

Taxon: <i>Veronica persica</i> Poir.	Family: Plantaginaceae
Common Name(s): birdeye speedwell bird's-eye common field speedwell creeping speedwell creeping veronica large field speedwell Persian speedwell winter speedwell	Synonym(s): Veronica agrestis L. var. byzantina Sm. Veronica byzantina (Sibth. & Sm.) Britton et al. Veronica tournefortii C. C. Gmel.

Assessor: Chuck Chimera	Status: Approved	End Date: 14 Jun 2024
WRA Score: 11.5	Designation: H(HPWRA)	Rating: High Risk

Keywords: Annual Herb, Naturalized, Crop Weed, 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	y
204	Native or naturalized in regions with tropical or subtropical climates	y = 1, n = 0	y
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	y = 1*multiplier (see Appendix 2), n = 0	y
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	y
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	n
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	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	n
405	Toxic to animals	y = 1, n = 0	n

Qsn #	Question	Answer Option	Answer
406	Host for recognized pests and pathogens	y = 1, n = 0	y
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		
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	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	y = 1, n = -1	n
604	Self-compatible or apomictic	y = 1, n = -1	y
605	Requires specialist pollinators	y = -1, n = 0	n
606	Reproduction by vegetative fragmentation		
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	y
704	Propagules adapted to wind dispersal	y = 1, n = -1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y = 1, n = -1	y
707	Propagules dispersed by other animals (externally)	y = 1, n = -1	y
708	Propagules survive passage through the gut	y = 1, n = -1	y
801	Prolific seed production (>1000/m ²)	y = 1, n = -1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y = 1, n = -1	y
803	Well controlled by herbicides	y = -1, n = 1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y = 1, n = -1	n
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
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence of domestication] "Naturalized in waste fields and roadsides; below 1700 m. Anhui, Fujian, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, W Xinjiang (Yining Xian), E Xizang, Yunnan, Zhejiang [native to SW Asia and since the 19th century spread over most of the world]."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2024). 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
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch . [Accessed 12 Jun 2024]	"Naturalized REGION: Asia-Temperate CHINA: China [Anhui Sheng, Fujian Sheng, Guangxi Zhuangzu Zizhiqu, Guizhou Sheng, Hubei Sheng, Hunan Sheng, Jiangsu Sheng, Jiangxi Sheng, Xinjiang Uygur Zizhiqu (w.), Xizang Zizhiqu (e.), Yunnan Sheng, Zhejiang Sheng] EASTERN ASIA: Taiwan Other (probable origin s.w. Asia)"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch . [Accessed 12 Jun 2024]	"Naturalized REGION: Asia-Temperate CHINA: China [Anhui Sheng, Fujian Sheng, Guangxi Zhuangzu Zizhiqu, Guizhou Sheng, Hubei Sheng, Hunan Sheng, Jiangsu Sheng, Jiangxi Sheng, Xinjiang Uygur Zizhiqu (w.), Xizang Zizhiqu (e.), Yunnan Sheng, Zhejiang Sheng] EASTERN ASIA: Taiwan Other (probable origin s.w. Asia)"

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Flora of North America Editorial Committee. (2019). Flora of North America: 17: Magnoliophyta: Tetrachondraceae to Orbobanchaceae. Oxford University Press, Oxford, UK	"Elevation: 0-500(-2000) m." [Broadly distributed in North America with a potential elevation range of 2000 m]

