

Final Report submitted 25th February 2022, for the Australian Flora Foundation

Raising Rarity- testing the horticultural potential of rare and threatened Australian wildflowers

Acknowledgments

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Publication arising from this project

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Figure 1. From left to right Raising Rarity stock *Podolepis muelleri*, *Brachyscome tadgellii*, *Podolepis laciniata*, *Rutidosia leptorhynchoides*, *Stylidium armeria* subsp. *pilosifolium*, *Glycine latrobeana*, *Leptorhynchos orientalis*, *Brachyscome chrysoglossa*, and *Leucochrysum albicans* subsp. *tricolor* growing in 140ml containers at The University of Melbourne- Burnley campus nursery. Photo MJ Hirst.

Many of Australia's rare plant species are restricted to ecosystems that are severely threatened by habitat loss, fragmentation and consequent genetic isolation, and climate change. In this project we seek to raise public awareness of and engagement with a range of Victoria's rare and threatened wildflower species that we believe have potential for use in horticulture.

Introduction

A strong driver in plant conservation science is to identify species at risk of extinction and focus on conservation efforts for those most critically endangered to prevent further loss. This is no easy task. Many physiological processes, species distributions and ecosystem processes are already being affected by global warming worldwide. And here in Australia there is documented evidence of changes at the species level, such as shifts in flowering time and effects on species' health and abundance. So, caring about plant rarity and the steps involved to safeguard species becomes a complex issue.

Conservation horticulture aims to retain genetic and phenotypic variation present in natural populations, while commercial production seeks a uniform product, often through clonal propagation or the use of highly selected seed. While the efficiencies of large-scale commercial horticultural production may seem an obvious way to save rare and threatened plants, the selection of plant material or propagules from a limited range of sources may further compromise at-risk species, especially if the impetus to conserve variability is not clearly identified. One solution is to enhance the profile of rare and threatened species by developing selected, commercially attractive forms that can be made available to commercial growers, while maintaining separate, genetically diverse populations for use in species conservation.

The Raising Rarity project seeks to raise awareness of the plight of our flora restricted to ecosystems that are severely threatened by habitat loss, fragmentation, and climate change by growing and displaying rare and threatened Victorian species in an accessible horticultural setting. Plants are grown by seed in containers and transplanted to the Research Garden located within the Australian Garden at Royal Botanic Gardens Victoria (RBGV) Cranbourne. We are working with rare species that we believe have the potential for use in horticulture.



Figure 2. Raising Rarity volunteers measuring plant growth in the outdoor research plots. Photo D. Jeetun.

Volunteers have been instrumental to the success of the program (Fig. 2), and it is through their work, the RBGV was awarded the Protection of the Environment Award for the Raising Rarity project at the 2019 Keep Victoria Beautiful Awards. Student volunteers from the University of Melbourne tirelessly measured plants on weekends and advised customers on the growing conditions of our potted stock at the Cranbourne Friends Plant Sale. Cranbourne horticultural staff provided advice and installation of the drip irrigation system and ongoing maintenance to ensure the project ran smoothly. David Roberts and Gemma Cotterell of the RBGV Melbourne horticultural staff planted out a selection of Raising Rarity stock across their living collections and monitored plant progress over an 18-month period.

Raising rarity awareness

Throughout the Raising Rarity project there have been opportunities to learn from others working on plant selection and performance indicators as well as present our work to a greater audience. Due to the generosity of a BGANZ professional award scholarship, recipient Meg Hirst was able to travel to the Chicago Botanic Gardens in July 2018 to spend time with Plant Evaluation and Associate Scientist Mr. Richard Hawke (Fig. 3a on left) Mr. Hawke's program, which he has managed since 1982, is now one the largest of its kind in the United States, focusing on evaluating plants for local climatic conditions, predominantly working with herbaceous perennials (Fig.3b and Fig.3c on left). For further information see publication link here: Hirst, M.J. (2018) Travels with my grant. Botanic Gardener, BGANZ, November Edition 51 [THE BOTANIC GARDENER Issue 51 – November 2018](https://www.bganz.org.au/publications/botanica/issue-51-november-2018) ([bganz.org.au](https://www.bganz.org.au))



Figure 3. From left Richard Hawke and the evaluation gardens (a, b, c) at the Chicago Botanic Gardens. Centre, Tanya Hendy and Meg Hirst accepting the Protection of the Environment Award, and right Sue Murphy and Meg Hirst with Nigel of Garden Gurus. Photo credits left to right MJ Hirst, Keep Victoria Beautiful and Garden Gurus.

In November 2019, the Raising Rarity project won the Protection of the Environment Award at the Keep Victoria beautiful Sustainable Cities Program (Fig. 3 central). On 21 December 2019, the television program Garden Gurus aired an interview with Sue Murphy and Meg Hirst talking about the project on site at the Cranbourne research plots (Fig. 3 on right). Throughout the project, Raising Rarity has provided seed packets of rare Victorian species to participants in RBGV public programs, such as *Botany Bootcamp* and *Punctum's Public Cooling House*. Providing seed (with sowing instructions), helps facilitate awareness and increase levels of engagement through public participation

Cranbourne Plant Sale

On 26 October 2019, the Raising Rarity project tested the public interest in purchasing rare and threatened stock (Fig. 4). The most popular species sold on the day were *Leucochrysum albicans* subsp. *tricolor*, *Craspedia canens* (in all available container sizes), *Argyrotegium nitidulum*, *Brachyscome tadgellii*, and *Glycine latrobeana* (sold best in 140ml containers), and *Stylidium armeria* subsp. *pilosifolium* (sold in 200ml containers). There was overwhelming interest in *Leucochrysum albicans* subsp. *tricolor*, *Craspedia canens* and *Stylidium armeria* subsp. *pilosifolium* on the day, unfortunately we didn't have sufficient stock to sate the interest (Table 1).



Figure 4. Getting Raising Rarity stock ready for sale at the Cranbourne Friends biannual plant sale. Photo B Jeffrey.

Table 1. Raising Rarity species available for sale, container size, price and number of plants sold

Raising Rarity species for sale	Container size (ml) or tube	Price per item \$	Total number available	Sold on day	Sold per species \$
<i>Argyrotegium nitidulum</i>	140	5	9	9	45
	200	5	9	0	
<i>Brachyscome chrysoglossa</i>	tube	3.5	31	9	
	125	5	30	19	
<i>Brachyscome tadgellii</i>	tube	3.5	121	5	
	140	5	9		
	125	5	10		
	200	5	9		
<i>Craspedia canens</i>	125	5	5		
	140	5			
	200	5			
<i>Glycine latrobeana</i>	140	5			
	200	5			
	125	5			
<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>	125				
<i>Lobelia gelida</i>	140				
	200				
<i>Podolepis laciniata</i>					
<i>Rutidosia leptorhynchoides</i>					
<i>Stylidium armeria</i> subsp					
<i>Xerochrysum p</i>					

Research methods

Study species

All study species (Table 2) are endangered, threatened, or vulnerable flora (Department of Environment and Primary Industries Advisory List of Rare or Threatened Plants in Victoria-2014). Seed of each species was obtained from the Victorian Conservation Seedbank (VCS).

