrus growers do not currently control any *Bactrocera* species and would likely have to change production practices should *B. correcta* become established. Therefore, the introduction of *B. correcta* into the conterminous United States is likely to result in significant yield losses and increases in costs of production beyond normal fluctuations.

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Risk Element C2: Spread potential	Yes	C	Adults of some species of *Bactrocera* can live for several months (White and Elson-Harris, 1992; Christenson and Foote, 1960). *Bactrocera* species can fly long distances (Koyama et al., 2004), and *B. correcta* has been reported to be moved in fruit in China (Liu et al., 2013).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.2. *Bactrocera cucurbitae*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *B. cucurbitae* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera cucurbitae*

Climatic suitability	The geographic distribution of *B. cucurbitae* ranges in Asia from Saudi Arabia in the west to Taiwan in the east, south through Indonesia, and in China from Jiangsu in the north to Hainan in the south (CABI, 2013; EPPO, 2006). It also occurs in northeastern Australia, in multiple countries in Africa, and in various island groups of the Pacific, including Hawaii (CABI, 2013; EPPO, 2006). The reported distribution primarily encompasses the global Plant Hardiness Zones 8-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Bactrocera cucurbitae* mainly feeds on plants in the family Cucurbitaceae (in the genera *Citrullus*, *Cucumis*, *Cucurbita*, *Lagenaria*, *Luffa*, *Momordica*, *Sechium*, and *Trichosanthes*), but it has also been recorded feeding on non-cucurbitaceous taxa, such as *Mangifera* (Anacardiaceae), *Phaseolus* (Fabaceae), *Juglans* (Juglandaceae), *Persea* (Lauraceae), *Ficus* (Moraceae), *Citrus* (Rutaceae), and *Solanum* (Solanaceae) (Allwood et al., 1999; GAQSIQ, 2011; Mau et al., 2007;

	Tan and Lee, 1982; Weems, 1964a; White and Elson-Harris, 1992). All the above genera occur in the continental United States, and many are widely distributed in Plant Hardiness Zones 8-11 (Kartesz, 2010; NRCS, 2014).
Economically important hosts at risk[a]	The economically important hosts of *B. cucurbitae* include watermelon (*Citrullus lanatus*), *Citrus*, cantaloupe (*Cucumis melo*), cucumber (*Cucumis sativus*), squash (*Cucurbita moschata*), pumpkin (*Cucurbita pepo*), and tomato (*Solanum lycopersicum*) (CIPM, 2013, 2014).
Pest potential on economically important hosts at risk	*Bactrocera cucurbitae* has greatly reduced the production of melons, cucumbers, tomatoes, and similar vegetables in Hawaii (PPQ, 2002; Weems, 1964a). Yield losses vary between 30 to 100 percent depending on the host species and the season (Dhillon et al., 2005; Kapoor, 1989). Damage results from oviposition punctures, which cause blemishes or deformities in fruit, and from larval tunneling through fruit (Mau et al., 2007; PPQ, 2002), which predisposes the fruit to infection by secondary organisms of decay (Lall, 1977; Mau et al., 2007). The larvae also feed on seedlings, tap roots, stems, buds, and seeds of host plants (Mau et al., 2007; White and Elson-Harris, 1992). Infested young fruit usually drop prematurely (Mau et al., 2007).
Defined Endangered Area	The area endangered by *B. cucurbitae* includes cucurbit and citrus plants in Plant Hardiness Zones 8-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013)

Assessment of the likelihood of introduction of *Bactrocera cucurbitae* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	Low	MU	This analysis assumes that no integrated pest management practices have been employed. Although *B. cucurbitae* was listed as a pest of citrus (GAQSIQ, 2011), citrus appears to be a marginal host. The fruit fly was reared from two samples of wild lime (*Citrus hystrix*) (Allwood et al., 1999) and once from pomelo (*C. grandis*) (Tan and Lee, 1982). Conditions making citrus acceptable to *B. cucurbitae* appear to be seldom met.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Low	MC	The post-harvest practices of washing, brushing, etc. are unlikely to affect *B. cucurbitae* larvae inside the citrus fruit.

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Low	MU	We have no information indicating that conditions during transport and storage would affect this pest, so we did not change the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Low	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	Adult flight is a major means of dispersal of *B. cucurbitae* to new areas (CABI/EPPO, 1997), as the species can make migratory flights of at least 65 km (Fletcher, 1989). Even if the pest arrived during winter months, some suitable host material is likely to be available in Zones 8-11. Thus, we concluded that *B. cucurbitae* is highly likely to contact suitable host material in the endangered area.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera cucurbitae* into the continental United States (i.e., the PRA area)

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	C	U.S. growers do not currently control any *Bactrocera* species and would have to change production practices should *B. cucurbitae* become established. Yield losses caused by this fruit fly vary between 30 to 100 percent depending on the host species and the season (Dhillon et al., 2005; Kapoor, 1989). The introduction of *B. cucurbitae* into the conterminous United States is likely to result in significant yield losses and increases in costs of production beyond normal fluctuations.
Risk Element C2: Spread potential	Yes	C	*Bactrocera cucurbitae* has spread from Asia to several Pacific islands and many parts of Africa (Mwatawala et al., 2010). Adult flies seem to enter a dispersal phase immediately after they emerge and before reaching sexual maturity (Fletcher, 1989). As mentioned above, *B. cucurbitae* can fly long distances. Adults may live from one to five months (Christenson and Foote, 1960), which can facilitate their spread by flight. The transport of infested fruit in trade or by other human-assisted means also is a major means of dispersal of the species to new areas (CABI/EPPO, 1997).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.3. *Bactrocera dorsalis* complex, including *B. dorsalis*, *B. occipitalis*, and *B. pedestris*

The *Bactrocera dorsalis* species complex contains a large number of closely related species distributed over a wide geographical range in southeast Asia. A few of those species have shown pest potential on citrus. We analyzed them as a group because of their genetic similarity and presumed similarities in biology. Analysis focused on nominal *dorsalis*. We determined the overall likelihood of introduction to be High. We present the results of this assessment in the table below.

We determined that the establishment of *Bactrocera dorsalis* complex species in the continental United States is likely to cause unacceptable impacts. We present those results in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera dorsalis* complex species

Climatic suitability	Besides China, *B. dorsalis* complex members that feed on citrus have been reported from the following areas: *B. pedestris*: Indonesia and the Philippines; *B. occipitalis*: Brunei, Malaysia, and the Philippines; and *B. dorsalis*: Bhutan, Cambodia, India, Myanmar, Nepal, Singapore, Taiwan, Vietnam, various countries in Oceania and Africa, and the United States (Hawaii) (Clark et al., 2005; CABI/EPPO, 2008, 2013a; Schutze et al., 2015). These areas correspond to global Plant Hardiness Zones 9-11 (Magarey et al., 2008), which include southern Florida and parts of California.
Potential hosts at risk in PRA Area	*Bactrocera dorsalis* has been recorded on more than 150 plant species, including *Citrus* spp., *Psidium guajava* (guava), *Mangifera indica* (mango), *Carica papaya* (papaya), *Persea americana* (avocado), *Solanum lycopersicum* (tomato), *Prunus armeniacum* (apricot), *Prunus persica* (peach), *Pyrus* spp. (pear), and *Ficus* spp. (fig), all of which occur in the PRA area (Weems, 1964b).
Economically important hosts at risk[a]	The economic hosts at risk include avocado, citrus, peaches, and pears.
Pest potential on economically important hosts at risk	Damage caused by *B. dorsalis* consists of punctures of the host tissue by adults during oviposition and feeding and tunneling within the fruit pulp by larvae (Ye and Liu, 2005). Heavy infestations can cause major losses in fruit production (Drew and Hancock, 1994; White and Elson-Harris, 1992).
Defined Endangered Area	The area endangered by the *B. dorsalis* species complex includes avocados, peaches, citrus, and pears in Zones 9-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Bactrocera dorsalis* complex species into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MC	In this analysis, we assumed that no integrated pest management practices have been employed. The *Bactrocera dorsalis* complex is a major pest where introduced (White and Elson-Harris, 1992), and is a known pest of citrus in China (Cai and Peng, 2008). However, we reduced our uncertainty slightly because we were unable to specifically determine the prevalence on citrus in China.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	High	MC	*Bactrocera dorsalis, B. occipitalis,* and *B. pedestris* larvae feed inside of the fruit (Clark et al., 2005; Ye and Liu, 2005) and therefore would be unaffected by post-harvest practices, such as washing and brushing, that merely treat the fruit surface. We did not change the previous rating.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	High	MU	We have no information indicating that storage and transport conditions would affect larval survival, so we did not change the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	High	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	Adult *B. dorsalis* can fly up to 46 km (Liang et al., 2001), and citrus and other hosts are widely and regularly distributed in the endangered area (NRCS, 2014).
Risk Element B2: Likelihood of arriving in the endangered area	High	MC	Greater than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	High	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera dorsalis* complex species into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	C	As there presently are no dacine fruit flies occurring and requiring control in the continental United States, should species of the *B. dorsalis* complex become established, U.S. citrus, peach, and pear production is highly likely to become more expensive as integrated pest management and other control programs are implemented or adjusted to manage these pests.
Risk Element C2: Spread potential	Yes	MC	*Bactrocera* adults may live for several months depending on the species (White and Elson-Harris, 1992; Christenson and Foote, 1960). Species of *Bactrocera* can fly long distances (Koyama et al., 2004) and have become established in new areas, such as Hawaii and Africa.
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.4. *Bactrocera minax*

We determined the overall likelihood of introduction to be High. We present the results of this assessment in the table below.

We determined that the establishment of *B. minax* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera minax*

Climatic suitability	*Bactrocera minax* is found in temperate and subtropical areas, and has been recorded from Sikkim, India (Drew, 1979), West Bengal, India, southern China, and Bhutan (Wang and Luo, 1995 in Dorji et al., 2006). This distribution primarily encompasses global Plant Hardiness Zones 9-11 as defined by Magarey et al. (2008). In China, the species ranges from southern Shaanxi Province south to Guangxi (Plant Hardiness Zones 7-10), and it is said to survive in cold climates (Yang et al., 1994b). Therefore, we determine the climatic suitability in the continental United States to include Plant Hardiness Zones 7-11.
Potential hosts at risk in PRA Area	*Bactrocera minax* principally feeds on citrus (Allwood et al., 1999). Some records report feeding on *Fortunella crassifolia* (White and Elson-Harris, 1992) and *Lycium chinense* (Wang and Luo, 1995 in Dorji et al., 2006), all of which occur in the PRA area (NRCS, 2014).
Economically important hosts at risk[a]	Citrus is an economically important host at risk in the PRA area.
Pest potential on economically important hosts at risk	*Bactrocera minax* is the major fruit fly pest of citrus in Bhutan and can cause up to 50 percent fruit drop (Dorji et al., 2006). In China, infestation rates are reported as high as 100 percent depending on province and citrus variety (Zhang, 1989).
Defined Endangered Area	The area endangered by *B. minax* comprises citrus in Zones 7-11.

