

<b>Taxon:</b> <i>Matthiola incana</i> (L.) W. T. Aiton	<b>Family:</b> Brassicaceae
<b>Common Name(s):</b> Brompton stock common stock gilly flower hoary stock ten week stock	<b>Synonym(s):</b> Cheiranthus incanus L.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 16 Nov 2022
<b>WRA Score:</b> 1.0	<b>Designation:</b> EVALUATE	<b>Rating:</b> Evaluate

**Keywords:** Temperate Herb, Annual or Perennial, Naturalized, Self-Fertile, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Low
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	y
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	n
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	Low
	Source(s)	Notes
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Nov 2022]	"Native Asia-Temperate WESTERN ASIA: Cyprus Europe SOUTHEASTERN EUROPE: Bosnia and Herzegovina, Greece, Croatia, Italy (incl. Sardinia, Sicily), Montenegro, Slovenia SOUTHWESTERN EUROPE: France (s. & Corsica)"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Nov 2022]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes

Qsn #	Question	Answer
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Flowering Mar-Jun. Ocean cliffs and bluffs, sandy areas near beaches, roadsides, abandoned gardens; 0-300 m; introduced; Calif., Tex.; Europe; introduced also elsewhere in the New World, Australia." [Low elevation range in the continental U.S.]
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 14 Nov 2022]	"Zone: 7 to 10"
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	Origin/Distribution - It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia. Agroecology - <i>Matthiola incana</i> is a cool climate species, growing best in temperatures of 15–24 °C."

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	" <i>Matthiola incana</i> is a cool climate species, growing best in temperatures of 15–24 °C."

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It has been introduced into the New World and Australia."
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	" <i>Matthiola incana</i> is widely cultivated worldwide for its attractive, highly scented flowers."

301	<b>Naturalized beyond native range</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia."

Qsn #	Question	Answer
	<p>USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a>. [Accessed 14 Nov 2022]</p>	<p>"Naturalized Africa MACARONESIA: Spain [Canarias], Portugal [Azores] NORTHERN AFRICA: Algeria (n.), Libya, Morocco SOUTHERN AFRICA: South Africa [Western Cape] Asia-Temperate WESTERN ASIA: Turkey Australasia AUSTRALIA: Australia [South Australia, Western Australia] NEW ZEALAND: New Zealand Europe NORTHERN EUROPE: United Kingdom EASTERN EUROPE: Ukraine (incl. Krym) SOUTHWESTERN EUROPE: Spain, Portugal Northern America SOUTH-CENTRAL U.S.A.: United States [Texas] SOUTHWESTERN U.S.A.: United States [California] Southern America WESTERN SOUTH AMERICA: Ecuador, Peru SOUTHERN SOUTH AMERICA: Chile"</p>
	<p>Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI</p>	<p>No evidence in the Hawaiian Islands (as of 2019)</p>

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	<p>The Weeds Society of Western Australia. (2022). Western Weeds Database Online Edition. <a href="https://www.wswa.org.au/western_weeds.htm">https://www.wswa.org.au/western_weeds.htm</a>. [Accessed 15 Nov 2022]</p>	<p>"A garden escape, now found in limestone heaths from Cervantes to Mandurah."</p>
	<p>Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall</p>	<p>Classified as a weed in a number of publications. Impacts generally unspecified.</p>
	<p>White, M., Cheal, D., Carr, G. W., Adair, R., Blood, K., Muir, A. and Meagher, D. (2022). Advisory list of environmental weeds in Victoria 2022. Arthur Rylah Institute for Environmental Research. Department of Environment, Land, Water and Planning, Heidelberg, Victoria</p>	<p>Classified as an environmental weed, but with "Rarely significant" impacts on natural systems</p>
	<p>CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a></p>	<p>No impacts specified</p>