Table 2. Study species tested, species status for the EPBC (Environment Protection and Biodiversity Conservation) Act referring to the Federal Environmental Protection and Biodiversity Conservation Act 1999, the FFG Act referring to the Victorian State Flora and Fauna Guarantee Act 1988, and collection information for each species. Species with an asterix (i.e., **Aciphylla glacialis*) indicates germination was not at enough to continue in this project

Raising Rarity Species	EPBC Status	FFG Status	Collection Information
* <i>Aciphylla glacialis</i>		rare	Collected from tussock grassland in the Victorian alpine region.
<i>Argyrotegium nitidulum</i>	vulnerable	vulnerable	Extremely localised Victoria alpine endemic on the Bogong High Plains
<i>Ballantinia antipoda</i>	endangered	endangered	Seed collection has been produced through seed orcharding at the RBGV
<i>Brachyscome chrysoglossa</i>		vulnerable	Seed collection has been produced through seed orcharding at the RBGV
<i>Brachyscome foliosa</i>		vulnerable	A rare alpine species confined to tussock grassland and herb fields
<i>Brachyscome tadgellii</i>		vulnerable	Endemic to Victoria
<i>Craspedia canens</i>		endangered	In Victoria only known to occur in a small area of grassland in the southeast at low elevation
<i>Drabastrum alpestre</i>		vulnerable	In Victoria only known from 2 small populations
<i>Glycine latrobeana</i>	vulnerable	vulnerable	Although widespread distribution, it has a sporadic occurrence and rarely encountered
* <i>Leptorhynchus orientalis</i>		endangered	Open grassland community, under severe habitat loss in Victoria
<i>Leucochrysum albicans</i> subsp. <i>tricolor</i>		endangered	Exceedingly rare in Victoria
<i>Lobelia gelida</i>	vulnerable	vulnerable	Endemic to Victoria with only a few populations occurring on Mt Buffalo and Mt Reynard
<i>Podolepis laciniata</i>		rare	Mostly in grassy alpine habitats near or below <i>Eucalyptus pauciflora</i> tree line
<i>Podolepis muelleri</i>		endangered	Common at the only known Victorian locality
<i>Rutidosis leptorhynchoides</i>	endangered	endangered	Confined to basaltic grasslands in Victoria, due to habitat loss
<i>Stylidium armeria</i> subsp. <i>pilosifolium</i>		vulnerable	Endemic to Victoria
<i>Xerochrysum palustre</i>	vulnerable	vulnerable	Rare due to habitat depletion

Seed assessment

Conventional seed testing was undertaken to investigate the quality and viability of each seed collection. To determine seed quality and seed fill a cut test was undertaken with a scalpel under a dissecting microscope on a sample of 20 seeds of each species. Due to low seed numbers in some VCS collections, only five seed were cut tested. Across all species, seed fill was 90 –100% and in most cases seed had plump endosperm surrounding the embryo. Average seed weights using five replicates of 50 seed per species excluding *Lobelia gelida* and *Wahlenbergia densifolia* which was five

replicates of 100 seed (Fig. 5 taken from public presentation).

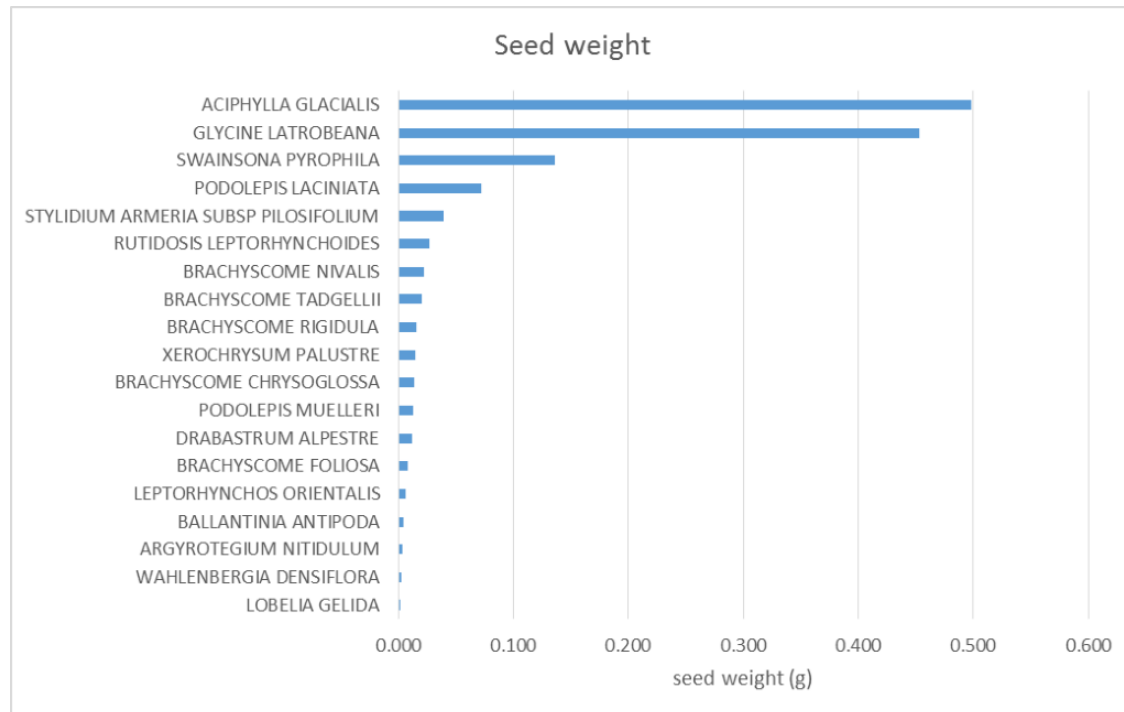


Figure 5. Average weight of five replicates of 50 seed for each Raising Rarity species

Germination and seedling development

Plate tests for germination were performed in sterile petri dishes containing 1% agar. For species where dormancy or low germination was expected, agar plates with 250mg/L gibberellic acid (GA₃), were used. For species where seed was readily available 25 seeds were tested. Ten seed were plated for seed collections with dwindling numbers. Plates were incubated in a germination cabinet on a 12-hour light: 12-hour dark photoperiod at 20°C and 15°C, respectively. Nursery sowings were undertaken in March 2018 with one seed per cell into 100 cell plastic trays with a pine bark-based sowing medium with a low-level controlled release fertiliser. Two trays were sown per species excluding *Craspedia canens* in which only one tray was sown due to limited seed availability. Trays were placed in a glasshouse maintained at 18°C under natural light. Counts of seedling emergence were made weekly for up to ten weeks. The basic design in these growth trials was after germination occurred seedlings remained in the 100 cell trays (Fig. 6 on left) and were monitored in a glasshouse. Seedlings were transferred from an individual cell into tubes when adequate root formation had occurred (Fig. 6 on right).