[a] As defined by ISPM No. 11, supplement 2, “economically” important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Bactrocera minax* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MU	In this analysis, we assumed that no integrated pest management practices have been employed. Infestation by *B. minax* causes fruit to drop (Dorji et al.,

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			2006; Weems and Fasulo, 2002), but only before harvest if heavily infested (Zhang, 1989). Hence, some infested fruit could be harvested. This pest is widely occurring in China, causing significant economic damage to citrus growers (Zhang, 1989).
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	High	MC	The post-harvest practices of washing, brushing, etc. are highly unlikely to affect the fly larvae inside of the fruit, as they treat the fruit surface only. We did not change the previous rating.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	High	MU	We have no information indicating that storage and transport conditions would affect larval survival, so we did not change the previous rating. However, mature larvae can remain inside mature fruit a long time. For example, Mandarin fruit (*Citrus reticulata*) infested with *B. minax* eventually drop to the ground, where there is a period of 18-52 days before larvae leave the fruit and pupate in the soil (Dorji et al., 2006). Fruits harvested prior to larval emergence are likely to retain larvae during transport. Furthermore, *B. minax* (synonym: *Tetradacus citri* [Chen]; White and Elson-Harris, 1992) is one of the more cold tolerant species in the genus, with larvae able to survive freezing temperatures for days (Fang, 2009; Luo and Chen, 1987)
Risk Element A: Overall risk rating for likelihood of entry	High	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	Suitable hosts (*Citrus* sp.) are widely established in the endangered area (NRCS, 2014).
Risk Element B2: Likelihood of arriving in the endangered area	High	C	Greater than 25 percent of the U.S. population lives in the endangered area (PERAL, 2015). The demand for host

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	High	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera minax* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MC	*Bactrocera minax* can cause from 35 to 75 percent fruit drop in mandarin orchards (Schoubroeck, 1999). In China, *B. minax* infestations can cause 30-40 percent fruit injury (Zhang, 1989). Infestation in the United States would likely increase the production costs of citrus production.
Risk Element C2: Spread potential	Yes	MC	The species' powers of natural dispersal appear to be rather low. Yang et al. (1994b) found its low degree of vagility an enigma worthy of further study. However, spread potential is enhanced by the transport of infested fruit to areas suitable for establishment.
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.5. *Bactrocera tau*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *Bactrocera tau* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera tau*

Climatic suitability	*Bactrocera tau* is primarily distributed in tropical and subtropical areas in Asia. It is reported from Bangladesh, Bhutan, Brunei, Cambodia, China (Chongqing, Fujian, Guangdong, Guangxi, Guizhou, Hainan, Hong Kong, Hubei, Shaanxi, Sichuan, Tibet, Yunnan, Zhejiang), India, Andaman Islands, Nicobar Islands, Indonesia, Laos, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand and Viet Nam (CABI, 2013; Carroll et al., 2006; Gould and Raga, 2002; Lin et al., 2006; White and Elson-Harris, 1992). In China, the species ranges as far north as eastern Gansu Province (Zhou et al., 1993) (Plant Hardiness Zone 6), and is one of four tephritid species "distributed commonly" in Shaanxi (Zhang et al., 2004) (Zones 4-8). The reported distribution primarily encompasses Plant Hardiness Zones 8-11, but given the evidence that this species ranges into eastern Gansu Province, we conclude that the entire range of climatic suitability as global Plant Hardiness Zones 6-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Bactrocera tau* appears to prefer fruits of Cucurbitaceae (Allwood et al., 1999; White and Elson-Harris, 1992), but it also infests fruits of several other plant families, including Fabaceae, Loganiaceae, Moraceae, Myrtaceae, Sapotaceae, Vitaceae (Allwood et al., 1999), Solanaceae (Khan et al., 2011), Passifloraceae (Hasyim et al., 2008) and Rutaceae (Lin et al., 2005; Wu et al., 2011).
Economically important hosts at risk[a]	Economically important hosts at risk in the PRA area include watermelon (*Citrullus lanatus*), muskmelon (*Cucumis melo*), cucumber (*Cucumis sativus*), squash and pumpkin (*Cucurbita maxima*, *C. moschata*, *C. pepo*), tomato (*Solanum lycopersicum*) and *Citrus* spp. (Allwood et al., 1999; Khan et al., 2011; Lin et al., 2005; NRCS, 2014; Wu et al., 2011).
Pest potential on economically important hosts at risk	*Bactrocera tau* is an economically important pest in China (Yang et al., 1994a), one of the most destructive pests on some fruits in Indonesia (Hasyim et al., 2008), and considered a serious horticultural pest in Bangladesh (Khan et al., 2011).
Defined Endangered Area	The area endangered by *B. tau* includes cucurbit and citrus crops in Plant Hardiness Zones 6-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Bactrocera tau* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	Low	MU	Citrus appears to be a conditional host of *B. tau*. While *B. tau* is reported on citrus (GAQSIQ, 2011; CASI, 1994), and known to occur in several Chinese provinces (CABI, 2013; White and Elson-Harris, 1992), choice test laboratory studies (Lin et al., 2005; Wu et al., 2011; Zhou et al., 2005) and field fruit surveys (Lin et al., 2005) suggest that citrus fruits are less suitable and less preferred hosts than Cucurbits. Also, during a fruit survey conducted in Thailand and Malaysia to determine the fruit fly species composition in these countries, *B. tau* was reared from 14 different species of fruit, but none from *Citrus* (Allwood et al., 1999), indicating that *Citrus* fruit may be a marginal host for *B. tau*.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Low	MC	*Bactrocera tau* is an internal feeding pest (CABI, 2013) and is unlikely to be removed during the standard packinghouse processes of washing and brushing. Thus, we did not change the previous rating.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Low	U	We found no evidence that *B. tau* would be impacted by transport and storage conditions, so we made no change to the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Low	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	Hosts of *B. tau* are widely and regularly distributed in the endangered area (NRCS, 2014).

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera tau* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MC	This species is a serious economic pest in China, Indonesia, and Bangladesh (Yang et al., 1994a; Hasyim et al., 2008; Khan et al., 2011), causing losses to curcurbit fruit, such as melons and pumpkins (Prabhakar et al., 2012).
Risk Element C2: Spread potential	Yes	MU	The flight ability of *B. tau* has not been examined (Ohno et al., 2008), but it can probably disperse over long distances. For instance, *B. tau* was detected on Ishigaki Island, Okinawa, where it was not previously known to occur (Ohno et al., 2008). Authors suspect it arrived via long-distance dispersal or human-induced means.
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.6. *Bactrocera tsuneonis*

We determined the overall likelihood of introduction of *B. tsuneonis* to be High. We present the results of this assessment in the table below.

We determined that the establishment of *B. tsuneonis* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Bactrocera tsuneonis*

Climatic suitability	*Bactrocera tsuneonis* has been recorded in citrus-growing regions of Japan (Kyushu, Amami-O-shima Island, and Ryukyu Islands) and China (White and Elson-Harris, 1992; Wang, 1996). In China, the species occurs in the provinces of Guangxi, Guizhou, Hunan, Jiangsu, Sichuan, and Yunnan (White and Wang, 1992; Liu et al., 2013; Jiang et al., 2014), corresponding to global Plant Hardiness Zones 8-11 (Magarey et al., 2008).
Potential hosts at risk in PRA Area	*Bactrocera tsuneonis* feeds on species of Rutaceae (Allwood et al., 1999), specifically within the genera *Citrus* and *Fortunella* (White and Elson-Harris, 1992). Both genera occur in the PRA area (NRCS, 2014).
Economically important hosts at risk[a]	The economically important host of *B. tsuneonis* in the PRA area is citrus.
Pest potential on economically important hosts at risk	*Bactrocera tsuneonis* larvae destroy fruit quality and cause fruit to drop (Zhang, 1989; Weems and Fasulo, 2002).
Defined Endangered Area	The area endangered by *B. tsuneonis* comprises citrus in Zones 8-11.

[a] As defined by ISPM No. 11, supplement 2, “economically” important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Bactrocera tsuneonis* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MU	*Bactrocera tsuneonis'* life history and behavior are very similar to those of *B. minax*, suggesting that the two species may be considered ecological homologues (Zhang, 1989). Like its congener, *B. tsuneonis* is considered a serious pest of citrus fruit (Zhang, 1989). Infestation by *B. tsuneonis* causes fruit to drop (Dorji et al., 2006; Weems and Fasulo, 2002; Miyake, 1919). Fruit usually drops from the tree by the time larvae have matured (Clausen, 1927). We assume that what is observed with *B. minax* is the same as for *B. tsuneonis*, where only heavily infested fruit drop before harvest (Zhang, 1989). Therefore, some infested fruit could be harvested.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	High	MC	The post-harvest practices of washing, brushing, etc. are not expected to affect the fly larvae inside of the fruit.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	High	MU	We have no information indicating that storage and transport conditions would affect larval survival, so we did not change the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	High	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	High	MC	Suitable hosts (*Citrus* sp.) are widely established in the endangered area (NRCS, 2014).
Risk Element B2: Likelihood of arriving in the endangered area	High	C	Greater than 25 percent of the U.S. population lives in the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Risk Element B: Combined likelihood of establishment	High	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	High	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Bactrocera tsuneonis* into the continental United States (i.e., the PRA area)

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MC	Extensive outbreaks have occurred in some commercial citrus areas in Japan since 1947, when up to 60 percent or more of the fruits were infested (Weems and Fasulo, 2002). Infestation in the United States is highly likely to increase citrus production costs.
Risk Element C2: Spread potential	Yes	MC	Long-distance dispersal is mainly due to transport of infested fruit and seed (Zhang, 1989).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.7. *Brevipalpus junicus*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *B. junicus* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Brevipalpus junicus*

Climatic suitability	The distribution of *Brevipalpus junicus* appears to be limited to China, although the full extent of its geographical range in China is unknown. Based on the only two available reports, *B. junicus* is distributed from the province of Hainan (Ma and Yuan, 1982) and Guangdong (CASI, 1994). The reported distribution area primarily encompasses global Plant Hardiness Zones 9-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	The only reported hosts for *B. junicus* are *Citrus* species (CASI, 1994; Ma and Yuan, 1982).
Economically important hosts at risk[a]	*Brevipalpus junicus* feeds on citrus (CASI, 1994; Ma and Yuan, 1982), which is an economically important host present within the areas of concern.
Pest potential on economically important hosts at risk	*Brevipalpus* mites are known vectors of several economically important viruses, including *Citrus leprosis virus* (CiLV) (Childers and Derrick, 2003; Ochoa, 2005; Rodrigues et al., 2003). CiLV is not known to occur in China. We have no specific information about the vector potential of *B. junicus*. We also found no information about direct damage caused by *B. junicus*. Based on the four most common species of *Brevipalpus* worldwide [*B. phoenicis*, *B. californicus* (which is a suspected senior synonym of *B. junicus*; Mesa et al., 2009), *B. obovatus*, and *B. lewisi*], feeding results in chlorosis and necrosis of leaves, striation of the fruit surface, gall formation, and malformation of fruit (Ochoa, 2005).
Defined Endangered Area	The area endangered by *Brevipalpus junicus* comprises citrus in Zones 9-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Brevipalpus junicus* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MU	Depending on climate, *Brevipalpus* spp. may exhibit several generations per year, some of which may be parthenogenetic (Jeppson et al., 1975). We had no information that pest prevalence would be limited in the field. *Brevipalpus junicus* is listed as a

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			harmful pest of orange trees in China (CASI, 1994), suggesting that the species is found with some regularity on that host.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Medium	MC	Mites can be removed from citrus fruits by packinghouse processes (CABI/EPPO, 1997), such as those described in section 1.4. When protected by the pedicel disk, 10 to 40 percent of *B. chilensis* mites on oranges and grapefruits survived post-harvest fruit treatment (Castro and Astudillo, 2001). Without a specific requirement for washing with detergent, *B. junicus* is unlikely to be completely removed from the pathway. Consequently, we decreased the previous rating by only one level.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Medium	U	We found no evidence that this species would be affected by transport and storage conditions, so we made no change to the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Medium	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Low	C	The Tenuipalpidae family is characterized as "slow moving" (Doreste, 1988; Jeppson et al., 1975), which decreases the likelihood that *B. junicus* will disperse naturally from citrus fruit imported for consumption.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that a pest population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Brevipalpus junicus* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Unknown	U	The lack of information on *B. junicus* makes it difficult to assess the impact this pest has in China, and its behavior in new environments is completely unknown. Mite monitoring and control are part of routine management for citrus in the United States (e.g., Dreistadt, 2012), but it is unknown if these practices would adequately control *B. junicus*. Based on the available information, we cannot determine if *B. junicus* is likely to directly impact citrus production in the United States. Therefore, we answered "unknown" here, and analyzed potential trade impacts.
Risk Element C2: Spread potential	N/A		
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Unknown	N/A	
Trade Impacts			
Risk Element D1: Export markets at risk	Yes	MU	*Brevipalpus junicus* is only known to occur in China (Ma and Yuan, 1982; CASI, 1994). At least 13 *Brevipalpus* species are listed as pests of quarantine concern for a number of trading partners (APHIS, 2013a). For example, *B. chilensis* also has a very limited global distribution and is a pest of concern for Australia, Brazil, Costa

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			Rica, Japan, Mexico, South Korea, Peru, South Africa, and Taiwan (APHIS, 2013b; Biosecurity Australia, 2005; FreshFruitPortal.com, 2010; CABI, 2013). All of these trading partners have a history of importing fresh citrus from the United States (FAS, 2013). They are likely also to consider *B. junicus* a quarantine pest. Of total U.S. citrus exports, over 10 percent is exported to the above-listed countries (FAS, 2013). The host range of *B. junicus* outside of citrus is currently unknown, adding to our uncertainty about this element.
Risk Element D2: Likelihood of trading partners imposing additional phytosanitary requirements	Yes	MU	Countries have imposed phytosanitary requirements to mitigate *Brevipalpus* mites for a long time. For example, some of the countries listed above require an Additional Declaration (AD) that commodities from the United States are “free of” the related mite *B. lewisi* (APHIS, 2013b). In other cases, approvals have been rescinded after detection of *Brevipalpus* mites. For example, Brazil recently halted imports of grapes from Argentina after finding *B. chilensis* in a consignment (FreshFruitPortal.com, 2010). Therefore, we conclude that one or more U.S. trading partners is likely to require additional phytosanitary measures for our exports should *B. junicus* become established in the continental United States.
Risk Element D: Pest is likely to cause significant trade impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.8. *Carposina niponensis* and *Carposina sasakii*