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	<p>The Weeds Society of Western Australia. (2022). Western Weeds Database Online Edition. <a href="https://www.wswa.org.au/western_weeds.htm">https://www.wswa.org.au/western_weeds.htm</a>. [Accessed 15 Nov 2022]</p>	<p>[Garden escape with no significant impacts described] "<i>Matthiola incana</i> (stock) is a densely hairy perennial herb, woody at the base, to 1m tall. The leaves are grey-green and linear. The petals are purple, pink or white, 20-30mm long. The fruit is a silique, 4.5 to 16cm long, slightly compressed. Flowers in spring. A garden escape, now found in limestone heaths from Cervantes to Mandurah. Native to western and southern Europe."</p>

Qsn #	Question	Answer
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	No evidence

304	Environmental weed	
	Source(s)	Notes
	Sandercock, R. & Schmucker, P. (2006). Weeds of Concern in the Northern and Yorke Coastal Region. Department for Environment and Heritage, Adelaide SA	" <i>Matthiola incana</i> Common Stock. A perennial herb, to waist high, with narrow leaves at the base of and along the erect, branched stems. Bears large purple, pink or white flowers with 4 rounded petals. Whole plant covered with stellate hairs. Fruit a long, narrow, cylindrical capsule, with two short horns at the top, more or less erect on slender stalks. Not recorded in the coastal region but found around holiday settlements and at Innes National Park." [No significant impacts described]
	White, M., Cheal, D., Carr, G. W., Adair, R., Blood, K., Muir, A. and Meagher, D. (2022). Advisory list of environmental weeds in Victoria 2022. Arthur Rylah Institute for Environmental Research. Department of Environment, Land, Water and Planning, Heidelberg, Victoria	Classified as an environmental weed, but with "Rarely significant" impacts on natural systems

305	Congeneric weed	y
	Source(s)	Notes
	Horst, J. L., Kimball, S., Becerra, J. X., Noge, K., & Venable, D. L. (2014). Documenting the early stages of invasion of <i>Matthiola parviflora</i> and predicting its spread in North America. <i>The Southwestern Naturalist</i> , 59(1), 47-55	[Potential to spread further and impact natural systems] "Habitats likely to be invaded include heavily disturbed areas, especially locations that have experienced a recent change in disturbance regime (Moles et al., 2008). We found <i>M. parviflora</i> in heavily disturbed, roadside habitats and also in an undisturbed natural area. Many of the roadside populations inspected in Tucson in spring 2010 were high-density monocultures. Though it has not yet formed a dense monoculture, it also has spread rapidly through an undisturbed area of a 100-year-old nature preserve over three growing seasons."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Several other species are listed as naturalized and/or weeds

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[No evidence] "Biennials or perennials, rarely annuals; usually densely tomentose. Stems erect, (1-) 2.5-6(-9) dm, (unbranched or branched distally), often tomentose. Basal leaves often in vegetative rosettes. Cauline leaves shortly petiolate or sessile; blade linear-oblongate, narrowly oblong, or lanceolate, (2.5-) 4-16(-22) cm × (5-)8-18(-25) mm (smaller distally), base attenuate to cuneate, margins usually entire or repand, rarely sinuate. Fruiting pedicels ascending, straight or slightly curved, (6-)10-20(-25) mm, thinner than fruit. Flowers: sepals linear-lanceolate to narrowly oblong, 10-15 × 2-3 mm; petals purple, violet, pink, or white, obovate to ovate, 20-30 × 7-15 mm, claw 10-17 mm (margin not crisped), apex rounded or emarginate; filaments 5-8 mm; anthers 3-4 mm. Fruits divaricate-ascending to suberect, latiseptate, (4-)6-12(-15) cm × (3-)4-6 mm; valves densely pubescent; style 1-5 mm; stigma without horns. Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm."

402	Allelopathic	
	Source(s)	Notes
	Brinker, A. M., & Spencer, G. F. (1993). Herbicidal activity of sulforaphene from stock ( <i>Matthiola incana</i> ). Journal of Chemical Ecology, 19(10), 2279-2284	[Potentially] "A herbicidal compound was isolated from extracts of <i>Matthiola incana</i> and identified as sulforaphene (4-methylsulfinyl-3-butenyl isothiocyanate). The ED50 of this compound against velvetleaf seedlings was approximately 2×10 <sup>-4</sup> M. Glucoraphenin, the glucosinolate that is the natural precursor of sulforaphene, was less phytotoxic, with an ED50 of near 6×10 <sup>-3</sup> M." ... "Anecdotal reports (Rice, 1984) indicate that greenhouse soil in which stock ( <i>Matthiola</i> and <i>Malcolmia</i> spp.) has been grown cannot be reused, suggesting that these species might be allelopathic."