Figure 6. **On left** an example of a 100-cell germination tray showing *Podolepis laciniata* seedlings in individual cells. Coding for each cell involved one letter per row and the accompanying number to provide unique identifier. For example, the top left-hand cell would be coded as A1 and the last cell in the bottom right-hand corner would be coded as J10. **On right** an example of an individual *Styliidium armeria* subsp. *pilosifolium* seedling 'plug' from an individual cell (C8) within a 100-cell germination tray. Photo MJ Hirst.

Outdoor research plots at the Royal Cranbourne Botanic Gardens-Cranbourne

All outdoor growth trials occurred in raised plots in the Research Garden within the Australian Garden at the Royal Botanic Gardens-Cranbourne site. To capture seedling growth and flowering time we measured individual plants for height (cm) and width (cm) using digital calipers and scored phenological stages from vegetative, bud development through to flowering and seed maturation. If an individual plant had more than one phenological stage present (i.e., bud and open flower) we recorded the most advanced stage (i.e., open flower). We recorded any signs of predation and collected mature seed from individual plants throughout the project. The soil in each raised plot was a mix of one-part brown coal, one-part double-composted mulch, and eight parts sand. Irrigation in the boxes involved 0.185 L of water per plant for two 3-minute periods separated by 10 minutes applied daily unless it rained. Measurements and phenological stages were recorded at four-week intervals.

Additional plantings at the Royal Botanic Gardens-Melbourne

- Alpine bed
- Xanthorrhoea bed
- *Eucalyptus robusta* bed
- Elm and Qld Box bed
- Australian Rainforest Walk - F Gate Lodge bed

Analysis

To investigate overall plant growth and the duration and stage of flowering for each individual plant, we plotted each species mean and range for plant height (or width) and for the phenological stage occurring at the same time the growth measurements were recorded (~4 weeks) using Microsoft® excel.

Results

The following section is presented as individual information on each of the 16 species we tested. Each species section contains descriptions, and a planting guide constructed from the growing trials (both containerised and in the raised plots) and the additional plantings across various beds within the Royal Botanic Gardens Victoria Melbourne site. Neville Walsh and Andre Messina aided with descriptions and habitat of which much of this taxonomic and site information can be searched using the Flora of Victoria database [Flora of Victoria \(rbg.vic.gov.au\)](http://Flora.of.Victoria.(rbg.vic.gov.au)). Information accessible in the following datasheets cannot be reproduced, edited or otherwise exploited. Inquiries or application for permission to use this report should be directed to Meg Hirst Megan.Hirst@rbg.vic.gov.au or Russell Larke Russell.Larke@rbg.vic.gov.au of Royal Botanic Gardens Victoria.

Raising Rarity-testing the horticultural potential of rare and threatened Australian wildflowers

Species list

1. *Argyrotegium nitidulum*
2. *Brachyscome chrysoglossa*
3. *Brachyscome tadgellii*
4. *Craspedia canens*
5. *Leptorhynchos orientalis*
6. *Leucochrysum albicans* subsp. *tricolor*
7. *Podolepis laciniata*
8. *Podolepis muelleri*
9. *Rutidosia leptorhynchoides*
10. *Xerochrysum palustre*
11. *Ballantinia antipoda*
12. *Drabastrum alpestre*
13. *Wahlenbergia densifolia*
14. *Lobelia gelida*
15. *Glycine latrobeana*
16. *Stylidium armeria* subsp. *pilosifolium*

1. *Argyrotegium nitidulum*

Asteraceae

Shining Cudweed

Rare and threatened classification

Listed as rare (r) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.004 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (76%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (200 seed sown, 100% germinated)
- Transplant to tubes (reasonable survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 56 seedlings plants. Average growth on 23/12/18 was **5.49 cm**. The average growth (plant width) from mid-summer (23/12/2018) through to early autumn (4/8/2019) was **2.77 cm**.
- Performance in containers; it was noted plants did not form a clump as readily as those in the outdoor research plots. We transferred containerised plants into the research plots to explore if the clumping habit would return, however we observed containerized plants did not clump well when transplanted into the outdoor plots after >1 year in a container.

Species description

Argyrotegium nitidulum is a small, mat-forming perennial herb growing to no more than 3 cm in height. Plants began branching shortly after germination



Figure 1. On left showing a healthy *A. nitidulum* forming a well-rounded mound. On right, after a hot summer individual plants showed sections of die-back. Not all plants that suffered from die back perished. Photos MJ Hirst.

Plant form as seedling: responded well in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on responded better when first planted out in the research plots.

Suitability for container production and transport

The high germination rate of *Argyrotegium nitidulum* is positive; however, the slow growth rate may be limiting in large-scale production. The species is suited to a gardener keen on Victorian plants, as poor ground coverage and underwhelming flowers may put off the average gardener. That said, we did see a difference in the overall shape of a containerised plant to one growing in the research plot. The containerised plant did not hold an effective mound and the overall shape became quite open and had more gaps, leading to weeds potentially filling those gaps. The issue here is that weeds could easily establish within the spaces and therefore not act as a weed suppressor as other ground covers can be used for.



Figure 2. On left *Argyrotegium nitidulum* growing in a 140ml container. On right, plants growing in the outdoor research garden under drip irrigation. Photos MJ Hirst.

Suggested horticultural use based on plant performance

Argyrotegium nitidulum provides dense coverage of the planting substrate, but its low canopy and slow growth will not prevent germination and establishment of taller growing species in gaps. It would be difficult to weed out invading plants without disrupting the mat, and this would provide further gaps for weed species to establish. If a plant community approach was taken it may be possible to sow more rapid growing wildflowers amidst the mat with an aim for seedling recruitment to out- compete unwanted weed species. Die off was observed in 30% of those planted out in the research plots (Fig. 1). The remainder continued to spread in a raised mound. The same plant stock was planted out in the Alpine Bed at the RBGV-Melbourne

gardens but did not survive over the two-year period as the plants in the research plots at Cranbourne have. A coarse sand and mulch may be a preferable medium. Three plants were planted out in the Australian Forest Walk near the F Gate Lodge at RBGV-Melbourne. They are in full sun, and a well-watered position in a sandy well drained soil with the addition of mulch. The plants are watered once-twice weekly in summer, but not much additional water is applied in the cooler months. Sadly, all plants died after an extremely sweltering summer in 2019-20.

Environmental conditions: *A. nitidulum* is localised in alpine areas in VIC, NSW and TAS in damp, open grassland communities (VicFlora 2019).

Sun: full sun

Drought tolerance: poor

Flowers: golden flowers appear from Dec-Jan

Growth rate: slow - medium

Germination rate: particularly good

2. *Brachyscome chrysoglossa*

Asteraceae

Yellow-tongue Daisy

Rare and threatened classification

Listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.014 mg
- Seed fill (50%); 20 seed tested
- Dish germination test (20%); 20 seed sown; GA (Gibberellic Acid) pre- treatment
- Cell sowing outcomes (180 seed sown, 13.9% germinated)
- Transplant to tubes (majority surviving to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; **only planted out for seed orcharding**
- Performance in containers; appeared straggly

Species description

Brachyscome chrysoglossa is an erect perennial herb reaching 0.15-0.4 m in height. The species extends from to Horsham to Strathmerton, commonly on clay soils subject to inundation. Yellow flowers appear in June and September to January.