At this time, the identification and distribution of *Carposina niponensis* and *Carposina sasakii* are not clear. Some references indicate that *C. niponensis* and *C. sasakii* are synonyms (Davis, 1969; Wu et al., 2016). However, investigation into the morphological differences in reproductive structures has shown that they are separate species and should not be considered synonyms (Diakonoff, 1989; Hua, 1992; Nasu et al., 2010). As described by Nasu et al. (2010), some references have also mistakenly reported *C. sasakii* as *C. niponensis*. In addition, the common name "peach fruit moth" appears to be occasionally incorrectly attributed to *C. niponensis* (Sato et al., 1977), further perpetuating the confusion. Even more recent literature in China commonly uses "peach fruit moth" for *C. niponensis* (Wang et al., 2002), indicating a general lack of consensus. It has been noted that references to common name "peach fruit moth" should refer only to *C. sasakii* (CABI, 2017). While multiple references indicate that *C. niponensis* is present in China (CASI, 1994; Li et al., 1997), other authors have determined that only *C. sasakii* is present (Hua, 1992). Therefore, the evidence suggests that while there is likely a single species of *Carposina* affecting citrus in China, we are unable to determine whether it is *C. niponensis* or *C. sasakii*. While we only found references that *C. niponensis* is on citrus in China, we will analyze both species together for this risk assessment, referring to the pest as *Carposina niponensis/sasakii* due to this confusion and similarities in the reported host range, distribution, and impacts. We are not considering them synonyms, but also do not have enough information to separate out a different level of risk presented by the moth(s).

We determined the overall likelihood of introduction of *C. niponensis/sasakii* to be Medium. We present the results of this assessment in the table below.

We determined that establishment of *C. niponensis/sasakii* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Carposina niponensis/sasakii*

Climatic suitability	*Carposina niponensis* and *C. sasakii* are generally distributed in China (Wang et al., 2015; Li et al., 1997), Korea (Kim and Yiem, 1981; Kim et al., 2000), and Japan (Ishiguri and Shirai, 2004; Nasu et al., 2010). A comparison of global Plant Hardiness Zones (Magarey et al., 2008) indicates that potential establishment in the continental United States could occur within Plant Hardiness Zones 3-9.
Potential hosts at risk in PRA Area	Due to the difficulties in differentiating *C. niponensis* and *C. sasakii*, we cannot effectively evaluate the true host range of the pest(s) in Asia. The published host ranges of *C. niponensis* and *C. sasakii* overlap to some extent (CABI, 2017). Hosts recorded for both species include *Citrus* spp. (Li et al., 1997), *Malus* spp. (apple), *Prunus* spp. (apricot, plum, peach), *Zizyphus jujuba* (jujube), and *Pyrus sorotina* (pear) (Lei et al., 2012).

Economically important hosts at risk[a]	Economically important hosts at risk include apple, apricot, citrus, peach, pear, and plum (Ishiguri and Shirai, 2004; Li et al., 1997).
Pest potential on economically important hosts at risk[a]	Economically significant damage has been noted on apple, pear, and jujube in China (Lei et al., 2012), and both species are considered major pests of apple and other rosaceous fruits in Japan (Ishiguri and Shirai, 2004).
Defined Endangered Area	The area of the continental United States endangered by *C. niponensis/sasakii* lies within Plant Hardiness Zones 3-9.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2011).

Assessment of the likelihood of introduction of *Carposina niponensis/sasakii* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	U	*Carposina niponensis/sasakii* is reported to be a pest of citrus in China (CASI, 1994; Li et al., 1997), but there is little information on the infestation levels and damage done on the fruit. On other fruit, apples and stone fruit, the eggs are laid near the calyx or stem crevice, and the larvae penetrate and feed within the fruit. There are no known standard industry practices that may mitigate the presence of this internal pest on harvested fruit (see the description of the pathway in section 1.4).
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Medium	MU	No information was provided that may indicate any mitigating factors during post-harvest processing of citrus from China (see the description of the pathway in section 1.4).
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Medium	MU	No information was provided that may indicate any mitigating factors during transport and storage of citrus from China (see the description of the pathway in section 1.4). In addition, larvae

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			have been shown to survive long periods in stored fruits (CABI, 2017). Typical shipping conditions for citrus seem unlikely to affect the pest population.
Risk Element A: Overall risk rating for likelihood of entry	Medium	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Medium	MC	Fruit of host plants are required for development of *C. niponensis/sasakii* (CABI, 2017). In the endangered area of the United States, fruit is not expected to be available year-round so a potential introduction would have to coincide with fruit availability. The most likely life stage that may be imported with citrus from China would be eggs (near the stem end), or larvae (feeding internally). In order for establishment to occur, the pest must successfully develop, find hosts, and mate. We rated this risk element to be Medium due to the likelihood of these required conditions being met for development.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that a pest population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a]C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Carposina niponensis/sasakii* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MC	Chemical insecticides are effective at mitigating impact in apple fruit; however, damage incurred in orchards without insecticide usage has been documented at 26.3-62.5 percent (Kim et al., 2000). Costs of insecticide applications exceeded 50 percent of the total pest control costs for apple growers (Kawashima, 2008). While the "economic status" of *C. niponensis/sasakii* in orchards is considered comparable to that of *Cydia pomonella* (present in the United States) (Kim et al., 2000), increased damage may be observed in non-commercial hosts, and additional control efforts may be required in organic orchards.
Risk Element C2: Spread potential	Yes	MU	Inherent powers of dispersal of the species appear to be rather weak, moths normally flying only short distances (CABI/EPPO, 1997). However, long-distance movement has been documented. For example, while *C. niponensis* had not been detected in Japan since 1886, the recent detection of this species there (Nasu et al., 2010) reflects the ability for *Carposina* to spread to new areas.
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a]C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.9. *Cryptoblabes gnidiella*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *C. gnidiella* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Cryptoblabes gnidiella*

Climatic suitability	*Cryptoblabes gnidiella* does best in warm climates and cannot survive winters in cooler temperate areas (CABI, 2013). *Cryptoblabes gnidiella* is found in Europe (Austria, Cyprus, France, Greece, Italy, Malta, Portugal, and Spain), Asia (India, Israel, Lebanon, Pakistan, Thailand, and Turkey), Africa (Egypt, Liberia, Morocco, Nigeria, Sierra Leone, and South Africa), North America (Bermuda), South America (Argentina, Uruguay), and Oceania (the United States - Hawaii, New Zealand) (CABI, 2013). We estimated the potential distribution of *C. gnidiella* using the degree-day model reported by Ringenberg et al. (2005) and considered areas where *C. gnidiella* could complete five generations as conducive for permanent establishment (Ben Yehuda et al., 1991-1992). The results indicated that *C. gnidiella* could establish in the continental United States within Plant Hardiness Zones 6-11 (Magarey et al., 2008).
Potential hosts at risk in PRA Area	*Cryptoblabes gnidiella* is polyphagous and attacks multiple plant species in the following plant families: Anacardiaceae, Annonaceae, Fabaceae, Lauraceae, Liliaceae, Malvaceae, Meliaceae, Moraceae, Poaceae, Punicaceae, Rosaceae, Rubiaceae, Rutaceae, and Vitaceae (CABI, 2013).
Economically important hosts at risk	Examples of economically important hosts *C. gnidiella* attacks include *Citrus*, *Gossypium* (cotton), *Persea americana* (avocado), *Phaseolus* (beans), *Zea mays* (corn), and *Vitis* (grape) (CABI, 2013).
Pest potential on economically important hosts at risk[a]	In citrus, it is an internal feeder that punctures fruit and causes premature ripening, blotches, and early fruit drop (CABI, 2013; Moore, 2003; Silva and Mexia, 1999). This type of damage can cause substantial losses to citrus crops (Moore, 2003; Silva and Mexia, 1999). In grapes, *C. gnidiella* feeds on grape clusters, which causes them to

	wilt and fall (Bisotto-de-Oliveira et al., 2007; Ringenberg et al., 2005). On fruit close to harvest, feeding causes the disruption of the berries, which results in leakage of juice and reduces the quality of wines or depreciates the fruits (Ringenberg et al., 2005). In addition, feeding increases the incidence of fungal and bacterial diseases that cause fruit rot (Bisotto-de-Oliveira et al., 2007; Ringenberg et al., 2005).
Defined Endangered Area	The area endangered by *C. gnidiella* includes citrus, cotton, avocado, bean, corn, and grape crops in Zones 6-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Cryptoblabes gnidiella* into the endangered area via the importation of citrus fruit from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	Medium	MU	*Cryptoblabes gnidiella* is a secondary pest of citrus fruit (Silva and Mexia, 1999). In its early stages, it feeds on honeydew excreted on the fruit surface by aphids or mealybugs, and in later stages burrows into the fruit using holes previously made by birds or other borers. Fruit that become infested are typically smaller in size (Moore, 2003), and damage by larvae feeding internally causes the fruit to yellow prematurely and may cause them to drop (Silva and Mexia, 1999). For these reasons, the prevalence of *C. gnidiella* on harvested fruit is likely to be lower than for some other citrus pests.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Low	MC	Early stages of *C. gnidiella* feed externally, as discussed above, and therefore are highly likely to be removed during the standard packinghouse processes of washing, brushing, rinsing, and drying. Later instars usually occur in the fruit, as discussed above. The symptoms on the fruit vary according to the feeding site, but entrance holes typically begin

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			rotting (Öztürk and Ulusoy, 2013), and frass may be present (CABI, 2013). Infested fruit are therefore likely to be culled during processing, but *complete* removal of all infested fruit is unlikely. Based on this evidence, we decreased the rating for all stages of *C. gnidiella* by one level.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Low	U	We found no evidence that this species would be impacted by transport and storage conditions, so we made no change to the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Low	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Medium	MC	As mentioned above, *C. gnidiella* has a wide host range, and those hosts are widely and regularly distributed throughout the entire endangered area. Eggs are laid at the base of fruits, and larvae can feed internally (de Morais Oliveira et al., 2014); eggs and larvae are the most likely forms to follow the pathway. In order for establishment to occur, the pest must successfully develop, find hosts, and mate. We rated this risk element to be Medium due to the likelihood of these required conditions being met for development.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a]C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Cryptoblabes gnidiella* into the continental United States (i.e., the PRA area)

Criteria	Meets criteria? (Yes/No)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MU	*Cryptoblabes gnidiella* is a secondary pest of citrus and may cause 4-5 percent reductions in yield and up to 50 percent in fruit damage (Moore, 2003; Silva and Mexia, 1999). In Israel, *C. gnidiella* is a major pest of grapes (Harari et al., 2007), but its co-occurrence with other important pests means that determining the amount of yield loss attributed to it is difficult. In pomegranate in Turkey *C. gnidiella* has caused between 6 and 41 percent fruit damage (Öztürk and Ulusoy, 2011b). In addition, several countries actively control *C. gnidiella* populations [e.g., Turkey (Öztürk and Ulusoy, 2011a) and Israel (Harari et al., 2007)].
Risk Element C2: Spread potential	Yes	MU	*Cryptoblabes gnidiella* adults can naturally disperse by flying (CABI, 2013; Öztürk and Ulusoy, 2011a).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a]C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.10. *Ostrinia furnacalis*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *O. furnacalis* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Ostrinia furnacalis*

