Taxon: Collinsia heterophylla **Family:** Plantaginaceae

Common Name(s): Chinese houses
innocence

Synonym(s): Collinsia bicolor Benth.

Assessor: Assessor **Status:** Assessor Approved **End Date:** 3 Oct 2014

WRA Score: 7.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Annual, Wildflower, Self-Compatible, Entomophilous, Dehiscent Capsules

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)	Intermediate
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	y
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		
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
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		
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
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	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
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	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	y
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		
704	Propagules adapted to wind dispersal		
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)	y=1, n=-1	y
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**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed]	No evidence

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2014. 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"**	**Intermediate**
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 30 Sep 2014]	"Native: NORTHERN AMERICA Southwestern U.S.A.: United States - California [s.w.] Northern Mexico: Mexico - Baja Norte [n.]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 30 Sep 2014]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Wildflower Information.org. 2006. Chinese Houses - Collinsia heterophylla. http://www.wildflowerinformation.org/Wildflower.asp ID=29. [Accessed 1 Oct 2014]	[Can be grown in >5 hardiness zones] "Zones: 3-10"
	The Watershed Nursery. 2012. Collinsia heterophylla. http://www.watershednursery.com/nursery/plant-finder/collinsia-heterophylla/. [Accessed 1 Oct 2014]	[Elevation range can exceed 1000 m, demonstrating environmental versatility] "Elevation: Between 0 and 1750 meters"

204	**Native or naturalized in regions with tropical or subtropical climates**	**n**
	Source(s)	**Notes**
	DAISIE. 2014. Species Factsheet - Collinsia heterophylla. http://www.europe-aliens.org/speciesFactsheet.do?speciesId=19829#. [Accessed 30 Sep 2014]	"Austria: Alien/Not established Belgium:: Alien/Not established Italy: Alien/Extinct"
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 30 Sep 2014]	"Native: NORTHERN AMERICA Southwestern U.S.A.: United States - California [s.w.] Northern Mexico: Mexico - Baja Norte [n.]"
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Gardenstuff, 2014. Collinsia heterophylla. http://gstuff.co.nz/shop/garden/index.php main_page=product_info&products_id=16. [Accessed]	[Available for sale in New Zealand] "Purple Chinese Houses is an annual plant growing in shady places..."
	DAISIE. 2014. Species Factsheet - Collinsia heterophylla. http://www.europe-aliens.org/speciesFactsheet.do?speciesId=19829#. [Accessed]	[Introduced into Europe] "Austria: Alien/Not established Belgium:: Alien/Not established Italy: Alien/Extinct"
	GrowOrganic.com. 2014. PV Flowering Pollinator Mix. http://www.groworganic.com/pv-flowering-pollinator-mix-lb.html. [Accessed 2 Oct 2014]	Available in wildflower seed mixes

301	**Naturalized beyond native range**	
	Source(s)	**Notes**
	DAISIE. 2014. Species Factsheet - Collinsia heterophylla. http://www.europe-aliens.org/speciesFactsheet.do?speciesId=19829#. [Accessed 30 Sep 2014]	"Austria: Alien/Not established Belgium:: Alien/Not established Italy: Alien/Extinct"

Qsn #	Question	Answer
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Included in lists of naturalized and weedy plants, but no evidence found to support these listings. Otherwise, considered a casual alien or cultivation escape] "Collinsia heterophylla G.Buist ex Graham Scrophulariaceae Cultivated Refs: 7 1220-U, 819-N, 711-UC, 708-UC, 314- CZ, 161-W, 42-C"
	WRA Specialist. 2014. Personal Communication	Randall (2012) lists Collinsia heterophylla as naturalized, and cites DAISIE (2009). Handbook of alien species in Europe. Springer, Dordrecht. ISBN 978-1-4020-8279-5. Chapter 11: List of Species Alien in Europe and to Europe. However, the current DAISIE website does not list C. heterophylla as naturalized.

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as a weed, but cited reference included no information on detrimental impacts of this species.]

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Holm, L. G., Pancho, J.V., Herberger, J.P. & Plucknett, D.L. 1979. A Geographical Atlas of World Weeds. John Wiley and Sons, New York, NY	
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	
	Source(s)	**Notes**
	Holm, L. G., Pancho, J.V., Herberger, J.P. & Plucknett, D.L. 1979. A Geographical Atlas of World Weeds. John Wiley and Sons, New York, NY	[Listed as a weed of unspecified impacts] Collinsia parviflora: "X for Present as a weed (the species is present and behaves as a weed, but its rank of importance is unknown)"