Plant form as seedling: responded reasonably well in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on responded better when first planted out in the research plots.

Suitability for container production and transport

The seed from *Brachyscome chrysoglossa* is easy to collect and will readily fall from the plant when mature and the species survives in pots. However, the poor germination rate, both in the dish germination test and when sown in cells, may limit large-scale horticultural production of this species.



Figure 1. On the left *B. chrysoglossa* growing in a 140ml container. Photo MJ Hirst. A closeup of a RBGV-Melbourne planting in the *Eucalyptus robusta* bed Photo D Roberts. Plants growing in the RBGV-Melbourne F Gate Lodge Photo MJ Hirst.

Suggested horticultural use based on plant performance

Due to the open habit of *Brachyscome chrysoglossa*, the species would be best planted en masse. Applications include use in a perennial border, in a meadow-style planting or in a bush garden. The species occurs on clay soils commonly subject to inundation, however, reliable performance in the outdoor field plots suggests plasticity in tolerance of environmental conditions. *B. chrysoglossa* can survive in a container, although ground planting is preferable. The seed is easy to collect and will fall readily from the plant once mature. Once seed has been collected or after flowering, the plant should be cut back hard to base foliage.

At the same time as the stock went into the research plots twenty tubes were planted by David Roberts in the *Eucalyptus robusta* bed at the RBGV-Melbourne Gardens. According to David they thrive in this location and flower for many months on end, producing a mass of seed. Five additional plantings were made by Gemma Cotterell in the Australian Forest Walk near the F Gate Lodge at RBGV-Melbourne, which faces the hot afternoon sun with limited automated irrigation. It took longer to establish, however after one year the plants are flowering and spreading out. All plants are in full sun, and a well-watered position in a sandy well drained soil with the addition of mulch. The plants are watered once a week in summer, but not much additional water is applied in the cooler months. Three plants remain after a sweltering summer in 2019-20.

Environmental conditions: extends throughout south-eastern Australia, commonly on clay soils subject to inundation (VicFlora 2020).

Sun: full sun

Drought tolerance: good

Flowers: yellow flowers in June and September to January

Growth rate: N/A

Germination rate: poor

3. *Brachyscome tadgellii*

Asteraceae

Creeping Daisy

Rare and threatened classification

Listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.020 mg
- Seed fill (90%); 20 seed tested
- Dish germination test (28%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (200 seed sown, 60.5 % germinated)
- Transplant to tubes (majority surviving to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 60 seedlings planted out in November 2018. Average growth measured on 23/12/18 was 13.71cm.
- Performance in containers; performed well in all container sizes. Flowered



Figure 1 On left a close up of *B. tadgellii* tube stock. On right numerous tube stock of *B. tadgellii* produced. Photos MJ Hirst.

Species description

Brachyscome tadgellii is a clumping perennial herb, growing to 10 cm tall. Leaf form is variable as observed in the nursery tubes (Fig. 2), ranging from thin and linear to almost

succulent, thick, and lobed. White and yellow flowers appear throughout summer and autumn. The species is endemic to the high plains of the Victorian alps, throughout the Dargo High Plains, Mt Hotham, Bogong High Plains and Cobberas.

Plant form as seedling: responded very well in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on responded well in both situations, however flowering occurred more frequently in the outdoor plots

Suitability for container production and transport

The fast growth rate and good germination rate of *Brachyscome tadgellii* is promising for a wide-spread horticultural production. The attractive flowers and good growth in the trial plots are likely to be appealing to the average gardener.



Figure 2 On left three different container sizes tested (200, 140, 125ml). On right leaf variation observed in *B. tadgellii* seedlings. Photo MJ Hirst.

Suggested horticultural use based on plant performance

Brachyscome tadgellii can be used as edging, at the forefront of a mixed border or as drifts in the front of a perennial border. The flowers provide interest throughout summer and autumn if planted in favourable conditions with ample moisture. The species can perform well in a container when watered regularly, however better performance can be expected when planted in the ground. Flower heads should be cut back after seed has been collected. At the same time tube stock was planted into the research plots, stock was planted into the Alpine Bed and the Xanthorrhoea Bed by David Roberts at the RBGV-Melbourne Gardens. Those planted in the moist location within the Alpine Bed have grown well, flowering and producing seed. In situ seedlings have also been observed, however as mentioned by David Roberts it is unlikely this

species holds any weed potential. All planting in the Xanthorrhoea bed died. Ten plants were planted out by Gemma Cotterell in a drift design in the Australian Forest Walk near the F Gate Lodge at RBGV-Melbourne. All plants are in full sun, and a well-watered position in a sandy well drained soil with the addition of mulch. The plants are watered once-twice weekly in summer, but not much additional water is applied in the cooler months. All plants grew well in the first season and flowered. They have been cut back post flowering and continue to thrive after an extremely sweltering summer in 2019-20.

Environmental conditions: endemic to the high plains of the Victorian alps

Sun: full sun

Drought tolerance: poor

Flowers: white and yellow from December to April

Growth rate: fast

Germination rate: good

4. *Craspedia canens*

Asteraceae

Grey Billy-buttons

Rare and threatened classification

Listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): N/A
- Seed fill (100%); 20 seed tested
- Dish germination test (90%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (67 seed sown, 97.1% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; The average growth measured on 4/8/18 was **11.44 cm**.
- Performance in containers; flowered well however difficult to transport given length of flowering stalk.

Species description

Craspedia canens is a clumping perennial herb reaching 0.06 to 0.25 m tall. Tomentose leaves range in colour from grey green to green. Yellow, globose to hemispherical inflorescences appear in spring on peduncles 0.15 to 0.65 m in length. The species is distributed from Queensland to Victoria in grasslands, often bordering swamps. In Victoria, *Craspedia canens* is found only in low altitude grasslands between Cranbourne and Traralgon.



Figure 1 On left *Craspedia canens* in flower in the outdoor research plots. On right, *C. canens* flowering in three different container sizes (200, 140 and 125ml). Photos MJ Hirst.

Plant form as seedling: responded reasonably well in one 100 cell tray under nursery conditions

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on responded equally well in containers and the outdoor plots, however damage occurred to the long flowering stalks when containerised.

Suitability for container production and transport

The large-scale production of *Craspedia canens* is promising due to the fast growth rate and particularly good germination rate. Highly attractive flowers that last throughout spring are desirable to the average gardener. This plant was one of the most popular on sale at the Cranbourne Friends biannual plant sale held in October 2019. It is not easy to transport when in full flower due to the length of the flowering stalk which can be easily damaged.

Suggested horticultural use based on plant performance

Craspedia canens is best planted en masse to produce an attractive show of flowers and support the flower heads, which sometimes can flop over. The species performed really in the trial plots and is suited to a cottage-style, bush or meadow garden planted in drifts as part of a mixed or perennial border. Spent flower heads should be cut back after seed is collected. Plant stock has been growing successfully in dry shade in the *Eucalyptus robusta* Bed and thriving in a moister, sunnier, and less competing location in the Xanthorrhoea Bed at the RBGV-Melbourne Gardens, the two sites planted and

monitored by David Roberts.