Qsn #	Question	Answer
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	"Their phenotypic plasticity is enormous; in favourable environmental circumstances, plants branch very strongly (see also HARRIS & LOVELL 1980 a)."
	Hardiness.zone. (2024). <i>Veronica persica</i> . https://hardiness.zone/plant/?sle=Veronica&art=persica . [Accessed 13 Jun 2024]	[>5 hardiness zones] " <i>Veronica persica</i> is a annual in the Plantaginaceae family. It's registered as winter hardy at USDA zone 4 and higher. It typically grows around 20 cm tall. The origin of this species is Asia."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. <i>Flora of China</i> . Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Broad elevation range and distribution] "Naturalized in waste fields and roadsides; below 1700 m. Anhui, Fujian, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, WXinjiang (Yining Xian), E Xizang, Yunnan, Zhejiang [native to SW Asia and since the 19th century spread over most of the world]."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. <i>Bishop Museum Occasional Papers</i> 156: 71-110	[Hawaii island] " <i>Veronica persica</i> was found during a roadside grass survey on Hawai'i Island, where it was naturalized on a roadside in Waimea."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Flora of North America Editorial Committee. (2019). <i>Flora of North America: 17: Magnoliophyta: Tetrachondraceae to Orbobanchaceae</i> . Oxford University Press, Oxford, UK	"Introduced; Alta., B.C., Man., N.B., Nfld. and Labr. (Nfld.), N.W.T., N.S., Ont., P.E.I., Que., Sask., Ala., Alaska, Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Kans., Ky., La., Maine, Md., Mass., Mich., Minn., Miss., Mo., Mont., Nebr., Nev., N.H., N.J., N.Mex., N.Y., N.C., Ohio, Okla., Oreg., Pa., R.I., S.C., S.Dak., Tenn., Tex., Utah, Vt., Va., Wash., W.Va., Wis., Wyo., sw Asia, introduced also in Mexico (Michoacán, Veracruz), Central America, South America, Eurasia, e Asia, Africa, Atlantic Islands, Pacific Islands, Australia."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. <i>Flora of China</i> . Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"native to SW Asia and since the 19th century spread over most of the world"

301	Naturalized beyond native range	y
	Source(s)	Notes
	Flora of North America Editorial Committee. (2019). <i>Flora of North America: 17: Magnoliophyta: Tetrachondraceae to Orbobanchaceae</i> . Oxford University Press, Oxford, UK	"Introduced; Alta., B.C., Man., N.B., Nfld. and Labr. (Nfld.), N.W.T., N.S., Ont., P.E.I., Que., Sask., Ala., Alaska, Ariz., Ark., Calif., Colo., Conn., Del., D.C., Fla., Ga., Idaho, Ill., Ind., Iowa, Kans., Ky., La., Maine, Md., Mass., Mich., Minn., Miss., Mo., Mont., Nebr., Nev., N.H., N.J., N.Mex., N.Y., N.C., Ohio, Okla., Oreg., Pa., R.I., S.C., S.Dak., Tenn., Tex., Utah, Vt., Va., Wash., W.Va., Wis., Wyo., sw Asia, introduced also in Mexico (Michoacán, Veracruz), Central America, South America, Eurasia, e Asia, Africa, Atlantic Islands, Pacific Islands, Australia."
	Wu, Z. Y., & P. H. Raven, (eds). 1998. <i>Flora of China</i> . Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Naturalized in waste fields and roadsides; below 1700 m. Anhui, Fujian, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, WXinjiang (Yining Xian), E Xizang, Yunnan, Zhejiang [native to SW Asia and since the 19th century spread over most of the world]."