401	Produces spines, thorns or burrs	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 1 Oct 2014]	[No evidence] "Plant 10–50 cm. Leaf: lance-deltate, toothed, often deeply lobed in seedlings. Inflorescence: interrupted, glabrous to hairy, ± glandular; whorls dense; pedicel < calyx. Flower: calyx lobe tips generally acute, glabrous to shaggy-hairy; corolla throat hairy inside, strongly angled to tube, as wide as long, pouch prominent, ± square, upper lip white to lavender or tipped dark violet, wine spotted and generally ± red lined near base, lower lip ± white to rose-purple, lowest lobe generally with darker red tip; upper filaments hairy, basal spur 1–2 mm, curved into pouch. Seed: many, ovate, ± flat. "

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown

403	Parasitic	n
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 1 Oct 2014]	[No evidence of parasitism] "Annual ... "Plant 10–50 cm. Leaf: lance-deltate, toothed, often deeply lobed in seedlings."

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	The Watershed Nursery. 2012. Collinsia heterophylla. http://www.watershednursery.com/nursery/plant-finder/collinsia-heterophylla/. [Accessed 2 Oct 2014]	[Possibly unpalatable] "Deer Resistant"

405	Toxic to animals	n
	Source(s)	**Notes**
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	**n**
	Source(s)	**Notes**
	Gardening Info Zone. 2014. Collinsia. http://www.gardeninginfozone.com/collinsia. [Accessed 2 Oct 2014]	"Pests and diseases: Trouble free."
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	No evidence

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Global Species. 2014. Collinsia heterophylla (purple Chinese houses). http://www.globalspecies.org/ntaxa/857974. [Accessed 2 Oct 2014]	"Allergen Potential [1]: Low"
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence of toxicity

Qsn #	Question	Answer
408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 2 Oct 2014]	[In chaparral, but occurs in shady places & no evidence that this annual contributes significantly to fire fuel loads] "Annual" ,,, "C. heterophylla var. austromontana" ... "Shady places in chaparral, mixed woodland; 300–1700 m. San Gabriel Mountains, San Bernardino Mountains, Peninsular Ranges (Santa Ana Mtns)."

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	**y**
	Source(s)	**Notes**
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	"Distribution: Common in shady woods and many plant communities of cismontane California." ... "Exposure: Partial shade" ... "Chinese houses are ideal for a shaded border or massed among trees and shrubs."
	Wiese, K. 2013. Sierra Nevada Wildflowers. Morris Book Publishing, Kearney, NE	"Habitat/Range: Shady places in chaparral and foothill woodland, below 4,300' "
	Munz, P.A. 1961. California Spring Wildflowers, from the Base of the Sierra Nevada and Southern Mountains to the Sea.University of California Press, Berkeley and Los Angeles, CA	"It frequents shaded places below 2,500 feet, from Humboldt and Shasta counties to Lower California and flowers from March to June."

Qsn #	Question	Answer
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wildflower Information.org. 2006. Chinese Houses - Collinsia heterophylla. http://www.wildflowerinformation.org/Wildflower.asp ID=29. [Accessed 1 Oct 2014]	"Soil preference: Adaptable but perfers rich, moist soil."
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	"Soil: Adaptable"

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 1 Oct 2014]	"Plant 10–50 cm. Leaf: lance-deltate, toothed, often deeply lobed in seedlings."

412	Forms dense thickets	y
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	"Collinsia heterophylla often forms dense populations with hundreds to thousands of individuals, with individuals varying in size from short plants on thin, drier soils to taller plants on moister shady microhabitats, and populations can be harder to find during years with low precipitation."

501	Aquatic	n
	Source(s)	**Notes**
	Wiese, K. 2013. Sierra Nevada Wildflowers. Morris Book Publishing, Kearney, NE	[Terrestrial wildflower] "Habitat/Range: Shady places in chaparral and foothill woodland, below 4,300' "

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 30 Sep 2014]	"Family: Plantaginaceae tribe: Cheloneae. Also placed in: Scrophulariaceae Veronicaceae "

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 30 Sep 2014]	"Family: Plantaginaceae tribe: Cheloneae. Also placed in: Scrophulariaceae Veronicaceae"

Qsn #	Question	Answer
504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 1 Oct 2014]	"Plant 10–50 cm. Leaf: lance-deltate, toothed, often deeply lobed in seedlings. Inflorescence: interrupted, glabrous to hairy, ± glandular; whorls dense; pedicel < calyx. Flower: calyx lobe tips generally acute, glabrous to shaggy-hairy; corolla throat hairy inside, strongly angled to tube, as wide as long, pouch prominent, ± square, upper lip white to lavender or tipped dark violet, wine spotted and generally ± red lined near base, lower lip ± white to rose-purple, lowest lobe generally with darker red tip; upper filaments hairy, basal spur 1–2 mm, curved into pouch."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	[No evidence] "Distribution: Common in shady woods and many plant communities of cismontane California."