Figure 2 *Craspedia canens* growing in the Xanthorrhoea bed at the RBGV Melbourne Photo D Roberts.

Environmental conditions: low altitude grasslands, often bordering swamps, between Cranbourne and Traralgon. Also present in Queensland and New South Wales.

Sun: full sun

Drought tolerance: poor

Flowers: yellow in spring

Growth rate: fast

Germination rate: particularly good

5. *Leptorhynchos orientalis*

Asteraceae

Lanky Buttons

Rare and threatened classification

Listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.006 mg
- Seed fill (90%); 20 seed tested
- Dish germination test (80%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (200 sown, 0.5% germinated)
- Transplant to tubes (high survival to potting on to 125 mm diameter pots)
- Performance in trial beds; **N/A**
- Performance in containers: this species appeared straggly and was not a strong performer overall in containers, however all plants flowered.

Species description

Leptorhynchos orientalis is an erect annual herb growing to 0.3 m tall. The species may be branched, or single stemmed and yellow flowers appear from September to November. Known from several collections made over 90 years ago throughout northern, central, and western Victoria, but currently confined to an open grass woodland in Terrick Terrick National Park in Victoria. Also occurs in woodland and riverine grassland in New South Wales (VicFlora 2020).

Plant form as seedling: responded poorly in the 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well into tubes and consolidated.

Plant form at planting out or potting on no seedlings were planted in the outdoor plots. Flowering occurred in containers.

Suitability for container production and transport

The germination rate of *Leptorhynchos orientalis* was extremely low and, consequentially, could not be tested in the trial plots. The next generation sowing was vastly improved, which is promising if there is the time and resources available to

selectively breed. However, the commercial demand is limited by the straggly appearance in a container and the species is, therefore, only for the Victorian plant enthusiast. This plant, although in full flower, did not sell well at the Cranbourne Friends biannual plant sale held in October 2019.



Figure 1 *Leptorhynchos orientalis* flowering in a 140ml container. Photo MJ Hirst

Suggested horticultural use based on plant performance

Leptorhynchos orientalis is best planted en masse in an annual garden bed. It may be suited to a meadow or grassland garden interspersed with other species; however, the low germination rate limits the self-sustainability of the species.

Environmental conditions: woodland and riverine grasslands

Sun: full sun

Drought tolerance: particularly good

Flowers: yellow from September to November

Growth rate: N/A

Germination rate: poor

6. *Leucochrysum albicans* subsp. *tricolor*

Asteraceae

Hoary Sunray

Rare and threatened classification

Listed as Endangered (E) under the EPBC Act 1999 and listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed):N/A
- Seed fill (100%); 20 seed tested
- Dish germination test (88%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (157 seed sown, 47.8% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 46 seedlings planted out.
- Performance in containers; performed well with flowering occurring within 12 months

Species description

Leucochrysum albicans subsp. *tricolor* is a clumping perennial herb growing to 0.1 m tall. The species is best treated as an annual as it dies back to a rootstock over summer. Foliage is grey and large yellow and white flowers appear in November and February. Flowering can extend through to late March under favourable conditions. The species occurs on volcanic grasslands and once extended throughout Victoria.

Plant form as seedling: did not germinate readily in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on responded well in both situations, however post flowering the foliage turns lots grey and there is considerable die back.

Suitability for container production and transport

Leucochrysum albicans subsp. *tricolor* performs well in a container, however, an average germination rate may limit horticultural production. The plant is attractive,

and flowers are showy, so the species is likely to be popular amongst general gardeners. This plant was one of the most popular on sale at the Cranbourne Friends biannual plant sale held in October 2019.



Figure 1. On left *Leucochrysum albicans* subsp. *tricolor* flowering in a 140ml container. Centre, a species label in the outdoor research plots showing endangered status. On right the different colours observed as the bud opens. Photos MJ Hirst.

Suggested horticultural use based on plant performance

Leucochrysum albicans subsp. *tricolor* is best treated as an annual plant, as it dies back to root stock in summer. The species is suited to planting en masse or as edging in annual displays, either in the ground or containers. The flowers are attractive with differing colour displays as the bud opens to when in full flower, with the open flower resembling a 'fried egg.'

Environmental conditions: volcanic grasslands

Sun: semi shade to full sun

Drought tolerance: good to particularly good

Flowers: white and yellow in November and December (can be prolonged under favourable conditions)

Growth rate: medium

Germination rate: average

7. *Podolepis laciniata*

Asteraceae

High-plain Podolepis

Rare and threatened classification

Listed rare (r) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.072 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (92%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (200 seed sown, 67.5% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 72 seedlings were planted out in November 2018.

The average growth measured on 23/12/18 was **14.31 cm**. An average growth of **2.40 cm** was calculated between mid-summer (23/12/18) and early autumn (4/8/19). Survival was high for the seedlings throughout the 14 months in the trial beds. Limited flowering occurred throughout the period, indicating a minimum two-year period for flowering to occur for most plants.

- Performance in containers: did not flower in first two years however requires transplanting due to size of rosette. Leaves can become damaged when transporting if container is too small.

Species description

Podolepis laciniata is a rosette forming perennial herb growing to 0.7 m high. The species takes a full year as a basal rosette before showing any indication of flowering. Yellow flowers appear in January to February once the plant is two years old. The species is from grassy habitats near the tree-line or below in alpine regions of Victoria.



Figure 1 On left *Podolepis lacinata* in flower in the outdoor research plots. On right three different container sizes (200, 140 and 125ml) of *P. lacinata* prior to flowering. Photos MJ Hirst.

Plant form as seedling: germinated well in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted well with high survival, however predation of rosette was increasingly noticeable over time.

Plant form at planting out or potting on responded well in both situations, however, did not flower in the first two years instead remaining as a basal rosette.

Suitability for container production and transport

Podolepis laciniata may be unsuited to horticultural production due to the slow growth rate, long time to flower and poor suitability for container growth. Once seed can be collected, however, germination rates are good. The large yellow flowers are attractive, and the species may find popularity among garden enthusiasts. This plant did not sell well at the Cranbourne Friends biannual plant sale most likely as it was not in flower at the time.

Suggested horticultural use based on plant performance

Podolepis laciniata can be used as edging in formal plantings or at the fore-front of a mixed/perennial border. Flowering time is short, however, as the basal rosettes provide interest year-round and form good coverage if densely planted. The species performs better when planted in the ground compared to a container. Six tube stock was planted out by David Roberts in the Alpine Bed and the Xanthorrhoea Bed Plant at the RBGV-Melbourne Gardens. All plants across all locations are growing well, indicating an ability to adapt to the different conditions according to David. Seven plants were planted out by Gemma Cotterell in the Australian Forest Walk near the F

Gate Lodge at RBGV-Melbourne. All seven plants are in full sun, and in a well-watered position in a sandy well drained soil with the addition of mulch. The plants are watered once-twice weekly in summer, but not much additional water is applied in the cooler months. All plants grew well in the first season with a decent flower display after an extremely sweltering summer in 2019-20. More flowering is occurring in December 2020.