Climatic suitability	*Ostrinia furnacalis* has been reported from Afghanistan, Australia, Brunei Darussalam, Cambodia, China, the Federated States of Micronesia, Guam, India, Indonesia, Japan, Korean Peninsula, Laos, Malaysia, Myanmar, the Northern Mariana Islands, Pakistan, Papua New Guinea, New Guinea, the Philippines, Far East Russia, Singapore, Solomon Islands, Sri Lanka, Ceylon, Taiwan, Thailand, and Viet Nam (CABI, 2013). The reported distribution area primarily encompasses global Plant Hardiness Zones 4-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Ostrinia furnacalis* feeds mainly on maize, but it can adapt to other hosts when maize is not available (CABI, 2013), including plant species in the following families: Poaceae, Malvaceae, Cucurbitaceae, Polygonaceae, Rutaceae, Solanaceae, and Zingiberaceae (Cai and Peng, 2008; Nafus and Schreiner, 1991).
Economically important hosts at risk[a]	Examples of economically important hosts of *O. furnacalis* in climatically suitable areas of the continental United States include *Citrus* spp. (citrus) (Cai and Peng, 2008), *Cucumis melo* (cantaloupe), *Gossypium hirsutum* (cotton), *Capsicum annuum* (bell pepper), *Solanum melongena* (eggplant), *Zea mays* (maize, sweet corn), *Panicum miliaceum* (millet), *Sorghum bicolor* (sorghum), and *Saccharum officinarum* (sugarcane) (CABI, 2013; Nafus and Schreiner, 1991; Robinson et al., 2001).
Pest potential on economically important hosts at risk	*Ostrinia furnacalis* is an important pest on corn in much of Asia and the Western Pacific region (Nafus and Schreiner, 1991). Yield loss reports for corn range from 1.7 percent up to 100 percent (Hsu et al., 1988; Nafus and Schreiner, 1991; Teng et al., 1992). In China, *O. furnacalis* is an important component of the lepidopteran pest complex of cotton, where feeding damage causes loss of cotton bolls (He et al., 2004). *Ostrinia furnacalis* can infest and internally damage citrus fruit when maize is grown next to citrus groves (Cai and Peng, 2008).
Defined Endangered Area	The area endangered by *O. furnacalis* includes corn, cotton, and citrus in Zones 4-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Ostrinia furnacalis* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	Low	MC	*Ostrinia furnacalis* is usually not a problem in citrus, unless the main host, maize or sweet corn (CABI, 2013; Cai and Peng, 2008), is grown next to citrus groves (Cai and Peng, 2008). Infestations on young citrus fruit can lead to early drop (Cai and Peng, 2008). Thus, we consider the likelihood that *O. furnacalis* is present in harvested fruit as low.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Low	MU	It is unknown at what larval stage *O. furnacalis* starts burrowing into the fruit, but later instars usually occur in the fruit (Cai and Peng, 2008). As internal borers, larvae are not likely to be removed during the packinghouse processing (see section 1.4). However, signs of fruit infestation include an entrance hole and expelled frass from the hole (Cai and Peng, 2008). Thus, severely infested fruit are likely to be culled during processing, but complete removal of all infested fruit is unlikely. Based on this evidence, we expect the pest prevalence to remain somewhat constant. Thus, we did not change the previous risk rating but acknowledge that our uncertainty level increased.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Low	U	We found no evidence that this species would be affected by transport and storage conditions, so we made no change to the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Low	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Medium	MC	*Ostrinia furnacalis* feeds mainly on maize, but it can adapt to other plants when maize is not available (CABI, 2013). Suitable hosts are widely and regularly distributed throughout the endangered area (see endangered area section), and the adult stage can

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			disperse on its own (Shirai, 1998; Wang et al., 1994). However, the life stage most likely to arrive with the commodity (i.e., harvested and packed citrus) is the larva. Therefore, the pest would need to complete development within the fruit in a suitable environment, emerge, mate and locate a suitable host to deposit eggs upon. Thus, we rated this risk element Medium due to the lower likelihood of events required for this pest to contact host material.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	*Ostrinia furnacalis* would be imported into areas of the United States that comprise more than 25 percent of the population (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Ostrinia furnacalis* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	C	*Ostrinia furnacalis* is an important pest in much of Asia and the Western Pacific region on corn (Nafus and Schreiner, 1991). Yield loss reports to corn range from 1.7 percent up to 100 percent loss (Hsu et al., 1988; Nafus

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			and Schreiner, 1991; Teng et al., 1992). In China, *O. furnacalis* is an important component of the lepidopteran pest complex of cotton, where feeding damage reduces cotton bolls and crop yields (He et al., 2004; He et al., 2006).
Risk Element C2: Spread potential	Yes	C	Under laboratory conditions, adult *O. furnacalis* displayed high flight ability for several days after emergence (Shirai, 1998). In a field recapture study, 95 percent of the recaptures occurred at a 4-km radius, and two specimens occurred up to 45.5 km from the release site (Wang et al., 1994). *Ostrinia furnacalis* has likely been moved by humans. Presumably native to Asia (Bourguet et al., 2014), *O. furnacalis* has spread to Guam (NAPIS, 2014).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.11. *Resseliella citrifrugis*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *R. citrifrugis* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Taxonomic note: Gagné (2010) lists *Resseliella citrifrugis* Jiang as a *nomina nudum*, which is "a term used for a name which is unavailable because it does not have a description, reference or indication (specifically a name published before 1931 which fails to conform to Article 12, or after 1930 but fails to conform to Article 13)" (ICZN, 2014). However, because the name *Resseliella citrifrugis* is used in multiple sources reporting it as a pest of *Citrus* in China (e.g., Cai and Peng, 2008; Chen and Hou, 2010; GAQSIQ, 2011; Huang et al., 2001; Lu, 2002a; Yang, 2010), we further analyzed this pest despite the nomenclatural uncertainty.

Determination of the portion of the continental United States endangered by *Resseliella citrifrugis*

Climatic suitability	*Resseliella citrifrugis* occurs in the Chinese provinces of Fujian (Chen and Hou, 2010), Hubei (Lu and Wang, 2004), Hunan (Huang et al., 2001; Lu, 2002b), Guangdong (Wu et al., 1999), Guangxi (Yang, 2010), Guizhou (Lu and Wang, 2004), and Sichuan (Xie et al., 2012). The reported distribution area primarily encompasses global Plant Hardiness Zones 8-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	Hosts include *Citrus* species (GAQSIQ, 2011; Lu, 2002b), such as pummelo (*Citrus maxima*) (Cai and Peng, 2008; Chen and Hou, 2010; Lu, 2002b) and grapefruit (*Citrus paradisi*) (Huang et al., 2001). *Citrus* species are naturalized in areas in the continental United States climatically suitable for *R. citrifrugis* (Kartesz, 2010).
Economically important hosts at risk[a]	Citrus is an economically important host in areas in the continental United States climatically suitable for *R. citrifrugis*, in particular areas of Arizona, California, Florida, Louisiana, and Texas (CIPM, 2013; NASS, 2012).
Pest potential on economically important hosts at risk	In China, *R. citrifrugis* is an important pest of grapefruit (Huang et al., 2001) and pummelo (Yang, 2010), and programs for its control exist (Huang et al., 2001; Lu, 2002b; Wang et al., 1997; Wu et al., 1999). This fly causes serious fruit drop (Wang et al., 1997) and can affect product yield and storage quality, causing serious economic losses (Yang, 2010). Yield losses range from 10 to 40 percent or more (Wang et al., 1997; Xie et al., 2012). Control measures include application of pesticides to soil surface and crowns of trees, fruit bagging, and cultural control (Huang et al., 2001; Lu, 2002b; Wang et al., 1997; Wu et al., 1999; Yang, 2010). The use of low temperature as a treatment for this fly in fruit has been investigated (Chen and Hou, 2010).
Defined Endangered Area	The area endangered by *R. citrifrugis* comprises citrus-producing areas in Plant Hardiness Zones 8-11.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Resseliella citrifrugis* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the	High	MC	*Citrus* is the only reported host (see endangered area section above), and fruit is the only feeding site for larvae (GAQSIQ, 2011; Wang et al., 1997; Yang, 2010). The percentage of fruit

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
baseline rating for entry)			infested in groves ranges from 10 to 70 (Huang et al., 2001; Lu, 2002b; Yang, 2010). Adults lay eggs on the stem and calyx area (Yang, 2010) or inside the mesocarp/albedo (white tissue) (Cai and Peng, 2008) of the fruit; after hatching, the early-instar larvae burrow into the fruit, tunneling in the white tissue (Yang, 2010). Infestations can cause fruit drop (Cai and Peng, 2008; Wang et al., 1997). Although the most damaging period is mid-June to early August (Lu, 2002b), prior to the fruit harvest period of September-December (GAQSIQ, 2011), larvae can also cause damage in late September to early October (Wu et al., 1999) or overwinter in the fruit through mid-December (Lu, 2002a).
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Medium	MC	Infestation can cause obvious symptoms on fruit (dark color of entrance hole and liquid exuding from the site; uneven yellow and brown spots on outer layer; deformed fruit; rotting) (Cai and Peng, 2008; Yang, 2010). Thus, some of the infested fruit are likely to be rejected during post-harvest processing. Despite that, this insect may spread through the transport of mature fruit (Huang et al., 2001; Lu and Wang, 2004; Wang et al., 1997), which indicates that infested fruit can escape post-harvest culling.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Medium	MU	We have no information indicating that transport and storage conditions are likely to affect this pest (see the description of the pathway in section 1.4).
Risk Element A: Overall risk rating for likelihood of entry	Medium	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Low	MU	Last instar larvae either overwinter in the fruit or leave the fruit to overwinter in the soil (Huang et al., 2001; Wu et al., 1999); therefore, individuals could survive until a host becomes available. Also, many larvae can be in a single fruit (Lu and Wang, 2004; Wu et al., 1999), which makes it likely emerging adults could

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			find a mate. However, the adult flies have short lifespans (only 2-5.5 days; Zhang, 2007) and limited flight ability (only 10-15 meters) (Lu, 2002b; Zhang, 2007). Also, the host range is apparently limited to citrus. These characteristics decrease the likelihood that *R. citrifrugis* will disperse naturally from imported fruit to come into contact with host material in the endangered area.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Resseliella citrifrugis* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MC	As mentioned above (endangered area section), this species has significant damage potential. Also, fruit-infesting cecidomyiid flies are not among the important pests of citrus in the continental United States (CIPM, 2013); therefore, *R. citrifrugis* may require control measures in addition to those already in place for other citrus pests.
Risk Element C2: Spread potential	Yes	MU	Although the adults of *R. citrifrugis* have limited flight ability (only 10-15 meters) (Lu, 2002b; Zhang, 2007), this species can spread long distances via the human-mediated

Criteria	Meets criteria? (Y/N)	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			transport of larvae in citrus fruit, or the larvae and pupae in soil (Huang et al., 2001; Lu and Wang, 2004; Zhang, 2007).
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.12. *Tuckerella knorri*

We determined the overall likelihood of introduction to be Medium. We present the results of this assessment in the table below.

We determined that the establishment of *Tuckerella knorri* in the continental United States is likely to cause unacceptable impacts. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Tuckerella knorri*

Climatic suitability	*Tuckerella knorri* is present in China (Hainan), Costa Rica, Cuba, Iran, the Philippines, and Thailand (Vacante, 2010b; López and Hechavarría, 2011; Zhang and Hong, 2010). The reported distribution area primarily encompasses global Plant Hardiness Zones 9-11 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Tuckerella knorri* has been detected on *Carica papaya* (papaya), *Persea americana* (avocado) (Lin, 1982), *Citrus* spp., *Mangifera indica* (mango) and *Manilkara zapota* (sapodilla) (Ochoa, 1989), which are present in Zones 9-11 of the PRA area (NRCS, 2014).
Economically important hosts at risk[a]	Economically important potential host plants in Zones 9-11 of the PRA area include citrus and avocado (CABI, 2013).
Pest potential on economically important hosts at risk	*Tuckerella knorri* is a serious citrus pest in Costa Rica (Ochoa et al., 1991), requiring control measures (Vacante, 2010b).
Defined Endangered Area	The area endangered by *Tuckerella knorri* comprises citrus and avocado in Zones 9-11.