403	Parasitic	n
	Source(s)	Notes
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Biennials or perennials, rarely annuals; usually densely tomentose." [Brassicaceae. No evidence]

Qsn #	Question	Answer
404	Unpalatable to grazing animals	y
	Source(s)	Notes
	Wade, G.L. & Mengak, M.T. (2010). Deer-Tolerant Ornamental Plants. Circular 985. University of Georgia Cooperative Extension, Athens, Georgia	"Annuals Deer Rarely Browse" [Includes <i>Matthiola incana</i> ]
	Jull, L.G. (2001). Plants not favored by deer. A3727. University of Wisconsin Extension, Madison, WI	"How can you avoid deer browsing? If deer are hungry enough, they will eat almost anything. However, there are a number of woody and herbaceous plants that deer usually don't find appealing. Many of these plants are listed below, though this list is not definitive as deer preferences vary by region." [Includes <i>Matthiola incana</i> ]
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"Resistance To Challenges: Deer"

405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. (2022). <i>Matthiola incana</i> . <a href="https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana">https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana</a> . [Accessed 15 Nov 2022]	"Known Hazards - None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 14 Nov 2022]	"No serious insect or disease problems."
	Hortipedia. (2022). <i>Matthiola incana</i> . <a href="https://en.hortipedia.com/Matthiola_incana">https://en.hortipedia.com/Matthiola_incana</a> . [Accessed 14 Nov 2022]	"Pests and diseases - Honeydew, galls and distorted leaves are a sign for an infestation with aphids. Use an insecticide or control biologically, e.g. with parasitic wasps or predators such as <i>Aphidoletes aphidimyza</i> . Sudden wilting and pale green discoloration indicate a fungal infection ( <i>phytophthora</i> ). Remove infected plants. Avoid by improving drainage and over-fertilization."
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"There are no serious insect or disease problems."



Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Plants for a Future. (2022). <i>Matthiola incana</i> . <a href="https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana">https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana</a> . [Accessed 15 Nov 2022]	"Known Hazards - None known"
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Seeds contain oil rich in linolenic acid, used for reducing cholesterol levels and increasing fatty acid levels in the plasma."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	" <i>Matthiola incana</i> is a cool climate species, growing best in temperatures of 15–24 °C." [No evidence where native or naturalized. Unlikely to contribute to fire risk relative to grasses and other fire-promoting or fire-adapted species]

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Plants for a Future. (2022). <i>Matthiola incana</i> . <a href="https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana">https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana</a> . [Accessed 15 Nov 2022]	"It cannot grow in the shade."
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It thrives in full sun to light shade and grows best in well- drained, moist, fertile, organic rich soil with a neutral or slightly alkaline pH range."
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"Light: Full sun (6 or more hours of direct sunlight a day) Partial Shade (Direct sunlight only part of the day, 2-6 hours)"
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 14 Nov 2022]	"Sun: Full sun" ... "In St. Louis, it is grown as a cool weather annual in average to humusy, consistently moist, well-drained soils in full sun."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	Notes
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"Soil Texture: Clay High Organic Matter Sand Soil Drainage: Good Drainage Occasionally Wet"
	Plants for a Future. (2022). <i>Matthiola incana</i> . <a href="https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana">https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana</a> . [Accessed 15 Nov 2022]	"Suitable pH: neutral and basic (mildly alkaline) soils. It cannot grow in the shade. It prefers moist soil."

Qsn #	Question	Answer
411	<b>Climbing or smothering growth habit</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Biennials or perennials, rarely annuals; usually densely tomentose."