Environmental conditions: grassy habitat near the tree-line in alpine Victoria, from ~1200-1700 m elevation.

Sun: semi shade to full sun

Drought tolerance: poor

Flowers: yellow in January and February once two years old

Growth rate: slow

Germination rate: good

8. *Podolepis muelleri*

Asteraceae

Small Copper-wire Daisy

Rare and threatened classification

Listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.013 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (30%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (200 seed sown, 5.5% germinated)
- Transplant to tubes (poor survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds: N/A
- Performance in containers: very spindly and weedy in appearance

Species description

Podolepis muelleri is an erect or ascending annual herb reaching 0.05 to 0.22 m. Yellowish, tubular flowers appear from August to October. The species is known from an individual location near Lake Tyrell in Victoria, on gypseous clay loam.



Figure 1. On left flowering tube stock of *Podolepis muelleri* growing at Burnley campus nursery. On right *Podolepis muelleri* growing in a 125ml container. Photos MJ Hirst.

Plant form as seedling: germinated poorly in 100 cell trays under nursery conditions

Plant form at initial transplant: transplanted poorly with low survival; foliage can be brittle and snap easily

Plant form at planting out or potting on this species underperformed in the outdoor research plots and appeared weedy when containerised.

Suitability for container production and transport

The poor germination rate and scraggly appearance of this plant are likely to hinder the success of wide-scale horticultural production. This plant, although in full flower, did not sell well at the Cranbourne Friends biannual plant sale held in October 2019.

Suggested horticultural use based on plant performance

Podolepis muelleri is only for the rare plant enthusiast. The straggly appearance and tendency to flop over is not promising in generating demand. The species could be used to provide seasonal interest in a meadow or bush garden, ensuring there are other plants to provide structure and support. Seed should be collected before the plant is removed, to propagate for planting the following year.

Environmental conditions: scrubland on gypseous clay loam

Sun: semi shade to full sun

Drought tolerance: particularly good

Flowers: yellow in August to October

Growth rate: N/A

Germination rate: poor

9. *Rutidosia leptorhynchoides*

Asteraceae

Button Wrinklewort

Rare and threatened classification

Listed as Endangered (E) under the EPBC Act 1999 and listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.028 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (70%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (200 seed sown, 82.5% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 63 seedlings planted out. An average plant size (width) of **12.74 cm** was measured in 4/8/19.
- Performance in containers: performed well, flowered

Species description

Rutidosia leptorhynchoides is an erect perennial herb to 0.3 m tall. Yellow, button-like flowers appear from November to March. The species originates from basaltic grasslands between Rokewood and Melbourne, where numbers are in decline due to habitat loss.



Figure 1 On left *Rutidosia leptorhynchoides* in flower in the outdoor research plots. On right a 125ml container of *R. leptorhynchoides*. Photos MJ Hirst

Plant form as seedling: germinated well in 100 cell trays under nursery conditions,

best to limit seed to one per cell to avoid over sowing but sow 20% more units.

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on this species performed well in the outdoor research plots and was cut back after flowering to avoid the woody second year stems that become straggly.

Suitability for container production and transport

The particularly good germination rate and fast growth rate of *Rutidosia leptorhynchoides* are great indicators for success in wide-scale production. The species also grows well in containers and is reliable. The attractive basal foliage and array of yellow flowers are desired traits for horticultural use.

Suggested horticultural use based on plant performance

Rutidosia leptorhynchoides performed very well in the outdoor research plots, maintaining healthy basal foliage, and producing a lovely show of yellow flowers. The species performs better when planted in the ground, however, will also grow well in a container. *R. leptorhynchoides* is best planted en masse, as flowering stems are prone to flop over so require the support of neighbouring plants. The species is well suited to a mixed/perennial border a cottage or bush-style garden. Fifteen tube stock was planted out by David Roberts into the Xanthorrhoea Bed in semi shade and a reasonable well-watered position. According to David, the plants thrive here, flowering for months at a time. Fifteen plants were planted out by Gemma Cotterell in the Australian Forest Walk near the F Gate Lodge at RBGV-Melbourne. All plants grow in full sun, and a well-watered position in a sandy well drained soil with the addition of mulch. The plants are watered once-twice weekly in summer, but not much additional water is applied in the cooler months. All plants grew well in the first season after an extremely sweltering summer in 2019-20 and have recommenced flowering in December 2020. Many plants have reshot after dead heading post flowering. A few have self-sown, but not indicating any weedy potential according to Gemma. This plant has performed well and established well in a difficult site in the warmer months.



Figure 2 *Rutidosia leptorhynchoides* in flower in the Xanthorrhoea Bed, RBGV-Melbourne. Photo D Roberts.

Environmental conditions: basaltic grasslands

Sun: semi shade to full sun

Drought tolerance: Good

Flowers: yellow in November to March

Growth rate: fast

Germination rate: particularly good

10. *Xerochrysum palustre*

Asteraceae

Swamp Everlasting

Rare and threatened classification

Listed as Vulnerable (V) under the EPBC Act 1999 and listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.015 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (100%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (200 seed sown, 82.5% germinated)
- Transplant to tubes (very high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 78 seedlings were planted out
- Performance in containers: good



Figure 1 On left *Xerochrysum palustre* growing in the outdoor research plots. On right Two flowering plants in the outdoor plots. Photos MJ Hirst.

Species description

Xerochrysum palustre is a clumping perennial herb to 0.3-1 m. The species originates from lowland swamps on black cracking clay soils between Portland and Bairnsdale.

Golden paper daisy flowers appear from November to March.



Figure 2 On left a close up of a late flowering *Xerochrysum palustre* in the outdoor research plots. On right *Xerochrysum palustre* growing in a 140ml container. Photos MJ Hirst.

Plant form as seedling: germinated well in 100 cell trays under nursery conditions, best to limit seed to one per cell to avoid over sowing.

Plant form at initial transplant: transplanted well with high survival

Plant form at planting out or potting on this species performed well in the outdoor research plots and was cut back after flowering to remove the foliage as it became spotted and looked unhealthy. It spread vigorously via stolons and even appeared in cracks within the confines of the plots. When irrigation was reduced, the plants did not perform as well. This species performed best in the ground versus a container, most likely due to the vegetative spread and high-water usage.

Suitability for container production and transport

Xerochrysum palustre is an ideal candidate for wide-spread horticultural production. The species has a particularly good germination rate and grows well in containers. The reliable performance observed in the trial plots, as well as a robust root system, make this plant ideal for the average gardener. Golden paper daisy flowers are highly attractive and appealing.

Suggested horticultural use based on plant performance

Xerochrysum palustre is well suited to a bog garden or close to a pond. The reliable performance in the trial plots suggests plasticity in environmental tolerances and satisfactory performance may be achieved in an area that receives reliable irrigation through the summer months. The species is best planted en masse to produce a show of yellow flowers over summer. *X. viscosum* also grows well in a container and could be moved to a prominent position when flowering. Seed is easy to collect.