[a] As defined by ISPM No. 11, supplement 2, “economically” important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Tuckerella knorri* into the endangered area via the importation of citrus from China

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	High	MC	*Tuckerella knorri* can be a serious pest of citrus fruit (Ochoa et al., 1991; Vacante, 2010a), and no standard industry field practices are being considered in this analysis.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Medium	MC	Mites can be removed from citrus fruits by packinghouse processes such as those described in section 1.4.3 (Hallman, 2007). However, this mite may be found in crevices of the epidermis of citrus fruit (Ochoa, 1989). For these reasons, we decreased the previous rating by one level rather than lowering the risk element to negligible.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Medium	U	We found no evidence that this species would be affected by transport and storage conditions, so we made no change to the previous rating.
Risk Element A: Overall risk rating for likelihood of entry	Medium	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Low	MU	We found no specific dispersal information for *T. knorri*. In general, mites disperse either by hitchhiking on other animals (phoresy), being blown by wind or by crawling between host plants (Jeppson et al., 1975). From imported fruit, mites are highly likely to have a limited ability to disperse naturally.
Risk Element B2: Likelihood of arriving in the endangered area	High	C	More than 25 percent of the U.S. population lives within the endangered area (PERAL, 2015). The demand for host material (fruit) contributes to the likelihood that an

Risk Element	**Risk Rating**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			insect population could establish should infested fruit arrive in areas with a suitable climate.
Risk Element B: Combined likelihood of establishment	Medium	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Medium	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

Assessment of the consequences of introduction of *Tuckerella knorri* into the continental United States (i.e., the PRA area)

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
Direct Impacts			
Risk Element C1: Damage potential in the endangered area	Yes	MU	Infestations of *T. knorri* in commercial citrus production in Costa Rica have resulted in significant yield reductions (Ochoa et al., 1991). Feeding damage on fruit, often in association with infection by the fungus, *Sphaceloma fawcettii*, consists of a fine cracking of the epidermis, which can cover the entire surface in severe attacks; as a result, fruit may be downgraded in quality (Aguilar et al., 1990). Predicting potential yield losses in the United States is difficult, but *T. knorri* is considered to be one of the "major pest threats for the California citrus industry" (PERAL, 2011).
Risk Element C2: Spread potential	Yes	MU	In recent years, various *Tuckerella* mites have expanded into new locations (López and Hechavarría, 2011). While the ability of *T. knorri* to disperse naturally may be limited, it has likely been moved by humans. This is corroborated by its spread to Costa Rica (PERAL, 2011) and Cuba

Criteria	**Meets criteria? (Y/N)**	**Uncertainty Rating[a]**	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			(López and Hechavarría, 2011) from its presumed origin in Asia.
Risk Element C: Pest introduction is likely to cause unacceptable direct impacts	Yes	N/A	
Conclusion			
Is the pest likely to cause unacceptable consequences in the PRA area?	Yes	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

3.2.13. *Zasmidium fructicola*, *Zasmidium fructigenum*

We determined the overall likelihood of introduction to be Negligible. We present the results of this assessment in the table below.

Determination of the portion of the continental United States endangered by *Zasmidium fructicola* and *Zasmidium fructigenum*

Climatic suitability	*Z. fructicola* is primarily distributed in tropical and subtropical areas in Asia. It has been reported from Cangnan, Changshan, Huangyan, Linhai, and Yuhuan counties in the Zhejiang Province; Nanjing and Pinghe counties in the Fujian Province; Pingyuan County in the Gunagdong Province, and Jishou County in the Hunan Province of China (Huang et al., 2015a). No other records of this pathogen are reported elsewhere in the world. *Z. fructigenum* is reported from Changshan, Linhai, and Yuhuan counties in the Zhejiang Province and Nanfeng County in the Jiangxi Province of China (Huang et al., 2015a). No other records of this pathogen are reported elsewhere in the world. The areas these pathogens are found encompass global Plant Hardiness Zones 9-10 as defined by Magarey et al. (2008).
Potential hosts at risk in PRA Area	*Zasmidium fructicola* and *Z. fructigenum* are reported from several species of *Citrus* in the Rutaceae family. Both species were isolated from *Citrus paradisi* x *Citrus* sp., *C. grandis, C. reticulata,* and *C. unshiu* (Huang et al., 2015a). *Zasmidium fructicola* was also isolated from *C. sinensis* (Huang et al., 2015a).
Economically important hosts at risk[a]	*Citrus* species are economically important hosts that are present in the areas of concern (NASS, 2012).
Pest potential on economically important hosts at risk	There are no studies to indicate the potential damage from these two fungal species. *Z. fructicola* and *Z. fructigenum* along with several other species of fungi including *Cercospora* cf. *flagellaris,*

	Pallidocercospora crystallina, Pallidocercospore heimiodes, Passalora loranthi, Pseudocercospora sp., *Verrucisporota* sp., and *Zasmidium citri-griseum*, causing leaf spots ranging from greasy spot, yellow spot, small or large brown spot, black dot, and brown dot were isolated from citrus (Huang et al., 2015a). However, only *Z. citri-griseum, Z. fructicola,* and *Z. fructigenum* were associated with citrus black spot, greasy spot, and black dot symptoms on fruit (Huang et al., 2015a). Several species of cercosporoid fungi have been associated with leaf and fruit spot diseases of *Citrus* spp. (Pretorius et al., 2003), of which two are regarded as particularly serious: greasy leaf spot, caused by *Zasmidium citri-griseum* (sexual morph *Mycosphaerella citri*) (Sivanesan, 1984; Timmer and Gottwald, 2000; Braun et al., 2014), and *Phaeoramularia* fruit and leaf spot, caused by *Pseudocercospora angolensis* (Seif, 2000). Based on the research work, *Z. fructicola,* and *Z. fructigenum* are two additional species associated with a leaf spot disease complex that affects citrus groves in China (Huang et al., 2015a). The economic importance of these fungi has not been assessed, but a closely related fungus *Z. citri-griseum*, which is already present in the United States, does cause impacts (Timmer and Gottwald, 2000).
Defined Endangered Area	The area endangered by *Zasmidium fructicola* and *Z. fructigenum* encompasses citrus in global Plant Hardiness Zones 9-10 of the United States.

[a] As defined by ISPM No. 11, supplement 2, "economically" important hosts refers to both commercial and non-market (environmental) plants (IPPC, 2013).

Assessment of the likelihood of introduction of *Zasmidium fructicola* and *Zasmidium fructigenum* into the endangered area via the importation of citrus from China

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
Likelihood of Entry			
Risk Element A1: Pest prevalence on the harvested commodity (= the baseline rating for entry)	Medium	MU	*Zasmidium fructicola* and *Z. fructigenum* have been reported infecting several species of citrus in citrus-growing provinces of China along with several other greasy spot-like causing fungi (Huang et al., 2015a). Due to the lack of biological information on *Z. fructicola* and *Z. fructigenum*, we used the biological information of *Z. citri-griseum*, which is closely related and causes similar symptoms on citrus with infections

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			that can occur at any time of the year (Timmer and Gottwald, 2000). *Zasmidium citri-griseum* primarily affects the leaves of citrus, but also affects fruit, producing greasy spot rind blotch (Timmer and Gottwald, 2000). The symptoms on the fruit include necrotic specks in the epidermis between the oil glands on fruit rind (Timmer and Gottwald, 2000). These specks do not generally appear until 3-6 months after infection (Timmer et al., 1980; Timmer and Gottwald, 2000). In conditions when the presence of inoculum could be continuous during the season, the possibility of having infected symptomatic and asymptomatic fruit at time of harvesting is possible.
Risk Element A2: Likelihood of surviving post-harvest processing before shipment	Medium	U	The symptoms that *Z. fructicola* and *Z. fructigenum* caused on fruit are similar to a conspecific fungi causing greasy spot rind blotch [*Mycosphaerella citri* Whiteside syn: *Zasmidium citri-griseum* (F.E. Fisher) U. Braun] (Huang et al., 2015a). Due to the lack of biological information on *Z. fructicola* and *Z. fructigenum* we used the biological information of *Z. citri-griseum* as proxy for comparison. We consider that *Z. fructicola* and *Z. fructigenum* are likely to behave in a similar way to *Z. citri-griseum*. Fresh fruit is subjected to a number of physical and chemical treatments in commercial packing houses(see section 1.4). *Zasmidium citri-griseum* grows epiphytically over the fruit surface before infection, during this phase it is considered to be vulnerable (Mondal et al., 2007). Fungicides would be effective at removing epiphytic spores from the surface of

Risk Element	Risk Rating	Uncertainty Rating[a]	Justification for rating and explanation of uncertainty (and other notes as necessary)
			fruit (Whiteside, 1970); however, infected fruit would unlikely be affected. Infection sites in the fruit are restricted on a few cells surrounding the penetration point (Whiteside, 1970), indicating that the infection will remain localized. Asymptomatic fruit may become symptomatic after packinghouse processing. Based on this information from the congeneric species (*Zasmidium citri-griseum*), we kept the current risk rating as medium.
Risk Element A3: Likelihood of surviving transport and storage conditions of the consignment	Medium	MU	We have no indication that standard conditions used to hold the citrus fruit during transport would impact the survival of *Z. fructicola* and *Z. fructigenum*; therefore, we did not change the previous risk rating.
Risk Element A: Overall risk rating for likelihood of entry	Medium	N/A	
Likelihood of Establishment			
Risk Element B1: Likelihood of coming into contact with host material in the endangered area	Negligible	MU	Based on the information of a congeneric species (*Zasmidium citri-griseum*) causing greasy spot on citrus in China and the United States. On fruit infected with *Z. citri-griseum*, the hyphae reach only a few cells beneath the substomatal chamber, causing little necrosis. No additional growth is observed after penetration in fruit tissues (Whiteside, 1972), and therefore the possible formation of pesudothecia or other differentiated structures on infected fruit tissue is unlikely. The production of conidia is reported on leaves only and does not occur on fruit tissue (Whiteside, 1970). *Zasmidium citri-griseum* produces conidia only from extramatricular hyphae and from a stroma embedded in the host tissue, which is not observed on infected fruit tissues (Whiteside, 1970). We consider that *Z.*

Risk Element	**Risk Rating**	**Uncertainty Rating**[a]	**Justification for rating and explanation of uncertainty (and other notes as necessary)**
			fructicola and *Z. fructigenum* will behave in similar way as *Z. citri-griseum* and rate these fungi as negligible.
Risk Element B2: Likelihood of arriving in the endangered area	N/A	N/A	
Risk Element B: Combined likelihood of establishment	Negligible	N/A	
Overall Likelihood of Introduction			
Combined likelihoods of entry and establishment	Negligible	N/A	

[a] C=Certain, MC=Moderately Certain, MU=Moderately Uncertain, U=Uncertain

4. Summary and Conclusions of Risk Assessment

Of the organisms associated with citrus worldwide and reported in China, we identified those that are actionable pests for the continental United States and have a reasonable likelihood of being associated with the commodity following harvesting from the field and post-harvest processing. We further evaluated these organisms for their likelihood of introduction (i.e., entry plus establishment) and their potential consequences of introduction. Pests that meet the threshold to likely cause unacceptable consequences of introduction and receive an overall likelihood of introduction risk rating above Negligible are candidates for risk management. The results of this risk assessment represent a baseline estimate of the risks associated with the import commodity pathway as described in section 1.4.

The pathogens *Phyllosticta citricarpa* (the causal agent of citrus black spot), and *Xanthomonas citri* subsp. *citri* (the causal agent of citrus canker) have limited distributions in the United States and are considered quarantine pests. These pests have each been previously analyzed by USDA-APHIS in stand-alone pest risk assessments examining the likelihood that these pathogens will spread through the movement of commercial citrus fruit intended for consumption. USDA-APHIS has determined that asymptomatic or commercially packed fruit is not an epidemiologically significant pathway for the introduction and establishment of these pathogens into new areas. For the above reasons, these pathogens were not analyzed in the pest risk assessment; however, additional import requirements will be specified in the risk management document as a condition of entry for citrus fruit from China to the continental United States.

Of the pests selected for further analysis, we summarize the results for pests which are *not* candidates for risk management because they do not meet the threshold to likely cause unacceptable consequences for introduction in Table 5. All the other pests selected for further analysis are candidates for risk management because they met the threshold to likely cause unacceptable consequences of introduction and they received an overall likelihood of introduction risk rating above Negligible. We summarize the results for each pest in Table 6.

Detailed examination and choice of appropriate phytosanitary measures to mitigate pest risk are part of the pest risk management phase within APHIS and are not addressed in this document.

Table 5. Summary for pests selected for further evaluation and determined *not* to be candidates for risk management.

Pest	Reason the pest is *not* a candidate for risk management	Uncertainty statement (optional)[a]
Zasmidium fructicola and *Z. fructigenum*	Negligible for likelihood of introduction	

[a] The uncertainty statement, if included, identifies the most important source(s) of uncertainty.

Table 6. Summary for pests selected for further evaluation and determined to be candidates for risk management. All of these pests meet the threshold for unacceptable consequences of introduction.

Pest	Likelihood of Introduction overall rating	Uncertainty statement (optional)[a]
Bactrocera correcta	High	
Bactrocera cucurbitae	Medium	
Bactrocera dorsalis	High	
Bactrocera minax	High	
Bactrocera occipitalis	High	
Bactrocera pedestris	High	
Bactrocera tau	Medium	
Bactrocera tsuneonis	High	
Brevipalpus junicus	Medium	
Carposina niponensis	Medium	
Carposina sasakii	Medium	
Cryptoblabes gnidiella	Medium	
Ostrinia furnacalis	Medium	
Resseliella citrifrugis	Medium	
Tuckerella knorri	Medium	

[a] The uncertainty statement, if included, identifies the most important source(s) of uncertainty.