Qsn #	Question	Answer
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	" <i>Veronica persica</i> was found during a roadside grass survey on Hawai'i Island, where it was naturalized on a roadside in Waimea. The area was not exhaustively surveyed, but approximately 10 plants were found along approximately 200 m of mowed roadside. <i>Veronica persica</i> is native to the Middle East but is now naturalized throughout much of the world (Albach 2019). It is associated with disturbed areas such as gardens, lawns, fields, and roadsides."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Bojňanský, V. & Fargašová, A. (2007). Atlas of Seeds and Fruits of Central and East-European Flora: The Carpathian Mountains Region. Springer, Dordrecht, The Netherlands	"Native to Asia, weedy places, wastelands, common in cultivated lands as a weed; in the Carpathians hauling and naturalized."
	Zhenghao Xu & Le Chang. (2017). Identification and Control of Common Weeds: Volume 3. Zhejiang University Press, Hangzhou and Springer Nature Singapore	[Disturbance, lawn and agricultural weed] "Habitat Naturalized in waste fields, fields, villages, roadsides, lawns, wetlands. Ecology <i>Veronica persica</i> usually establishes an advantageous population in the fields or roadsides, especially in fertile, moist habitats. Harmfulness A noxious weed in uplands, lawns, vegetables, fields. It acts as a host of harmful pathogens and insects, such as Cucumber mosaic virus, Plum pox virus, <i>Aphanomyces cladogamus</i> , and aphid."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	Zhenghao Xu & Le Chang. (2017). Identification and Control of Common Weeds: Volume 3. Zhejiang University Press, Hangzhou and Springer Nature Singapore	"Harmfulness A noxious weed in uplands, lawns, vegetables, fields. It acts as a host of harmful pathogens and insects, such as Cucumber mosaic virus, Plum pox virus, <i>Aphanomyces cladogamus</i> , and aphid."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	" <i>V. persica</i> is a weed of 27 crops in 45 countries (Figure 104-4). It is a serious or principal weed of cereals in Italy and Sweden; beets and potatoes in Germany; horticultural crops in England; oilseed rape in Sweden; sugar beets in Czechoslovakia, England, and Poland; sunflowers in Argentina; vegetables in Germany and England; and wheat in Iran. It is a common weed of barley in Peru; cereals in Bulgaria, Ecuador, England, France, Germany, the Netherlands, and Scotland; maize in Colombia and Ecuador; flax, potatoes, oilseed rape, sugar beets, and sunflower in France; horticultural crops in the Netherlands; oats in India; orchards in Turkey and Uruguay; vegetables in Hungary and Tasmania; and wheat in Colombia and Peru. <i>V. persica</i> is also an unranked weed of the following: barley in Colombia; edible beans in England; beets in France and Italy; cereals in Poland; coffee in Mexico; luceme in Italy and the United States; orchards in Argentina, Bolivia, and Spain; potatoes in Belgium and Colombia; oilseed rape in England and Japan; sugarcane in Australia; tobacco in Argentina; vegetables in Argentina, Australia, Iran, New Zealand, and Switzerland; vineyards in Bulgaria and the former Soviet Union; and wheat in Belgium, Czechoslovakia, England, Italy, and Japan."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	" <i>Veronica persica</i> ... Weed of: Canola, Carrots, Cereals, Grapevines, Orchards & Plantations, Pastures, Vegetables"

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Canola, Carrots, Cereals, Grapevines, Orchards & Plantations, Pastures, Vegetables" [A few citations as an environmental weed, but primarily a disturbance or agricultural weed]

Qsn #	Question	Answer
	Susheela, K. & Sathyanarayana, N. (2015). Illustrative Guide for Detection & Identification of Regulated Weeds. National Institute of Plant Health Management, Rajendranagar, Hyderabad	[Disturbance and agricultural weed] "Gardens, landscaped areas, turf, orchards, vineyards, crop fields, roadsides, and other disturbed sites."
	White, M., Cheal, D., Carr, G. W., Adair, R., Blood, K. and Meagher, D. (2018). Advisory list of environmental weeds in Victoria. Arthur Rylah Institute for Environmental Research Technical Report Series No. 287. Department of Environment, Land, Water and Planning, Heidelberg, Victoria	Veronica persica - Impact on natural systems = Rarely significant [Species naturalised in native vegetation, but causing minimal disruption to ecological processes, losses to biodiversity are minimal or their presence is transient.]

305	Congeneric weed	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Veronica agrestis ... Weed of: Cereals, Orchards & Plantations, Pastures, Potatoes"; "Veronica anagallis ... Weed of: Cereals"; "Veronica anagallis-aquatica ... Weed of: Cereals, Orchards & Plantations, Pastures"; "Veronica anagalloides ... Weed of: Cereals"; "Veronica arvensis ... Weed of: Canola, Cereals, Nursery Production, Orchards & Plantations, Pastures, Vegetables"; "Veronica austriaca ... Weed of: Pastures"; "Veronica beccabunga ... Weed of: Cereals, Pastures"; "Veronica bellidioides ... Weed of: Pastures"; "Veronica biloba ... Weed of: Cereals, Orchards & Plantations, Pastures, Pome Fruits"; "Veronica campylopoda ... Weed of: Cereals, Orchards & Plantations"; "Veronica catenata ... Weed of: Pastures"; "Veronica chamaedrys ... Weed of: Carrots, Cereals, Orchards & Plantations, Pastures, Vegetables"; "Veronica crassifolia ... Weed of: Pastures"; "Veronica cymbalaria ... Weed of: Cereals"; "Veronica didyma ... Weed of: Cereals, Orchards & Plantations, Pome Fruits"; "Veronica dillenii ... Weed of: Cereals"; "Veronica filiformis ... Weed of: Pastures"; "Veronica hederifolia ... Weed of: Bulbs, Canola, Cereals, Cutflowers, Nursery Production, Orchards & Plantations, Vegetables"; "Veronica jacquinii ... Weed of: Pastures"; "Veronica javanica ... Weed of: Cereals"; "Veronica longifolia ... Weed of: Cereals"; "Veronica officinalis ... Weed of: Cereals, Vegetables"; "Veronica opaca ... Weed of: Cereals"; "Veronica pectinata L. var. pectinate ... Weed of: Cereals"; "Veronica peduncularis ... Weed of: Orchards & Plantations"; "Veronica peregrina ... Weed of: Nursery Production, Pastures, Vegetables"; "Veronica peregrina L. subsp. xalapensis ... Weed of: Grapevines, Orchards & Plantations, Pome Fruit"; ... "Veronica polita ... Weed of: Canola, Cereals, Orchards & Plantations, Pastures, Vegetables"; "Veronica praecox ... Weed of: Cereals"; "Veronica prostrata ... Weed of: Pastures"; "Veronica ramosissima ... Weed of: Cereals"; "Veronica reuterana ... Weed of: Cereals"; "Veronica scutellata ... Weed of: Cereals"; "Veronica serpyllifolia ... Weed of: Cereals, Pastures, Vegetables"; "Veronica spicata ... Weed of: Cereals, Pastures"; "Veronica teucrium ... Weed of: Pastures"; "Veronica triphyllos ... Weed of: Cereals, Pastures"; "Veronica verna ... Weed of: Cereals, Pastures"