The species post flowering appeared prone to spotting and discolouration (Fig. 3). This

species, according to David Roberts has been previously grown for over 15 years in a well-watered and sheltered position in the Elm and Queensland Box Bed at the RBGV-Melbourne Gardens, however all plants have subsequently died.



Figure 3 On left species label on display in the outdoor research plots. On right a close up of the discolouration in the *X. palustre* foliage observed in the outdoor plots post flowering. Photos MJ Hirst.

11. *Ballantinia antipoda*

Brassicaceae

Southern Shepherd's Purse

Rare and threatened classification

Listed as Endangered (E) under the EPBC Act 1999 and listed as endangered (e) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.004 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (75%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (180 seed sown, 80.6% germinated)
- Transplant to tubes (high survival to potting on to 125 mm diameter pots)
- Performance in trial beds: N/A
- Performance in containers: quick growth and flowering time, typical of an ephemeral life cycle

Species description

Ballantinia antipoda is a prostrate or weakly ascending annual/ephemeral herb reaching 0.1 m high. The species originates from dry stony areas of west-central Victoria.

Plant form as seedling: germinated well in 100 cell trays under nursery conditions, best to limit seed to one per cell to avoid over sowing.

Plant form at initial transplant: difficult to transplant due to the small size of the seedlings. Best to sow directly into container rather than in individual cells.

Plant form at planting out or potting on this species performed well in containers, however due to the fast life cycle this species can germinate and be forming buds within 7 days. This makes this species a difficult plant to grow on with confidence. Seed orcharding has been undertaken with success at the RBGV nursery Melbourne indicating high performance for seed production can occur albeit with a high level of monitoring and labour.

Suitability for container production and transport

Ballantinia antipoda has a particularly good germination rate, which is promising for the horticultural production. However, as an ephemeral the species requires further trialling to establish an appropriate medium to ensure generations can continue producing seed. We are currently exploring mediums for seed germination for in situ field production.



Figure 1 A small container of *Ballantinia antipoda* seedlings (with some bud formation) growing at Burnley campus nursery Photo MJ Hirst.

Suggested horticultural use based on plant performance

Ballantinia antipoda can be used as a ground cover, interspersed with other species to provide full coverage. Based on the natural habitat of *B. antipoda*, the species could also be used in a rockery or stone garden.

Environmental conditions: dry stony areas

Sun: full sun

Drought tolerance: Good

Flowers: white in winter-spring

Growth rate: Not measured

but observed as fast.

Germination rate: high

12. *Drabastrum alpestre*

Brassicaceae

Mountain Cress

Rare and threatened classification

Listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.012 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (92%); 20 seed sown; no pre-treatment
- Cell sowing outcomes (191 seed sown, 11.5% germinated)
- Transplant to tubes (low survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 3 seedlings were planted out in November 2018, the average size of the three plants in 23/12/2018 was **9.95 cm**.
Unfortunately, all three plants died in late summer.
- Performance in containers N/A

Species description

Drabastrum alpestre is an erect herb or subshrub growing to 0.15-0.4 m. The species is known from two locations of dry rocky habitat north of Licola. Unfortunately, all plants in the trial plots died in summer.

Plant form as seedling: germinated poorly in 100 cell trays under nursery conditions.

Plant form at initial transplant: poor survival

Plant form at planting out or potting on this species performed poorly with limited data due to low number produced.

Suitability for container production and transport

The suitability for container production of *Drabastrum alpestre* is limited, due to the poor germination rate and zero survival in the research plots.



Figure 1. A seedling of *Drabastrum alpestre* in the process of transferal from a germination cell to a tube. Photo MJ Hirst.

Suggested horticultural use based on plant performance

Drabastrum alpestre could be used as edging or en masse in perennial/mixed border in a cottage style garden. Based on the natural habitat, *D. alpestre* may also be suited to a rockery garden. The species was trialled in the Alpine Bed at the RBGV-Melbourne Gardens but did not survive beyond two years.

Environmental conditions: dry rocky areas

Sun: full sun

Drought tolerance: Good

Flowers: white in spring-summer

Growth rate: N/A

Germination rate: poor

13. *Wahlenbergia densifolia*

Campanulaceae

Fairy Bluebell

Rare and threatened classification

Listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 100 seed): 0.003 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (90%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (200 seed sown, 38% germinated)
- Transplant to tubes (poor surviving to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 8 seedlings were planted out in November 2018. The average plant size (width) in mid-summer (23/12/2018) was **11.73 cm**.
- Performance in containers N/A

Species description

Wahlenbergia densifolia is an erect perennial herb reaching 0.2 m. The species originates from water-retentive basaltic soils in grasslands and herb fields in the Nunnion Plateau, Dargo High Plain and Cobungra areas (VicFlora 2019). Purplish-blue bell-shaped flowers appear in January and February (Fig. 1).



Figure 1 *Wahlenbergia densifolia* in flower in the outdoor research plots. Photo MJ Hirst

Plant form as seedling: germinated poorly in 100 cell trays under nursery conditions.

Plant form at initial transplant: low survival

Plant form at planting out or potting on this species performed poorly initially in the outdoor plots, however over time the few that remained put on growth and flowered. This species requires some patience with the initial establishment phase, however once settled spreads well and flowers over a fairly long period.

Suitability for container production and transport

The fast growth rate of *Wahlenbergia densiflora* is promising in container production, however further work is required, the average germination rate may be limiting. The species is highly attractive and likely to appeal to many gardeners as a sprawling ground cover.

Suggested horticultural use based on plant performance

Wahlenbergia densiflora is suited to a meadow-style garden, either planted en masse in drifts or interspersed randomly with other meadow species. The bell-shaped, attractive flowers are suited to a cottage-style garden.

Environmental conditions: water-retentive basaltic soils

Sun: full sun

Drought tolerance: Average

Flowers: blue purple from December to February

Growth rate: fast (after initial establishment phase)

Germination rate: average

14. *Lobelia gelida*

Campanulaceae

Snow Pratia

Rare and threatened classification

Listed as Vulnerable (V) under the EPBC Act 1999 and listed as vulnerable (v) under the FFG Act 1988 (original listing as *Pratia gelida*)

Summary data for species

- Average seed weight (x 100 seed): 0.002 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (20%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (187 seed sown, 19.3% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 12 seedlings were planted out in November 2018, and the average size (plant width) was 10.77cm in mid-summer (23/12/18).
- Performance in containers: performed best in containers showing cascading habit and flowering, did not die back as observed in the outdoor plots.

Species description

Lobelia gelida is a mat-forming perennial herb reaching 0.05 m tall. The species is naturally found in heavy dark mud around small pools formed by rainfall or snowmelt, or in stream margins in alpine regions of Victoria (VicFlora 2019). The species dies back over winter as observed in the Research Plots and small white flowers appear from November to February. Substantial root development was observed, and root initiation was observed in the nodes of cascading branches (Fig. 1).