412	<b>Forms dense thickets</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia." [No evidence]
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Ocean cliffs and bluffs, sandy areas near beaches, roadsides, abandoned gardens; 0-300 m" [No evidence]
	Lohr, M. T., & Keighery, G. (2016). The status and distribution of naturalised alien plants on the islands of the west coast of Western Australia. Conservation Science Western Australia, 10: 1	[No evidence] "Matthiola incana (common stock) – Recorded on Trigg Island in the Swan Region, where it is prioritised as N (A, B). A WA Herbarium record from 1998 notes that it was common on Trigg Island. Garden escape with limited invasive potential."

501	<b>Aquatic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[Terrestrial] "Ocean cliffs and bluffs, sandy areas near beaches, roadsides, abandoned gardens; 0-300 m; introduced; Calif., Tex.; Europe; introduced also elsewhere in the New World, Australia. "

502	<b>Grass</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Nov 2022]	"Genus: Matthiola Family: Brassicaceae (alt. Cruciferae) Tribe: Anchonieae"

503	<b>Nitrogen fixing woody plant</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 14 Nov 2022]	"Genus: Matthiola Family: Brassicaceae (alt. Cruciferae) Tribe: Anchonieae"

Qsn #	Question	Answer
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"A biennial or perennial tomentose herb, 15–75 cm high, unbranched or with sparingly basal branching."

601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	[No evidence] "It is native to the coastal areas of southern and western Europe and has naturalized elsewhere. It has been introduced into the New World and Australia."

602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 15 Nov 2022]	"Plants may also be grown from seed sown outdoors at last spring frost date, or from seed started indoors about 6-8 weeks prior to last frost date. Repeat sowings of seed (e.g., every two weeks) will help extend bloom period in hot summer areas."
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"The plant is readily propagated from seeds."
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"They grow easily from seed and can be sow directly outdoors or started 6-8 weeks before the last frost date. Sow seeds in several two-week intervals to prolong bloom time. They are upright plants with oblong hairy grey-green leaves."

603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Soliman, M. I. (1987). Cytogenetic studies in the genus <i>Matthiola</i> . PhD Dissertation. University of Leicester, Leicester, UK	"Furthermore no hybridization work has been done on the genus and no natural hybrids have been recorded in the literature as far as can be discovered." [Although artificial hybrids produced in this study]

604	<b>Self-compatible or apomictic</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Semeniuk, P. (1958). Effects of Temperature on Seed Production of <i>Matthiola incana</i> (L.) R. Br. <i>Journal of Heredity</i> , 49(4), 161-166	"Because <i>M. incana</i> is naturally self-pollinating and self-fertile, all flowers were allowed to self-pollinate unless stated otherwise."
	Soliman, M. I. (1987). Cytogenetic studies in the genus <i>Matthiola</i> . PhD Dissertation. University of Leicester, Leicester, UK	"Table 29 showing the mean chiasma frequency per bivalent, habit and breeding system of <i>Matthiola</i> species" [ <i>M. incana</i> = + inbreeding]

605	<b>Requires specialist pollinators</b>	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Nobes, S. R., Herreid, J. S., Panter, K. L., & Jabbour, R. (2022). Insect Visitors of Specialty Cut Flowers in High Tunnels. <i>Journal of Economic Entomology</i> , 115(3), 909-913	"Table 1. Timed observation abundances (reported as mean ± standard error) accumulated over the season on each flower species" [Matthiola incana visited by Bumble bees, Other native bees, Wasps & Dipterans]
	Plants for a Future. (2022). Matthiola incana. <a href="https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana">https://pfaf.org/user/Plant.aspx?LatinName=Matthiola+incana</a> . [Accessed 16 Nov 2022]	"The species is hermaphrodite (has both male and female organs) and is pollinated by Bees, Lepidoptera (Moths & Butterflies). The plant is self-fertile."
	Fusco, G. & Minelli, A. (2019). <i>The Biology of Reproduction</i> . Cambridge University Press, Cambridge, UK	"Zoogamous pollination also requires a fairly precise agreement between the dates and times of day when the flowers are open and dates and times when the potential pollinator is active. This concordance is often evident, as in the case of many flowers pollinated by moths, which open their corollas and/or begin to emit their scent only in the evening; an example is the hoary stock ( <i>Matthiola incana</i> )."