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

Qsn #	Question	Answer
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence] "Annuals, sometimes biennials. Stems diffuse, ca. 10-20 cm tall, 20-50 cm, densely pubescent with multicellular hairs often more densely so along 2 lines. Opposite leaves in (2 or)3 or 4(or 5) pairs; petiole 1-8 mm; leaf blade ovate-lanceolate to suborbicular, (6 -)10-20(-25) X (5-)8-15(-20) mm, evenly sparsely pubescent on both surfaces, margin flat, obtusely crenate-serrate, 3-6(-10)-toothed per side. Racemes terminal, lax, very long; bracts alternate, leaflike, petiolate, uppermost ones smaller than others. Fruiting pedicel (1.2 -)1.5-3(-4) cm, usually longer than bract. Calyx 4-lobed; lobes ovate-lanceolate, 5-8(-10) X 2.5-3.5(-4) mm in fruit, sparsely pubescent, veins 3. Corolla usually blue, rotate, 0.8-1.4 cm in diam., throat sparsely hairy; lobes ovate to orbicular. Stamens slightly shorter than corolla. Capsule obcordate, strongly compressed, 4-6 X 6-9 mm, apically notched at right to obtuse angle; lobes obtuse, glandular hairy, venation conspicuously reticulate. Style 2-3 mm, exserted. Seeds slightly navicular, usually 1.4-2.3 X 0.9-1.6 mm; seed coat deeply rugose dorsally. Fl. Mar-May. 2n = 28."

402	Allelopathic	
	Source(s)	Notes
	Li, Z. R., Liu, Y. B., Zhou, X. M., Li, X. G., & Bai, L. Y. (2019). Allelopathic herbicidal effects of crude ethanolic extracts of <i>Veronica persica</i> (Lour.) Merr. on weeds. <i>Allelopathy Journal</i> , 46(1), 85-96	[Extracts exhibit allelopathic effects] "We investigated the herbicidal activity of ethanolic extracts of <i>Veronica persica</i> (Lour.) Merr. against four weeds (<i>Echinochloa crusgalli</i> (L.) Beauv., <i>Beckmannia syzigachne</i> (Steud.) Fern., <i>Leptochloa chinensis</i> (L.) Nees and <i>Lindernia procumbens</i> (Krock.)). The chemical constituents of <i>V. persica</i> were identified using gas chromatography-mass spectrometry (GC-MS). The possible inhibitory mechanisms of the ethanolic <i>V. persica</i> (Lour.) Merr. extracts to <i>E. crusgalli</i> (L.) Beauv. were evaluated by comparing the activities of catalase (CAT), peroxidase (POD) and superoxide dismutase (SOD) enzymes. Lower extract concentrations (50 and 100 µg/mL) were less inhibitory than higher concentrations (150 and 300 µg/mL). The allelopathic herbicidal effects of <i>V. persica</i> (Lour.) Merr. on the 4-test weeds followed the order: <i>L. chinensis</i> (L.) Nees, <i>L. procumbens</i> (Krock.) Philcox, <i>B. syzigachne</i> (Steud.) Fern., <i>E. crusgalli</i> (L.) Beauv. Twenty-one compounds were identified in the ethanolic extracts, of which 9,12,15-octadecatrienoic acid (EC ₅₀ =0.65 µg/mL) was the major component, followed by 4-compounds [9,12-octadecadienoic acid, hexadecanoic acid (EC ₅₀ =7.13 µg/mL) and decanoic acid (EC ₅₀ =0.48µg/mL)]. All these compounds were herbicidal. The CAT, POD and SOD activity of <i>E. crusgalli</i> (L.) Beauv. leaves increased at lower concentrations of <i>V. persica</i> (Lour.) Merr. extracts, but decreased at higher concentrations. It was concluded that <i>V. persica</i> (Lour.) Merr. had strong allelopathic herbicidal activity, thus a standard herbicide against weeds can be developed from its major components."