Figure 1. On left a seedling of *Lobelia gelida* in the process of transferal from a germination cell to a tube. On right, cascading foliage of *L. gelida* growing in a tube. Note, rooting observed at the nodes. Photos MJ Hirst

Plant form as seedling: germinated spasmodically in 100 cell trays under nursery conditions.

Plant form at initial transplant: reasonable survival in the outdoor plots, however died back over winter

Plant form at planting out or potting on this species performed best in a 140ml container displaying a cascading habit. Further work is underway to explore vegetative propagation given the unreliable germination rate.

Suitability for container production and transport

Lobelia gelida has a fast growth rate, however, the poor germination rate reduces the likelihood of large-scale container production.



Figure 2 *Lobelia gelida* growing in a 140ml container. Photo MJ Hirst

Suggested horticultural use based on plant performance

Lobelia gelida is only for the Victorian plant enthusiast. The plant forms an interesting groundcover; however, coverage can be sparse and would not form a sufficient weed-suppressing cover. *L. gelida* dies back over winter as observed in the Research Plots, however this did not occur when grown in containers under automated irrigation in the nursery (Fig.2). For seed orcharding purposes it is recommended to keep plants containerised.

Environmental conditions: periphery of small pools formed by rainfall or snowmelt, or stream margins in alpine heathlands

Sun: full sun

Drought tolerance: poor

Flowers: white in November to February

Growth rate: fast

Germination rate: poor

15. *Glycine latrobeana*

Fabaceae

Clover Glycine

Rare and threatened classification

Listed as Vulnerable (V) under the EPBC Act 1999 and listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.453 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (16%); 20 seed sown; scarification pre-treatment
- Cell sowing outcomes (200 seed sown, 30% germinated)
- Transplant to tubes (medium survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 30 seedlings were planted out in November 2018; the average plant size (width) was measured in mid-summer (23/12/18) at **10.95 cm.**
- Performance in containers; performed well with cascading habit

Species description

Glycine latrobeana is a decumbent or ascending perennial herb reaching 0.1 m tall. The species naturally occurs in grasslands and woodlands throughout Victoria, however, is rarely encountered. Purple flowers appear September to December, later in the season at higher altitudes.



Figure 1. A close up of *Glycine latrobeana* plants flowering in containers at Burnley campus nursery. On right three different container sizes (200, 140 and 125ml) of *G. latrobeana*, showing cascading foliage and upright flowering stems. Photos MJ Hirst

Plant form as seedling: germinated spasmodically with overall low numbers in 100 cell trays under nursery conditions.

Plant form at initial transplant: reasonable survival in the outdoor plots, spread quickly

Plant form at planting out or potting on this species performed best in a 140ml container displaying a cascading habit with the foliage whilst the flowers stood upright above the container line, producing a very pleasing effect in combination.

Suitability for container production and transport

Glycine latrobeana grows well in a container and has a fast growth rate, however, the average germination rate may limit production. The species was slow to get started in the trial plots, but produced an attractive array of flowers by spring, which would appeal to many gardeners. This plant was flowering and sold well at the Cranbourne Friends biannual plant sale held in October 2019.

Suggested horticultural use based on plant performance

Glycine latrobeana can be used as a ground cover or edging of a mixed/perennial border. The purple pea flowers suit a cottage-style garden. The species grows well in containers and will eventually trail nicely over the edges. Plants have previously been trialled in the *Eucalyptus melliodora* Bed by David Roberts at the RBGV-Melbourne Gardens, but slowly died off. The same stock growing in the Cranbourne Research plots has been planted out by David in a shady and moist section of the *Eucalyptus*

robusta Bed at the RBGV-Melbourne Gardens and according to David is currently performing well.



Figure 2 *Glycine latrobeana* growing in the *Eucalyptus robusta* bed. Photo D Roberts.

Environmental conditions: grasslands and woodlands

Sun: semi shade to full sun

Drought tolerance: average

Flowers: purple in September to December

Growth Rate: fast

Germination rate: average

16. *Stylidium armeria* subsp. *pilosifolium*

Stylidiaceae

Hairy-leaved Trigger-plant

Rare and threatened classification

Listed as vulnerable (v) under the FFG Act 1988

Summary data for species

- Average seed weight (x 50 seed): 0.040 mg
- Seed fill (100%); 20 seed tested
- Dish germination test (75%); 20 seed sown; GA pre-treatment
- Cell sowing outcomes (163 seed sown, 64.4% germinated)
- Transplant to tubes (high survival to planting out or potting on to 125 mm diameter pots)
- Performance in trial beds; 40 seedlings were planted out in November 2018. The average plant size (width) in mid-summer (23/12/18) was **7.23 cm**.
- Performance in containers: performed very well

Species description

Stylidium armeria subsp. *pilosifolium* is a clumping perennial herb reaching 0.5 to 1 m tall. The species is naturally found on dry, shaly soil in the south-east Macedon Ranges. White or pale pink inflorescences, 5-15 cm long, appear in spring.

Plant form as seedling: germinated spasmodically but reasonably well in 100 cell trays under nursery conditions, the problem being the germination occurred over a long period rather than within 14 days.

Plant form at initial transplant: high survival in the outdoor plots

Plant form at planting out or potting on this species performed equally well in larger containers (> tube size) and in the outdoor plots. Colour changes were observed in the basal rosette from a lime green to pinkish red mainly seen on the leaf margins and the orange to deep red shade of the flowering stalks which remain upright post flowering producing a wonderful effect en masse.



Figure 1 On left the changing colours of the basal rosette of *Styloidium armeria* subsp. *pilosifolium*. Centre a flowering stalk at the outdoor research plots. On right, seedlings of *S. armeria* subsp. *pilosifolium* in the process of transferal from germination cells to tubes. Photos MJ Hirst.

Suitability for container production and transport

Styloidium armeria subsp. *pilosifolium* has a medium growth rate and good germination rate, which are promising in container production. The species is attractive and flower spikes are likely to appeal to a wide range of gardeners.

This plant was one of the most popular on sale at the Cranbourne Friends biannual plant sale held in October 2019.



Figure 2. On left, a flowering *Styloidium armeria* subsp. *pilosifolium* in a 125ml container. On right, the changing colours of *Styloidium armeria* subsp. *pilosifolium* post flowering in the outdoor research plots. Photos MJ Hirst.

Suggested horticultural use based on plant performance

Styloidium armeria subsp. *pilosifolium* is suited to a cottage or meadow-style garden, planted en masse, or interspersed with other species. The attractive flower spike provides seasonal interest and flowering can extend from spring to early autumn under favourable conditions. The red-tinged foliage provides great contrast and year-round interest. The flower stalks retain colour for weeks post seeding providing further interest. Two plants are in the *Eucalyptus robuta* Bed at the RBGV-Melbourne

Gardens. Both plants have flowered and are performing well.

Environmental conditions: dry shaly soils

Sun: semi shade to full sun

Drought tolerance: average

Flowers: pink in September to December (until March in favourable conditions)

Growth Rate: medium

Germination rate: good