606	Reproduction by vegetative fragmentation	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. (2014). <i>Edible Medicinal And Non-Medicinal Plants</i> . Volume 7, Flowers. Springer, Dordrecht	"A biennial or perennial tomentose herb, 15–75 cm high, unbranched or with sparingly basal branching." ... "The plant is readily propagated from seeds."
	NC State Extension. (2022). <i>Matthiola incana</i> . <a href="https://plants.ces.ncsu.edu/plants/matthiola-incana/">https://plants.ces.ncsu.edu/plants/matthiola-incana/</a> . [Accessed 15 Nov 2022]	"A low-maintenance cool-season herbaceous biennial or perennial in the Brassicaceae family. They grow easily from seed and can be sown directly outdoors or started 6-8 weeks before the last frost date. Sow seeds in several two-week intervals to prolong bloom time." [No evidence]

607	Minimum generative time (years)	1
	<b>Source(s)</b>	<b>Notes</b>
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 14 Nov 2022]	" <i>Matthiola incana</i> , commonly called stocks, is grown as a cool weather annual in St. Louis."
	Flora of North America Editorial Committee. (2010). <i>Flora of North America: North of Mexico</i> , Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[1 to 2+ years to maturity] "Biennials or perennials, rarely annuals; usually densely tomentose."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	<b>Source(s)</b>	<b>Notes</b>
	Rollins, R. C. (1993). <i>The Cruciferae of Continental North America: Systematics of the Mustard Family from the Arctic to Panama</i> . Stanford University Press, Stanford, CA	[Occurs along roadsides] "sandy areas behind beaches, ocean bluffs, beach sand dunes, roadsides, old garden areas, escaped from gardens"

Qsn #	Question	Answer
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[Possibly. Seeds lack means of attachment, but occurrence along roadsides suggests some dispersal along heavily trafficked corridors may occur] "Fruits divaricate-ascending to suberect, latiseptate, (4-)6-12(-15) cm × (3-)4-6 mm; valves densely pubescent; style 1-5 mm; stigma without horns. Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm. 2n = 14. Flowering Mar-Jun. Ocean cliffs and bluffs, sandy areas near beaches, roadsides, abandoned gardens"

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"It has been introduced into the New World and Australia."
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	" <i>Matthiola incana</i> is widely cultivated worldwide for its attractive, highly scented flowers."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Crop, Herbal, Ornamental Dispersed by: Humans, Escapee"
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	" <i>Matthiola incana</i> is widely cultivated worldwide for its attractive, highly scented flowers." [No evidence found, despite widespread cultivation]

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Sánchez, J. L., Domina, G., & Caujapé-Castells, J. (2005). Genetic differentiation of three species of <i>Matthiola</i> (Brassicaceae) in the Sicilian insular system. <i>Plant Systematics and Evolution</i> , 253(1), 81-93	"Although the seeds of <i>M. incana</i> are much larger in size than those of <i>M. tricuspidata</i> and <i>M. fruticulosa</i> , they possess narrow wings that permit prolonged flights, and this trait must have facilitated dispersal in <i>ssp. pulchella</i> from Pantelleria."
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[Winged seeds] "Fruits divaricate-ascending to suberect, latiseptate, (4-)6-12(-15) cm × (3-)4-6 mm; valves densely pubescent; style 1-5 mm; stigma without horns. Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm."

Qsn #	Question	Answer
705	<b>Propagules water dispersed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	[In coastal habitats, but not reported to be dispersed in saltwater] "Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm. 2n = 14. Flowering Mar-Jun. Ocean cliffs and bluffs, sandy areas near beaches, roadsides, abandoned gardens"
	Foggi, B., Guidi, T., Capecchi, M., Baldini, R. M., & Grigioni, A. (2009). Biological flora of the Tuscan Archipelago islets (Tyrrhenian Sea). <i>Webbia</i> , 64(1), 23-45	[Wind-dispersed] "Matthiola incana (L.) R. Br. – Chsuffr – Mediterranean – R/S – Entomogamy – Anemochory"