403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Annuals, sometimes biennials. Stems diffuse, ca. 10-20 cm tall, 20-50 cm, densely pubescent with multicellular hairs often more densely so along 2 lines." [No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	Haq, A., & Badshah, L. (2023). Palatability status and animals' preferences of forage plants in Pashat Valley, Pak-Afghan border, District Bajaur, Pakistan. <i>Ethnobotany Research and Applications</i> , 26, 1-22	"Table 3. Palatable flora of Pashat Valley, Bajaur" [<i>Veronica persica</i> ; Palatability class - Lp; Animal preference - Goat, sheep]
	Hilty, J. (2024). Weedy Weedy Wildflowers of Illinois - <i>Veronica persica</i> (Bird's Eye Speedwell). https://www.illinoiswildflowers.info/weeds/plants/be_speedwell.htm . [Accessed 13 Jun 2024]	"The foliage is not known to be toxic and is probably eaten by various mammalian herbivores, particularly rabbits."
	Rose, H. & Rose, C. (2018). Pasture "weeds" of coastal NSW. NSW Department of Primary Industries	"Unpalatable to stock, it is tolerant of low to high stocking rates."
	WRA Specialist. (2024). Personal Communication	Goats and sheep may consume plants, but reported to be unpalatable to cattle.

405	Toxic to animals	n
	Source(s)	Notes
	Burrows, G. E., & Tyrl, R. J. (2013). <i>Toxic Plants of North America</i> . Second Edition. Wiley-Blackwell, Hoboken, NJ	"In North America, species of <i>Veronica</i> have not been implicated in intoxication problems."
	Hilty, J. (2024). Weedy Weedy Wildflowers of Illinois - <i>Veronica persica</i> (Bird's Eye Speedwell). https://www.illinoiswildflowers.info/weeds/plants/be_speedwell.htm . [Accessed 13 Jun 2024]	"The foliage is not known to be toxic and is probably eaten by various mammalian herbivores, particularly rabbits."
	Quattrocchi, U. (2012). <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	Notes
	Zhenghao Xu & Le Chang. (2017). <i>Identification and Control of Common Weeds: Volume 3</i> . Zhejiang University Press, Hangzhou and Springer Nature Singapore	"Harmfulness A noxious weed in uplands, lawns, vegetables, fields. It acts as a host of harmful pathogens and insects, such as Cucumber mosaic virus, Plum pox virus, <i>Aphanomyces cladogamus</i> , and aphid."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Burrows, G. E., & Tyrl, R. J. (2013). <i>Toxic Plants of North America</i> . Second Edition. Wiley-Blackwell, Hoboken, NJ	"In North America, species of <i>Veronica</i> have not been implicated in intoxication problems."
	Quattrocchi, U. (2012). <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Zhenghao Xu & Le Chang. (2017). <i>Identification and Control of Common Weeds: Volume 3</i> . Zhejiang University Press, Hangzhou and Springer Nature Singapore	[No evidence. Not listed among impacts] " <i>Veronica persica</i> usually establishes an advantageous population in the fields or roadsides, especially in fertile, moist habitats."