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7. Appendix: Pests with non-actionable regulatory status

We found some evidence of the below listed organisms being associated with the commodity and being present in the export area. Because these organisms have non-actionable regulatory status for the PRA area, however, we did not list them in Table 2 of this risk assessment, and we did not evaluate the strength of the evidence for their association with the commodity or their presence in the export area. Because we did not evaluate the strength of the evidence, we consider the following pests to have only “potential” association with the commodity and presence in the export area.

Below we list these organisms along with the references supporting their potential association with the commodity, their potential presence in the export area, their presence in the PRA area (if applicable), and their regulatory status for the PRA area. For organisms not present in the PRA area, we also provide justification for their non-actionable status.

Organism	Evidence and/or other notes
Acari: Carpoglyphidae	
Carpoglyphus lactis (L.)	Baker and Delfinado, 1978
Acari: Eriophyidae	
Aceria sheldoni (Ewing)	Keifer, 1952
Aculops palekassi Keifer	Childers and Achor, 1999
Eriophyes sheldoni Ewing	Jeppson et al., 1975; Cheng et al., 2015
Phyllocoptruta oleivora (Ashmead)	CAB, 1970; Gao et al., 2012; Childers and Achor, 1999
Acari: Tarsonemidae	
Polyphagotarsonemus latus (Banks)	CABI, 1986; Cheng et al., 2015; Kousik et al., 2007
Acari: Tenuipalpidae	
Brevipalpus californicus (Banks)	Denmark, 2015
Brevipalpus lewisi McGregor	Kerns et al., 2004
Brevipalpus obovatus Donnadieu	Childers and Derrick, 2003
Brevipalpus phoenicis (Geijskes)	Jeppson et al., 1975; CABI/EPPO 2013b; Childers and Derrick, 2003
Cenopalpus pulcher (Canestrini & Fanzago)	Hatzinikolis and Emmanouel, 1987; Zhang, 2010
Acari: Tetranychidae	
Bryobia praetiosa Koch	Migeon and Dorkeld, 2006-2017
Bryobia rubrioculus (Scheuten)	Migeon and Dorkeld, 2006-2017
Eotetranychus sexmaculatus (Riley)	Migeon and Dorkeld, 2006-2017
Oligonychus coffeae (Nietner)	Bolland et al., 1998
Panonychus citri (McGregor)	Bolland et al., 1998; Zhao et al., 2014; Migeon and Dorkeld, 2006-2017
Panonychus ulmi (Koch)	Migeon and Dorkeld, 2006-2017
Petrobia harti Ewing	Migeon and Dorkeld, 2006-2017
Petrobia latens Müller	Migeon and Dorkeld, 2006-2017
Tetranychus kanzawai Kishida	Migeon and Dorkeld, 2006-2017
Tetranychus urticae Koch	Migeon and Dorkeld, 2006-2017
Coleoptera: Anthribidae	
Araecerus fasciculatus DeGeer	CABI, 2017; Hua, 2002

Coleoptera: Chrysomelidae	
Phyllotreta striolata (F.); syn.: *P. vittata* (F.)	CABI, 1994; Gao et al., 2012; Lee et al., 2011
Coleoptera: Nitidulidae	
Haptoncus luteolus Erichuon	Lindgren and Vincent, 1953; CASI, 1994
Diptera: Drosophilidae	
Drosophila suzukii Matsumura	CABI, 2017
Diptera: Muscidae	
Atherigona orientalis Schiner	CABI, 2017
Hemiptera: Aleyrodidae	
Dialeurodes citri (Ashmead)	Evans, 2008; Niu et al., 2014
Paraleyrodes minei Iaccarino	Longo and Rapisarda, 2014; CABI/EPPO, 2015
Hemiptera: Aphididae	
Aphis craccivora Koch	Li et al., 1997; Smith and Parron, 1978
Aphis fabae Scopoli; syn.: *A. citricola* van der Goot	Eastop and Blackman, 1988; Niu et al., 2014; Smith and Parron, 1978
Aphis gossypii Glover	Niu et al., 2014; Smith and Parron, 1978
Aphis nerii Boyer de Fonscolombe	Blackman and Eastop, 2000; Hua, 2000; Smith and Parron, 1978
Aphis spiraecola Patch; syn.: *A. citricola auct. mult.*)	Blackman and Eastop, 2000; Li et al., 1997; Palmer, 1952
Aulacorthum solani (Kaltenbach)	Blackman and Eastop, 2000; CAB, 1986
Brachycaudus cardui (L.)	Blackman and Eastop, 2000; Hua, 2000; Smith and Parron, 1978
Brachycaudus helichrysi (Kaltenbach)	Blackman and Eastop, 2000; Hua, 2000; Smith and Parron, 1978
Lipaphis erysimi (Kaltenbach); syn.: *L. pseudobrassicae* (Kaltenbach)	CAB, 1966; Li et al., 1997; Remaudière and Remaudière, 1997
Macrosiphum euphorbiae (Thomas)	Blackman and Eastop, 2000; Hua, 2000; Smith and Parron, 1978
Myzus persicae (Sulzer)	Niu et al., 2014; Smith and Parron, 1978
Rhopalosiphum maidis (Fitch)	Hua, 2000; Saraç et al., 2015; Smith and Parron, 1978
Sitobion avenae (F.)	Gao et al., 2012; Remaudière and Remaudière, 1997; Smith and Parron, 1978
Toxoptera aurantii (Boyer de Fonscolombe)	Niu et al., 2014; Smith and Parron, 1978
Toxoptera citricida (Kirkaldy)	Halbert and Brown, 2011; Niu et al., 2014; Smith and Parron, 1978
Hemiptera: Aleyrodidae	
Aleuroclava aucubae (Kuwana)	Evans, 2008
Aleuroclava jasmini (Takahashi); syn.: *Aleurotuberculatus jasmini* Takahashi	CASI, 1994; Evans, 2008; Luo and Zhou, 2001
Aleurodicus dispersus Russell	CABI, 2017; Evans, 2008
Aleyrodes proletella (Linnaeus)	Evans, 2008; ODA, 2016
Bemisia tabaci (Gennadius)	CABI, 2017; Evans, 2008; Luo and Zhou, 2001
Dialeurodes citri (Ashmead)	CABI, 2017; Evans, 2008; Luo and Zhou, 2001
Dialeurodes kirkaldyi (Kotinsky)	Evans, 2008; Luo and Zhou, 2001
Parabemisia myricae (Kuwana)	CABI, 2017; Evans, 2008; Luo and Zhou, 2001
Paraleyrodes minei Iaccarino	Evans, 2008

Singhiella citrifolii (Morgan)	CABI, 2017; Evans, 2008
Tetraleurodes acaciae (Quaintance)	Evans, 2008
Trialeurodes vaporariorum (Westwood)	CABI, 2017; Evans, 2008; Hua, 2000; Mukuka et al., 2002
Hemiptera: Asterolecaniidae	
Russellaspis pustulans pustulans (Cockerell)	García Morales et al., 2017
Hemiptera: Cicadellidae	
Limotettix striola (Fallén)	Osborn, 1900; Gao et al., 2012
Hemiptera: Coccidae	
Ceroplastes ceriferus (Fabricius)	García Morales et al., 2017
Ceroplastes floridensis (Comstock)	García Morales et al., 2017
Ceroplastes stellifer (Westwood)	García Morales et al., 2017
Coccus hesperidum (L.)	García Morales et al., 2017
Coccus longulus (Douglas)	García Morales et al., 2017
Coccus pseudomagnoliarum (Kuwana)	García Morales et al., 2017; Hua, 2000
Coccus viridis (Green)	García Morales et al., 2017
Eucalymnatus tessellatus (Signoret)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997
Kilifia acuminata (Signoret)	García Morales et al., 2017
Kilifia americana Ben-Dov	García Morales et al., 2017
Milviscutulus mangiferae (Green); syn.: *Protopulvinaria mangiferae* (Green), *Coccus mangiferae* (Green)	CASI, 1994; García Morales et al., 2017
Parasaissetia nigra (Nietner); syn.: *Saissetia nigra* (Nietner)	CASI, 1994; García Morales et al., 2017; Li et al., 1997
Parthenolecanium corni (Bouche)	CABI, 2017
Parthenolecanium persicae (Fabricius)	CASI, 1994; García Morales et al., 2017
Pulvinaria citricola (Kuwana); syn.: *Saissetia citricola* Takahashi & Tachikawa	CASI, 1994; García Morales et al., 2017; Gill, 1988; Li et al., 1997
Pulvinaria floccifera (Westwood)	García Morales et al., 2017
Pulvinaria nipponica (Borchsenius)	García Morales et al., 2017
Pulvinaria psidii Maskell	García Morales et al., 2017
Saissetia coffeae (Walker); syn.: *Lecanium hemisphaerica* (Targioni)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Hua, 2000
Saissetia oleae Olivier	CASI, 1994; García Morales et al., 2017; Li et al., 1997
Hemiptera: Diaspididae[1]	
Aonidiella aurantii (Maskell)	Gao et al., 2012; García Morales et al., 2017
Aonidiella citrina (Coquillett)	Cheng et al., 2015; García Morales et al., 2017
Aspidiotus destructor Signoret	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997
Aspidiotus excisus Green; syn.: *Temnaspidiotus excisus* Green	GAQSIQ, 2011; García Morales et al., 2017
Chrysomphalus aonidum (L.)	CABI/EPPO, 2016; García Morales et al., 2017
Chrysomphalus bifasciculatus Ferris	GAQSIQ, 2011; García Morales et al., 2017

Comstockaspis perniciosa (Comstock); syn.: *Quadraspidiotus perniciosus* (Comstock)	GAQSIQ, 2011; García Morales et al., 2017
Hemiberlesia cyanophylli (Signoret)	GAQSIQ, 2011
Hemiberlesia rapax (Comstock)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997
Lepidosaphes beckii (Newman)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997
Lepidosaphes gloverii (Packard)	CASI, 1994; GAQSIQ, 2011; Li et al., 1997
Lopholeucaspis japonica (Cockerell)	Cheng et al., 2015; García Morales et al., 2017
Parlatoria pergandii (Comstock)	Cheng et al., 2015; García Morales et al., 2017
Parlatoria proteus (Curtis)	GAQSIQ, 2011; Li et al., 1997
Parlatoria theae (Cockerell)	GAQSIQ, 2011; García Morales et al., 2017
Parlatoria ziziphi (Lucas)	Cheng et al., 2015; García Morales et al., 2017
Pinnaspis aspidistrae (Signoret)	GAQSIQ, 2011; García Morales et al., 2017
Pseudaonidia duplex (Cockerell)	GAQSIQ, 2011; García Morales et al., 2017
Pseudaonidia trilobitiformis (Green)	GAQSIQ, 2011; García Morales et al., 2017
Unaspis citri (Comstock)	GAQSIQ, 2011; García Morales et al., 2017
Unaspis yanonensis (Kuwana)	Gao et al., 2012; Blackburn and Miller, 1984; García Morales et al., 2017
Hemiptera: Miridae	
Adelphocoris lineolatus (Goeze)	Gao et al., 2012; Wheeler and Henry, 1992
Hemiptera: Monophlebidae	
Icerya purchasi Maskell	GAQSIQ, 2011; García Morales et al., 2017; Gao et al., 2012
Hemiptera: Ortheziidae	
Insignorthezia insignis (Browne)	García Morales et al., 2017
Hemiptera: Pentatomidae	
Nezara viridula (L.)	CABI/EPPO, 1998; Gao et al., 2012
Hemiptera: Plataspididae	
Megacopta cribraria (Fabricius)	CASI, 1994; Eger et al., 2010; Hua, 2000; Li et al., 1997
Hemiptera: Pseudococcidae	
Dysmicoccus boninsis (Kuwana)	García Morales et al., 2017
Dysmicoccus brevipes (Cockerell)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997
Dysmicoccus neobrevipes Beardsley	García Morales et al., 2017; Hu et al., 2017; Qin et al., 2013
Ferrisia virgata (Cockerell)	GAQSIQ, 2011; García Morales et al., 2017
Nipaecoccus nipae (Maskell)	García Morales et al., 2017
Phenacoccus madeirensis Green	García Morales et al., 2017
Phenacoccus solenopsis Tinsley	CABI, 2017; García Morales et al., 2017
Planococcus citri (Risso); syn.: *Pseudococcus citri* (Risso)	GAQSIQ, 2011; García Morales et al., 2017; Gao et al., 2012; Cheng et al., 2015
Planococcus minor (Maskell)	García Morales et al., 2017; Roda et al., 2012
Pseudococcus calceolariae (Fernald)	GAQSIQ, 2011; García Morales et al., 2017
Pseudococcus comstocki (Kuwana)	GAQSIQ, 2011; García Morales et al., 2017
Pseudococcus longispinus (Targioni Tozzetti)	GAQSIQ, 2011; García Morales et al., 2017