706	<b>Propagules bird dispersed</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Fruits divaricate-ascending to suberect, latiseptate, (4-)6-12(-15) cm × (3-)4-6 mm; valves densely pubescent; style 1-5 mm; stigma without horns. Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm." [Winged seeds presumably adapted for wind dispersal]

707	<b>Propagules dispersed by other animals (externally)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Foggi, B., Guidi, T., Capecchi, M., Baldini, R. M., & Grigioni, A. (2009). Biological flora of the Tuscan Archipelago islets (Tyrrhenian Sea). <i>Webbia</i> , 64(1), 23-45	[Wind-dispersed] "Matthiola incana (L.) R. Br. – Chsuffr – Mediterranean – R/S – Entomogamy – Anemochory"

708	<b>Propagules survive passage through the gut</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Foggi, B., Guidi, T., Capecchi, M., Baldini, R. M., & Grigioni, A. (2009). Biological flora of the Tuscan Archipelago islets (Tyrrhenian Sea). <i>Webbia</i> , 64(1), 23-45	[Wind-dispersed] "Matthiola incana (L.) R. Br. – Chsuffr – Mediterranean – R/S – Entomogamy – Anemochory"

801	<b>Prolific seed production (&gt;1000/m2)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. (2010). Flora of North America: North of Mexico, Volume 7. Magnoliophyta: Salicaceae to Brassicaceae. Oxford University Press, Oxford, UK	"Fruits divaricate-ascending to suberect, latiseptate, (4-)6-12(-15) cm × (3-)4-6 mm; valves densely pubescent; style 1-5 mm; stigma without horns. Seeds orbicular or nearly so, 2.5-3.2 mm diam.; wing 0.2-0.5 mm." [Unknown. Data on seed densities not found]

802	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	21food. (2022). High sprouting rate <i>Matthiola incana</i> seeds 5gram/bags. <a href="https://www.21food.com/products/high-sprouting-rate-matthiola--2194337.html">https://www.21food.com/products/high-sprouting-rate-matthiola--2194337.html</a> . [Accessed 16 Nov 2022]	"Seed longevity: Two years"

Qsn #	Question	Answer
	Royal Botanic Gardens Kew. (2022) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 16 Nov 2022]	"Storage Behaviour: Orthodox Storage Conditions: No loss in viability following 16 years storage at 35-40% r.h. and 4°C (Bass, 1980); seeds not damaged from exposure to liquid nitrogen (Stanwood & Bass, 1981); long-term storage with ultra-dry seeds and -10°C (Gómez-Campo, 1990); long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 14 years; average germination change 97 to 100%, mean storage period 11 years, 2 collections"
	WRA Specialist. (2022). Personal Communication	No data found on seed longevity under natural conditions. Seeds able to be stored for extended periods.

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Missouri Botanical Garden. (2022). <i>Matthiola incana</i> . <a href="http://www.missouribotanicalgarden.org">http://www.missouribotanicalgarden.org</a> . [Accessed 16 Nov 2022]	"This species develops a woody base in areas where it grows as a biennial or short-lived perennial, hence the name of stock."
	WRA Specialist. (2022). Personal Communication	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	Unknown

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Widely cultivated and naturalized (but not in the Hawaiian Islands to date)
- Described as a garden escape, and sometimes as a weed, but negative impacts are unspecified
- In Australia, regarded as an environmental weed of rarely significant impacts on natural systems
- Other species in the genus are invasive weeds
- Potentially allelopathic
- Unpalatable and resistant to deer (and probably other browsing animals)
- Tolerates many soil types
- Reproduces by wind-dispersed seeds
- Self-fertile
- May reach maturity in one growing season (annual life cycle in some environments)
- Seeds dispersed by wind, through intentional cultivation, and potentially through accidental movement

## Low Risk Traits

- Where cultivated, generally regarded as a desirable plant with minimal to negligible impacts
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Grows best in high light environments (dense shade may inhibit spread)

## Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? Unknown. Some sources list it as a weed of landscapes or agriculture, but evidence of impacts has not been found.

(B) Unpalatable to grazers or known to form dense stands? Unpalatable, but not known to form dense stands

Outcome = Evaluate