409	Is a shade tolerant plant at some stage of its life cycle	

Qsn #	Question	Answer
	Source(s)	Notes
	Hilty, J. (2024). Weedy Weedy Wildflowers of Illinois - <i>Veronica persica</i> (Bird's Eye Speedwell). https://www.illinoiswildflowers.info/weeds/plants/be_speedwell.htm . [Accessed 13 Jun 2024]	"Bird's Eye Speedwell prefers partial to full sun, moist conditions, and a rich loamy soil."
	Garden Organic. (2024). Common field-speedwell. https://www.gardenorganic.org.uk/expert-advice/garden-management/weeds/weed-datasheets/common-field-speedwell . [Accessed 13 Jun 2024]	"Growth of the weed is strongly suppressed in shade. In winter wheat, increasing the crop density reduces weed biomass and seed production."
	NC State Extension. (2024). <i>Veronica persica</i> . https://plants.ces.ncsu.edu/plants/veronica-persica/ . [Accessed 13 Jun 2024]	"Light: Full sun (6 or more hours of direct sunlight a day) Partial Shade (Direct sunlight only part of the day, 2-6 hours)"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Hilty, J. (2024). Weedy Weedy Wildflowers of Illinois - <i>Veronica persica</i> (Bird's Eye Speedwell). https://www.illinoiswildflowers.info/weeds/plants/be_speedwell.htm . [Accessed 13 Jun 2024]	"Bird's Eye Speedwell prefers partial to full sun, moist conditions, and a rich loamy soil. However, it will adapt to rocky and other kinds of poor soil."
	NC State Extension. (2024). <i>Veronica persica</i> . https://plants.ces.ncsu.edu/plants/veronica-persica/ . [Accessed 13 Jun 2024]	"It prefers partial to full sun, moist conditions, and rich loamy soil but is adaptable to poor soil."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Flora of North America Editorial Committee. (2019). Flora of North America: 17: Magnoliophyta: Tetrachondraceae to Orbobanchaceae. Oxford University Press, Oxford, UK	"Annuals. Stems creeping to decumbent, 10-50(-60) cm, eglandular-hairy."

412	Forms dense thickets	n
	Source(s)	Notes
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	" <i>Veronica persica</i> was found during a roadside grass survey on Hawai'i Island, where it was naturalized on a roadside in Waimea. The area was not exhaustively surveyed, but approximately 10 plants were found along approximately 200 m of mowed roadside."
	Zhenghao Xu & Le Chang. (2017). Identification and Control of Common Weeds: Volume 3. Zhejiang University Press, Hangzhou and Springer Nature Singapore	[No evidence] "Habitat Naturalized in waste fields, fields, villages, roadsides, lawns, wetlands. Ecology <i>Veronica persica</i> usually establishes an advantageous population in the fields or roadsides, especially in fertile, moist habitats. Harmfulness A noxious weed in uplands, lawns, vegetables, fields. It acts as a host of harmful pathogens and insects, such as Cucumber mosaic virus, Plum pox virus, <i>Aphanomyces cladogamus</i> , and aphid."
	Rose, H. & Rose, C. (2018). Pasture "weeds" of coastal NSW. NSW Department of Primary Industries	[No evidence] "Tends to be a pioneer species, which is most common after disturbance (pugging, overgrazing, etc.) and gradually declines as pastures recover."

Qsn #	Question	Answer
501	Aquatic	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Naturalized in waste fields and roadsides"
502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch . [Accessed 12 Jun 2024]	"Family: Plantaginaceae Tribe: Veroniceae"
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch . [Accessed 12 Jun 2024]	"Family: Plantaginaceae Tribe: Veroniceae"
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Annuals, sometimes biennials. Stems diffuse, ca. 10-20 cm tall, 20-50 cm, densely pubescent with multicellular hairs often more densely so along 2 lines."
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	[No evidence] "Fujian, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Taiwan, WXinjiang (Yining Xian), E Xizang, Yunnan, Zhejiang [native to SW Asia and since the 19th century spread over most of the world]."
602	Produces viable seed	y
	Source(s)	Notes
	Harris, G. R., & Lovell, P. H. (1980). Growth and Reproductive Strategy in <i>Veronica</i> Spp. <i>Annals of Botany</i> , 45(4), 447-458	"Seed of <i>V. persica</i> germinated rapidly and achieved a high final percentage under all conditions used."
603	Hybridizes naturally	n