Pseudococcus maritimus (Ehrhorn)	CASI, 1994; GAQSIQ, 2011; García Morales et al., 2017; Li et al., 1997
Pseudococcus odermatti Miller & Williams	García Morales et al., 2017
Pseudococcus viburni (Signoret)	García Morales et al., 2017
Hemiptera: Rhopalidae	
Liorhyssus hyalinus (F.)	Henry and Froeschner, 1998; Hua, 2000
Hemiptera: Rhizoecidae	
Ripersiella kondonis (Kuwana); syn.: *Rhizoecus kondonis* Kuwana	Cheng et al., 2015; García Morales et al., 2017
Lepidoptera: Arctiidae	
Hyphantria cunea (Drury)	Hua, 2005; Sourakov and Paris, 2014
Lepidoptera: Geometridae	
Hemithea aestivaria (Hübner)	LaGasa et al., 2000; Hua, 2005; Robinson et al., 2010
Lepidoptera: Gracillariidae	
Phyllocnistis citrella Stainton	Niu et al., 2014; Heppner and Fasulo, 2016
Lepidoptera: Noctuidae	
Acronicta increta (Morrison); syn.: *Acronycta increta* Butler	Forkner et al., 2004; Liu and Zhang, 2001; Poole, 1989a
Agrotis ipsilon (Hufnagel) (*A. ypsilon* Rottemburg *auct*.)	CAB, 1969; GAQSIQ, 2011
Spodoptera exigua (Hübner)	Atkins, 1960; Zhang et al., 2011
Lepidoptera: Limacodidae	
Cnidocampa flavescens (Walker)	Clausen, 1956; Cheng et al., 2015
Lepidoptera: Nymphalidae	
Vanessa cardui L.	Poole and Gentili, 1996
Lepidoptera: Saturniidae	
Samia cynthia (Drury); syn: *Attacus cynthia* (Drury), *Philosamia cynthia* (Drury)	Farmiloe, 1925; CASI, 1994; Li et al., 1997
Lepidoptera: Tortricidae	
Archips cerasivorana (Fitch); syn.: *Cacoecia cerasivorana* (Fitch)	Zhang, 1994
Archips rosanus Linnaeus	Johnson and Lyon, 1991; Zhang, 1994
Pandemis cerasana (Hübner); syn.: *P. ribeana* (Hübner)	Hitchcox, 2014; LaGasa, 2014; CASI, 1994; Li et al., 1997
Pyralidae	
Cadra cautella (Walker)	Poole and Gentili, 1996
Paramyelois transitella (Walker)	Poole and Gentili, 1996
Thysanoptera: Thripidae	
Chaetanaphothrips orchidii (Moulton)	CABI, 1988; Gao et al., 2012
Frankliniella intonsa (Trybom)	Nakahara, 1997; Xu et al., 2012
Frankliniella occidentalis (Pergande)	Nakahara, 1997; Niu et al., 2014
Megalurothrips distalis (Karny)	Xu et al., 2012; Tyler-Julian et al., 2014
Scirtothrips citri (Moulton)	Flowers, 1989; Cheng et al., 2015
Scirtothrips dorsalis Hood	Gao et al., 2012; Kumar et al., 2013
Thrips hawaiiensis (Morgan)	Nakahara, 1994; Gao et al., 2012

Thrips palmi Karny	Nakahara, 1994; Xu et al., 2012
Nematodes	
Aphelenchus avenae Bastian	Bao et al., 2007; Norton et al., 1984; PestID, 2017
Aphelenchus isomerus Anderson and Hooper	Bao et al., 2007; PestID, 2017
Ditylenchus destructor Thorne	CABI, 2017; PestID, 2017
Helicotylenchus belli Sher.	Hu, 1991; Sher, 1966; Norton et al., 1984
Helicotylenchus crenacauda Sher.	Hu, 1991; Norton et al., 1984; PestID, 2017
Helicotylenchus dihystera (Cobb) Sher	CABI, 2017
Helicotylenchus exallus Sher.	Hu, 1991; Norton et al., 1984
Helicotylenchus multicinctus (Cobb) Golden	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Hemicriconemoides mangiferae Siddiqi	CABI, 2017; PestID, 2017 (Action only when destined to Hawaii, Puerto Rico, Virgin Islands)
Meloidogyne arenaria (Neal) Chitwood	CABI, 2017; Wang et al., 2013; Volvas and Inserra, 1996; Sasser and Carter, 1985
Meloidogyne incognita (Kofoid & White) Chitwood	CABI, 2017; Goodey et al., 1965; Stokes, 1978; Sasser and Carter, 1985
Meloidogyne javanica (Treub) Chitwood	CABI, 2017; Goodey et al., 1965; Stokes, 1978
Mesocriconema ornatum (Raski) Loof & de Grisse; syn: *Criconemoides ornatum Raski*	Chang, 1993; CABI, 2017
Mescocriconema xenoplax (Raski) Loof & de Grisse; syn: *Criconemoides xenoplax* (Raski) Loof and de Grisse	Chang, 1993; CABI, 2017
Paratrichodorus minor (Colbran) Siddiqi; syn.: *Trichodorus christiei* Allen	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Paratrichodorus porosus (Allen) Siddiqi	CABI, 2017
Pratylenchus coffeae (Zimmerman) Filipjev & Schuurmans Stekhoven	CABI, 2017; Sasser and Carter, 1985
Pratylenchus loosi Loof	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Rotylenchulus reniformis Linford & Oliveira	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Scutellonema brachyurus (Steiner) Andrássy	CABI, 2017
Tylenchorhynchus brassicae Siddiqi	Bao et al., 2007; Geraert, 2011; Norton et al., 1984
Tylenchorhynchus claytoni Steiner	CABI, 2017
Tylenchorhynchus martini Fielding	Hu, 1991; Norton et al., 1984
Tylenchorhynchus nudus Allen	Hu, 1991; Norton et al., 1984
Tylenchulus semipenetrans Cobb	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Tylenchus paraminor Xie & Feng	Xie and Feng, 1997; PestID, 2017
Xiphinema americanum Cobb	CABI, 2017; Goodey et al., 1965; Norton et al., 1984
Xiphinema brevicolle Lordello & Da Costa	Hu, 1991; Norton et al., 1984
Xiphinema elongatum Schuurmans Stekhoven & Teunissen	Chang, 1993; Luo et al., 2003; Xu et al., 1995; Lehman, 2002
Xiphinema thornei Lamberti and Golden	Chang, 1993; Lamberti and Golden, 1986
Viruses and Viroids	

Apple stem grooving virus	CABI, 2017
Hostuviroid hop stunt viroid	CABI, 2017; Wang et al., 2008b
Citrus bark cracking viroid (previously known as Citrus viroid IV?)	Cao et al., 2010; Durán-Vila et al., 1988; Kunta et al., 2007
Citrus viroid V	Cao et al., 2010; CABI, 2017
Citrus viroid III	Wang et al., 2008b; Garnsey et al., 2002; Kunta et al., 2007
Citrus exocortis viroid (citrus exocortis)	CABI, 2017; Timmer et al., 2000
Citrus tatter leaf capillovirus	Timmer et al., 2000
Citrus tristeza virus	CABI, 2017; Timmer et al., 2000
Bacteria and Phytoplasmas	
Burkholderia andropogonis (Smith) Gillis et al.	Tang et al., 2013; CABI, 2017; Duan et al., 2009
‘*Candidatus* Phytoplasma asteris’ Lee et al. 16SrI	Chen et al., 2009a; Mou et al., 2012; Seemüller et al., 1994; Lee and Davis, 1988; Lee et al., 1993; Zhao et al., 2009; Poghosyan et al., 2014
Pseudomonas syringae van Hall	CABI, 2017; Gonzalez et al., 1981
Pseudomonas syringae pv. *syringae* (van Hall) Janse	CABI, 2017
Pseudomonas viridiflava (Burkholder) Dowson	CABI, 2017
Rhizobium radiobacter (Beijerinck and van Delden) Young	CABI, 2017
Rhizobium rhizogenes (Riker et al.) Young et al.	CABI, 2017
Fungi and Chromistans	
Albonectria rigidiuscula (Berk. & Broome) Rossman & Samuels	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Alternaria alternata (Fr.: Fr.) Keissl. = *Alternaria citrimacularis* E.G. Simmons	CASI, 1994; CABI, 2017; PestID, 2017
Alternaria brassicae (Berk.) Sacc.	CABI, 2017; PestID, 2017
Alternaria citri Ellis & N. Pierce	CABI, 2017; Farr and Rossman, 2017
Alternaria tenuissima (Nees & T. Nees : Fr.) Wiltshire	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Armillaria mellea (Vahl) P. Kumm.	CABI, 2017; PestID, 2017
Armillaria tabescens (Scop.) Emel	CABI, 2017
Aschersonia aleyrodis Webber	CABI, 2017
Aschersonia placenta Berk.	CASI, 1994; PestID, 2017
Aspergillus niger Tiegh.	CASI, 1994; CABI, 2017; PestID, 2017
Athelia rolfsii (Curzi) C. C. Tu & Kimbr. = *Sclerotium rolfsii* Sacc.	CABI, 2017; PestID, 2017
Atractium flammeum B. & Rav.	CASI, 1994; Ellis and Everhart, 1892
Botryosphaeria parva Pennycook & Samuels	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Botryosphaeria rhodina (Berk. & M.A. Curtis) Arx = *Lasiodiplodia theobromae*; *Botryodiplodia theobromae* Pat.	Farr and Rossman, 2017; Úrbez-Torres et al., 2006; PestID, 2017
Botryosphaeria ribis Grossenb. & Duggar	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Botryotinia fuckeliana (de Bary) Whetzel = *Botrytis cinerea* (Pers. Fr.)	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Ceratocystis fimbriata* Ellis & Halst.**	Farr and Rossman, 2017; PestID, 2017

Cercospora penzigii Sacc.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Cladosporium citri Massee	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Cladosporium cladosporioides (Fresen.) G.A. De Vries	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Cladosporium oxysporum Burk. & M.A. Curtis	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Cochliobolus lunatus R.R. Nelson & Haasis = *Curvularia lunata* (Wakker) Boedijn	CABI, 2017; PestID, 2017
Cochliobolus pallescens (Tsuda & Ueyama) Sivan. = *Pseudocochliobolus pallescens* Tsuda & Ueyama; *Curvularia pallescens* Boedijn	Jin, 1989; Shi et al., 2000; Farr and Rossman, 2017; PestID, 2017
Colletotrichum acutatum J.H. Simmonds	Farr and Rossman, 2017; PestID, 2017
Colletotrichum fructicola Prihastuti, L. Cai & K.D. Hyde	Peng et al., 2012; Farr and Rossman, 2017; Farr and Rossman, 2013
Colletotrichum coccodes (Wallr.) S. Hughes. Syn*:* *Gloeosporium foliicola* Nishida [as '*foliculum*'] = *Colletotrichum foliicola* (Nishida) Sawada; *Colletotrichum intermedium* (Sacc.) Sawada; *Gloeosporium intermedium* Sacc.	CASI, 1994; PestID, 2017
Colletotrichum karstii Y.L. Yang, Z.Y. Liu, K.D. Hyde & L. Cai	Farr and Rossman, 2017; Huang et al., 2013a; Peng et al., 2012; Damm et al., 2012; Huang et al., 2013a; PestID, 2017
Colletotrichum siamense Prihastuti, L. Cai & K.D. Hyde	Farr and Rossman, 2017; PestID, 2017
*Colletotrichum truncatum (*Schwein.) Andrus & W.D. Moore) = *Colletotrichum capsici* (Syd.) E.J. Butler & Bisby	Farr and Rossman, 2017; PestID, 2017
Coniothecium citri McAlpine	CASI, 1994; PestID, 2017
Corticium centrifugum (Lév.) Bres. = *Fibulorhizoctonia centrifuga* (Lév.) G.C. Adams & Kropp	Farr and Rossman, 2017; CASI, 1994; PestID, 2017
Diaporthe citri F.A. Wolf = *Phoma citri* Sacc; *Phomopsis citri* H.S. Fawc.	Farr and Rossman, 2017; PestID, 2017
Diaporthe cytosporella (Penz. & Sacc.) Udayanga & Castl. = *Phoma cytosporella* Penz. & Sacc.; *Phomopsis cytosporella* (Penz. & Sacc.) H.S. Fawc. & H.A. Lee	Huang et al., 2015b, Farr and Rossman, 2017; Udayanga et al., 2014
Diaporthe eres Nitschke = *Phyllosticta fraxinicola* (Curr.) Ellis & Everh	Huang et al., 2015b; Farr and Rossman, 2017; PestID, 2017
Diaporthe rudis *(*Fr. : Fr.) Nitschke = *Diaporthe faginea (Curr.)* Sacc.; *Diaporthe medusaea* Nitschke; *Phomopsis rudis* (Fr.: Fr.) Höhn.	GAQSIQ, 2011; Farr and Rossman, 2017; PestID, 2017
Dothidea tetraspora Berk. & Broome var. *citricola* Sacco = *Dothidea collecta* (Schwein.) Ellis & Everh.	CASI, 1994; Farr and Rossman, 2017; Ellis and Everhart, 1892
Elsinoë fawcettii (Bitancourt & Jenk.) = *Sphaceloma fawcettii* var. *fawcettii* Jenkins.;	Farr and Rossman, 2017; PestID, 2017