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	"Seeds sown in fall will bloom in April and May, and they will self-sow in favorable conditions."

603	**Hybridizes naturally**	**y**
	Source(s)	**Notes**
	Garber, E. D. 1960. The Genus Collinsia IX. Cytologia, 25 (2), 233 243	"Collinsia heterophylla and C. sparsiflora have been involved in more successful interspecific hybridizations than any other species in their respective groups."

604	**Self-compatible or apomictic**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Mayer, S. S., Charlesworth, D., & Meyers, B. 1996. Inbreeding depression in four populations of Collinsia heterophylla Nutt (Scrophulariaceae). Evolution 50(2): 879-891	"Abstract.-The effects of one and two generations of inbreeding were studied in plants from four natural populations of the annual plant, Collinsia heterophylla, using inbred and outcrossed plants generated by hand pollinations to create expected inbreeding coefficients ranging from 0-0.75. The selfing rates of the populations were estimated using allozyme markers to range from 0.37-0.69. Inbreeding depression was mild, ranging from 5-40%, but significant effects were detected for characters measured at all stages of the life cycle. Fitness components declined significantly with the inbreeding coefficient, and regression of fitness characters on inbreeding coefficients gave no evidence of any strongly synergistic effects attributable to the different genetic factors that contribute to decline in fitness under inbreeding. The magnitude of inbreeding depression did not clearly decrease with the populations' levels of inbreeding. This is not surprising because the selfing rates are similar enough that it is unlikely that the populations have been characterized for long periods of time by these different inbreeding levels."
	Weil, J., & Allard, R. W. 1964. The mating system and genetic variability in natural populations of Collinsia heterophylla. Evolution, 18(4): 515-525	"In the course of the genetic investigations of Carmine and Red Flush, the observation of Hiorth (1930) that there is no self-incompatibility in C. heterophylla was corroborated. It was observed, however, that in the absence of insect vectors and manual pollination seed set was often poor."

605	Requires specialist pollinators	y
	Source(s)	**Notes**
	Fenster, C. B., Armbruster, W. S., Wilson, P., Dudash, M. R. & Thomson, J. D. 2004. Pollination syndromes and floral specialization. Annual Review of Ecology, Evolution, and Systematics 35: 375-403	[Pollinated by large-bodied, long-tongued bees] "The pollination syndrome concept implies that specialization onto functional groups is a common occurrence in plant evolution. Thus, a plant has specialized pollination if it is successfully pollinated only by a subset of functionally grouped potential pollinators; such plants are also said to occupy pollination niches (Beattie 1971, Armbruster et al. 1994, Gomez & Zamora 1999). For example, some would describe Collinsia heterophylla as generalized because it is pollinated by some 14 species of animals, yet it is more cogently viewed as specialized onto a functional group of large-bodied, long-tongued bees in a community that contains potential pollinators of much greater functional disparity (Armbruster et al. 2002)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Park, M.S. & Neese, E.C. 2013. Collinsia, in Jepson Flora Project (eds.) Jepson eFlora, http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=19994. [Accessed 1 Oct 2014]	[Annual. No evidence of vegetative spread] "Annual ... " ... "Plant 10–50 cm. Leaf: lance-deltate, toothed, often deeply lobed in seedlings."

607	Minimum generative time (years)	1
	Source(s)	**Notes**

Qsn #	Question	Answer
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	[Annual wildflower] "Seeds sown in fall will bloom in April and May, and they will self-sow in favorable conditions ... Seeded in late spring, plants will bloom about September."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	[Unknown. No means of external attachment, but small size could allow for adherence to vehicles or footwear in mud or soil] "Seed: oblong, ovoid, or ± like grains of sand, (1.1–)1.6–2 × 1–1.3(–1.6) mm, dark brown, surface conspicuously shallowly netlike"

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	GrowOrganic.com. 2014. PV Flowering Pollinator Mix. http://www.groworganic.com/pv-flowering-pollinator-mix-lb.html. [Accessed 1 Oct 2014]	[Chinese Houses = Collinsia heterophylla. Sold in commercial seed mix] "Annuals and Biennial Open Pollinated. Attracts a wide range of insects and pollinators. Contains: Arroyo Lupine, Golden Lupine, Chinese Houses, Five Spot, California Poppy, Lacey Phacelia, Baby Blue Eyes, Dwarf Sunflower, White Alyssum, Globe Gilia, Tidy Tips, Bird's Eyes, and Primrose. 1/4 lb covers approximately 500 sq ft if broadcast."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	Oyegbile, M. B. 2011. Phenotypic and genotypic variations in floral traits that affect mating system of Collinsia heterophylla PhD Dissertation. University of Portsmouth, Portsmouth, UK	[Unknown. Small size could result in inadvertent dispersal and contamination of soil or plant materials growing in the vicinity] "The seed capsules of the treatment (cross pollinated flower) were bagged a few days before they were ripe, in order to avoid losing any seeds; because Collinsia heterophylla capsule break open to disperse their seeds (explosive mechanism)."

704	Propagules adapted to wind dispersal	
	Source(s)	**Notes**
	Oyegbile, M. B. 2011. Phenotypic and genotypic variations in floral traits that affect mating system of Collinsia heterophylla PhD Dissertation. University of Portsmouth, Portsmouth, UK	[Unknown. No specific adaptations, but wind likely facilitates the passive dispersal of the small seeds] "...Collinsia heterophylla capsule break open to disperse their seeds (explosive mechanism)."

Qsn #	Question	Answer
705	**Propagules water dispersed**	
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	[Small size may allow for some dispersal by overland flow of water following heavy rains] "Seed: oblong, ovoid, or ± like grains of sand, (1.1−)1.6–2 × 1–1.3(–1.6) mm, dark brown, surface conspicuously shallowly netlike..."

706	**Propagules bird dispersed**	**n**
	Source(s)	**Notes**
	Oyegbile, M. B. 2011. Phenotypic and genotypic variations in floral traits that affect mating system of Collinsia heterophylla PhD Dissertation. University of Portsmouth, Portsmouth, UK	[Not fleshy-fruited] "...Collinsia heterophylla capsule break open to disperse their seeds (explosive mechanism)."

707	**Propagules dispersed by other animals (externally)**	
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	[Unknown. No means of external attachment, but small size could allow for attachment to animals in mud stuck to fur, or feet] "Seed: oblong, ovoid, or ± like grains of sand, (1.1−)1.6–2 × 1–1. (–1.6) mm, dark brown, surface conspicuously shallowly netlike..."

708	**Propagules survive passage through the gut**	
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	[Unknown, but capsular fruit presumably not adapted for zoochory] "Fruit: capsule, loculicidal and septicidal (2-valved appearing 4-valved), to 20-seeded, subspheroid, 4.5−5 × 4–4.5 mm, pale brown, when immature sometimes with slightly bulging seeds. Seed: oblong, ovoid, or ± like grains of sand, (1.1−)1.6–2 × 1–1.3(–1.6) mm, dark brown, surface conspicuously shallowly netlike"

801	**Prolific seed production (>1000/m2)**	**y**
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	[Likely yes in dense populations] "Seed: oblong, ovoid, or ± like grains of sand, (1.1−)1.6–2 × 1–1.3(–1.6) mm, dark brown..." ... "Collinsia heterophylla often forms dense populations with hundreds to thousands of individuals, with individuals varying in size from short plants on thin, drier soils to taller plants on moister shady microhabitats, and populations can be harder to find during years with low precipitation. Within a population can be found flower variants in the purple colors, and rarely one will encounter an individual that produces totally white flowers. Fruit set is particularly high, and a single raceme may produce more than five hundred seeds, a level which probably ensures that the seed bank is fully replenished for years."

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Santa Monica Mountains NRA. 2014. Wildflowers of the Santa Monica Mountains National Recreation Area. http://www.smmflowers.org/bloom/bloom.htm. [Accessed 3 Oct 2014]	"Fruit set is particularly high, and a single raceme may produce more than five hundred seeds, a level which probably ensures that the seed bank is fully replenished for years."
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/. [Accessed 3 Oct 2014]	"Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 16 years; average germination change 96 to 97.5%, mean storage period 14 years, 2 collections"

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species, & generally regarded as a desirable plant where grown.

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	Schmidt, M.G. & Greenberg, K.L. 2012. Growing California Native Plants, Second Edition: Expanded and Updated. University of California Press, Berkeley and Los Angeles, CA	[Tolerates removal of inflorescences] "When plants are robust, they can be sheared back for a second flowering."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
- Elevation range exceeds 1000 m, and can grow in >5 hardiness zones demonstrating environmental versatility
- Possibly Naturalized outside native range
- Shade tolerant
- Tolerates many soil types
- Forms dense stands in native range
- Self-compatible
- Able to hybridize with other Collinsia species
- Able to reach maturity in <1 year (annual herb)
- Seeds dispersed passively by dehiscence & intentionally by people
- Small seeds could possibly be accidentally dispersed
- Capable of prolific seed production
- Seeds able to be stored for extended periods and show dormancy. May form a persistent seed bank
- Limited ecological information, particularly on dispersal vectors, makes accurate risk prediction difficult

Low Risk Traits
- Despite possible naturalization, no reports of negative impacts documented
- Mediterranean to temperate climate species (may only become established at higher elevations in the tropics)
- Unarmed (no spines, thorns or burrs)
- No reports of toxicity
- Ornamental
- Beneficial to bees and other pollinators
- Not reported to spread vegetatively