Sphaceloma fawcettii var. *scabiosa* (McAlpine & Tryon) Jenk.	
Erysiphe quercicola S. Takam. & U. Braun =*Oidium mangiferae* Berthet; *Oidium anacardii* F. Noack	Farr and Rossman, 2017; PestID, 2017
Erythricium salmonicolor (Berk. & Broome) Burdsall = *Corticium salmonicolor* Berk. & Broome; *Necator decret* Massee	CASI, 1994; CABI, 2017
Eutypella citricola Speg.	CASI, 1994; Farr and Rossman, 2017; Wolf, 1926; Adesemoye and Eskalen, 2011; Mayorquin et al., 2016
Fusarium concolor Reink	CASI, 1994; Farr and Rossman, 2017; Roberts et al., 1986
*Bisifusarium dimerum (*Penz.) L. Lombard & Crous; syn: *Fusarium dimerum* Penz. = *Microdochium dimerum* (Penz.) Arx)	Farr and Rossman, 2017; Schroers et al., 2009; Chen et al., 2002
***Fusarium lateritium* Nees : Fr.** = *Gibberella baccata* (Wallr.) Sacc.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Fusarium moniliforme* J. Sheld.**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Fusarium orthoceras* Appel & Wollenw**	CASI, 1994; Farr and Rossman, 2017
Fusarium oxysporum f. sp. *vasinfectum* (G. F.ATK.) W. C. Snyder & H. N. Hansen	Farr and Rossman, 2017; PestID, 2017
Fusarium oxysporum Schlcht. var. *aurantiacum* (Lk.) Wr.	CASI, 1994; Farr and Rossman, 2017
Fusarium oxysporum Schltdl. : Fr.	Farr and Rossman, 2017; PestID, 2017
Fusarium sambucinum Fuckel = *Gibberella pulicaris* (Fr. : Fr.) Sacc.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Fusarium scirpi Lamb. et Fautr.	CASI, 1994; Farr and Rossman, 2017
Fusarium solani (Mart.) Sacc.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Ganoderma applanatum (Pers.) Pat. = *Fomes applanatus* (Pers.) Gillet	Farr and Rossman, 2017; PestID, 2017
Ganoderma lucidum (Curtis) P. Karst.	Farr and Rossman, 2017
Geotrichum candidum Link = *Oospora lactis* (Fresen.) Sacc.; *Oospora lactis var. parasitica* Pritchard & Porte; *Galactomyces geotrichum* (E. E. Butler & L. J. Petersen) Redhead & Malloch	Farr and Rossman, 2017; PestID, 2017
Gibberella avenacea R.J. Cook; = *Fusarium avenaceum* (Fr. : Fr.) Sacc.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Globisporangium debaryanum (R. Hesse) Uzuhashi, Tojo & Kakish. = *Pythium debaryanum* R. Hesse	Farr and Rossman, 2017; PestID, 2017
Globisporangium splendens (Hans Braun) Uzuhashi, Tojo & Kakish. = *Pythium splendens* Hans Braun)	Farr and Rossman, 2017; PestID, 2017
Gloeodes pomigena (Schw.) Colby	Farr and Rossman, 2017; PestID, 2017
Glomerella cingulata (Stoneman) Spauld. & H. Schrenk = *Colletotrichum gloeosporioides* (Penz.)	CASI, 1994; Farr and Rossman, 2017; PestID, 2017

Penz. & Sacc. in Penz.; *Physalospora cattleyae* Maubl. & Lasnier	
Guignardia bidwellii (Ellis) Viala & Ravaz = *Phyllosticta ampelicida* (Engelm) Aa.	Farr and Rossman, 2017; PestID, 2017
Hendersonia citri McAlpine	CASI, 1994; PestID, 2017
Hendersonia socia McAlpine	CASI, 1994; PestID, 2017
Hypoxylon serpens (Pers. : Fr.) J. Kickx fil.	Farr and Rossman, 2017
Macrophomina phaseolina (Tassi) Goid	Farr and Rossman, 2017; PestID, 2017
Mucor alboater Naumov = *Mucor piriformis* A. Fisch.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Mycosphaerella horii Hara	Farr and Rossman, 2017
Nigrospora oryzae (Berk. & Broome) Petch = *Khuskia oryzae* H.J. Huds	Farr and Rossman, 2017; PestID, 2017
Nothopatella lecanidium Sacc. = *Botryodiplodia lecanidion* (Speg.) Petr. & Syd.	Farr and Rossman, 2017; Petrak, 1953
Oidium tingitaninum C.N. Carter	Farr and Rossman, 2017; French, 1987
Oospora citri-aurantii (Ferraris) E. E. Butler = *Geotrichum citri-aurantii* E.E. Butler	Farr and Rossman, 2017; PestID, 2017
Ophionectria coccicola (Ellis & Everh.) Berk. & Vogl. = *Podonectria coccicola* (Ellis & Everh.) Petch	Farr and Rossman, 2017; PestID, 2017
Ovatisporangium vexans (de Bary) Uzuhashi, Tojo & Kakish. = *Pythium vexans* de Bary	Farr and Rossman, 2017
Penicillium citrinum Thorn	Farr and Rossman, 2017; PestID, 2017
***Penicillium digitatum* (Pers. : Fr.) Sacc.**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Penicillium diversum* Raper & Fennell**	Farr and Rossman, 2017; PestID, 2017
Penicillium fructigenum Takeuchi	CASI, 1994; PestID, 2017
***Penicillium italicum* Wehmer**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Penicillium italicum* Webmer Var. *album* Wei**	CASI, 1994; PestID, 2017
***Penicillium viridicatum* Westl.**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
***Pestalotia guepini* Desm.**	CASI, 1994; Farr and Rossman, 2017
***Pestalotiopsis neglecta* (Thüm.) Steyaert** **=** *Pestalotia neglecta* Thüm.	Farr and Rossman, 2017; Huang and Hanlin, 1975
Phyllosticta adusta Ellis & G. Martin	Farr and Rossman, 2017
Phyllosticta capitalensis Henn.	Farr and Rossman, 2017; PestID, 2017
***Phyllosticta erratica* Ellis & Everh.**	Farr and Rossman, 2017
***Phyllosticta hesperidearum* (Catt.) Penz.**	Farr and Rossman, 2017; PestID, 2017
***Phytophthora cactorum* (Lebert & Cohn) J. Schröt.**	Farr and Rossman, 2017; PestID, 2017
***Phytophthora capsici* Leonian**	Farr and Rossman, 2017; PestID, 2017
Phytophthora cinnamomi Rands	Farr and Rossman, 2017
***Phytophthora citricola* Sawada**	Farr and Rossman, 2017; PestID, 2017
***Phytophthora citrophthora* (R.E. Sm. & E.H. Sm.) Leonian**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Phytophthora cryptogea Pethybr. & Laff.	CABI, 2013

Phytophthora nicotianae **Breda de Haan**	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Phytophthora palmivora **var.** ***palmivora*** (E.J. Butler) E.J. Butler	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Pithomyces sacchari **(Speg.) M.B. Ellis**	Farr and Rossman, 2017; Kirk, 1991
Pleospora herbarum (Pers. : Fr.) Rabenh.	Farr and Rossman, 2017; PestID, 2017
Pythium aphanidermatum (Eds.) Fitzp. = *Nematosporangium aphanidermatum* (Edson) Fitzp.; *Pythium butleri* L. Subram.	Cai and Peng, 2008; Farr and Rossman, 2017; Li et al., 2014; PestID, 2017
Rhizopus stolonifer (Ehrenb. : Fr.) Vuill. = *Mucor stolonifer* Ehrenb.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Rigidoporus microporus (Sw. : Fr.) Overeem = *Polyporus lignosus* Klotzsch	Farr and Rossman, 2017
Rosellinia necatrix Prill. = *Dematophora necatrix* R. Hartig	Farr and Rossman, 2017
Schizophyllum commune Fr. : Fr.	Farr and Rossman, 2017; PestID, 2017
Sclerotinia sclerotiorum (Lib.) de Bary	CABI, 2017; Farr and Rossman, 2017; PestID, 2017
Septobasidium albidum Pat.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium bogoriense Pat.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium carbonaceum Pat.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium citricola Sawada = *Septobasidium citricolum*	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium formosense Couch ex L.D. Gómez & Henk	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium leucostemum Pat.	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium reinkingii Couch ex L.D. Gómez & Henk	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Septobasidium sinense Couch ex L.D. Gómez & Henk	CASI, 1994; Farr and Rossman, 2017; PestID, 2017
Stemphylium botryosum Wallr.	Farr and Rossman, 2017; PestID, 2017
Thanatephorus cucumeris (A.B. Frank) Donk = *Rhizoctonia solani*	Farr and Rossman, 2017; PestID, 2017
Thielaviopsis basicola (Berk. & Broome) Ferraris = *Chalara elegans* Nag Raj & W.B. Kendr.	Farr and Rossman, 2017; PestID, 2017
Tryblidiella rufula (Spreng. : Fr.) Sacc. = *Rhytidhysteron rufulum* (Spreng. : Fr.) Speg.	Farr and Rossman, 2017; PestID, 2017
Ulocladium obovoideum E.G. Simmons	Farr and Rossman, 2017; Kirk, 2017; Simmons, 1990
Zasmidium citri-griseum (F.E. Fisher) U. Braun & Crous = *Mycosphaerella citri* Whiteside; *Stenella citri-grisea* (Fisher); *Cercospora citri-grisea* F.E. Fisher	CABI, 2017; Cai and Peng, 2008; Farr and Rossman, 2017; PestID, 2017

[1]All armored scales (Diaspididae) are non-actionable at U.S. ports-of-entry on fruit for consumption (NIS, 2008).

Appendix Note: The following fungi are sooty molds and although they are potentially found in China and with citrus, their association is not pathogenic with the plant: *Aithaloderma citri* (Briosi & Pass.) Woron., syn: *Capnodium citri* Penz.; *Aithaloderma clavatisporum* Syd. & P. Syd.; *Capnodium walter* Sacc.; *Capnophaeum fuliginoides* (Rehm) W. Yamam.; *Ceramothyrium aurantii* Bat. & H. Maia Syn: *Limacinia aurantii* Henn.; *Chaetoscorias vulgare* Yamam.; *Chaetothyrium citricola* Yamam.; *Chaetothyrium echinulatum* Yamam.; *Chaetothyrium javanicum* (Zimm.) Boedijn; *Chaetothyrium sawadae* Yamam.; *Hypocapnodium setosum* (Zimm.) Speg., syn: *Chaetothyrium setosum* (Zimm.) Hansf.; *Limacinia setosa* (Zimm.) Sacc. & D. Sacc; *Limacinia chenii* Sawada & W. Yamam.; *Limacinia clavatispora* W. Yamam.; *Limacinia filiformis* W. Yamam., syn: *Scolecobonaria filiformis* (W. Yamam.) Bat.; *Limacinia globosa* Yamam.; *Limacinia javanica* (Zimm.) Höhn; *Limacinia ovispora* Sawada, syn: *Capnodium coffeae* Pat.; *Meliola butleri* Syd.; ***Meliola camelliae*** **(Catt.) Sacc.;** *Meliola citricola* Syd. & P. Syd.; *Neocapnodium tanakae* (Shirai & Hara) W., syn: *Capnodium tanakae* Shirai & Hara; *Phaeosaccardinula javanica* (Zimm.) W. Yamam., syn: ***Limacinula javanica*** (Zimm.) Höhn.; *Phaeosaccardinula longispora* W. Yamam.; *Scorias communis* Yamam.; and *Triposporiopsis spinigera* **(Höhn.) W. Yamam.**