Qsn #	Question	Answer
	Source(s)	Notes
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	"The results and hypotheses of the LEHMANN school on this topic are summarized by LEHMANN & SCHMITZ-LOHNER (1954) and lead to the conclusion that <i>V. persica</i> , <i>V. agrestis</i> , and <i>V. opaca</i> FRIES are autotetraploid derivatives of the diploid <i>V. polita</i> . As evidence they take the absence of natural hybrids, the near impossible production of artificial hybrids, the occurrence of multivalents and secondary associations in the meiosis of the tetraploids, and the higher values of some quantitative characters in the tetraploids as compared with the diploids."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	[self-compatible and often autogamous] "Both, <i>V. polita</i> and <i>V. persica</i> (and probably also the other members of the group), exhibit several characteristics of the "ideal weed" (BAKER 1965, p. 166; 1974, p. 4): Seeds are produced almost throughout all the year (growth and flowering is possible during the winter) and can germinate shortly after maturity under a large range of environmental conditions, particularly at low temperatures (LEHMANN 1909, p. 149; KORSMO 1930, p. 167). They show rapid growth throughout the vegetative to the flowering phase. They are self-compatible and often autogamous though not exclusive inbreeders, and pollination is possible by unspecialized visitors."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Hickey, M., & King, C. (1997). <i>Common Families of Flowering Plants</i> . Cambridge University Press, Cambridge, UK	"Pollination. Many kinds of insects are attracted by the bright blue corolla and the nectar secreted by a disc situated below the ovary. If the weather is warm the flowers open in the early morning, and the filaments spread well away from the stigma to prevent self-pollination. Pollinating insects, directed by the guide-marks on the corolla-lobes, insert their proboscis into the short corolla-tube in order to seek out the nectar which is protected from rain by the short hairs near its base. On arriving at a flower the insect clings to the stamens and becomes dusted with pollen. At the same time its underside, which may be covered with pollen from another flower, brushes against the stigma. In this way cross-pollination is achieved. On damp mornings the stamens do not spread out so far, so the anthers may then deposit their pollen on to the stigma, effecting self-pollination."
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	"They are self-compatible and often autogamous though not exclusive inbreeders, and pollination is possible by unspecialized visitors."

606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Zhenghao Xu & Le Chang. (2017). <i>Identification and Control of Common Weeds: Volume 3</i> . Zhejiang University Press, Hangzhou and Springer Nature Singapore	"Diffusion Characteristics Seed reproduction."
	Harris, G. R., & Lovell, P. H. (1980). Growth and Reproductive Strategy in <i>Veronica</i> Spp. <i>Annals of Botany</i> , 45(4), 447-458	[Might be able to reproduce vegetatively in certain situations] "In <i>V. persica</i> adventitious roots develop at the prostrate stem nodes under suitable conditions and thus the plant may be able to root in more favourable soil conditions than those present at the parent root site."

Qsn #	Question	Answer
607	Minimum generative time (years)	1
	Source(s)	Notes
	Wu, Z. Y., & P. H. Raven, (eds). 1998. Flora of China. Vol. 18 (Scrophulariaceae through Gesneriaceae). Missouri Botanical Garden Press, St. Louis	"Annuals, sometimes biennials."
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Rose, H. & Rose, C. (2018). Pasture "weeds" of coastal NSW. NSW Department of Primary Industries	[Found along roadsides, and may be dispersed through attachment to footwear, vehicles or other equipment] "A native of Europe, it is found in grasslands, roadsides and disturbed areas."
702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Intentional and unintentional dispersal reported] "Major Pathway/s: Contaminant, Herbal, Ornamental"
703	Propagules likely to disperse as a produce contaminant	y
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Contaminant, Herbal, Ornamental"
	Susheela, K. & Sathyanarayana, N. (2015). Illustrative Guide for Detection & Identification of Regulated Weeds. National Institute of Plant Health Management, Rajendranagar, Hyderabad	"Seed is spread as an impurity in crop seed, manure and fodder."
	Otto, R., & Verloove, F. (2016). New xenophytes from La Palma (Canary Islands, Spain), with emphasis on naturalized and (potentially) invasive species. <i>Collectanea Botanica</i> , 35(e001)	" <i>Veronica persica</i> Poir. (Plantaginaceae). Spain, La Palma: Breña Alta, Avenida Bajamar, newly arranged border, scattered individuals, perhaps introduced with grass seed, 19.08.2007, R. Otto 13268 (pers. herb. RO); <i>ibid.</i> , San Pedro, Barranco de la Zarcita, wayside, numerous individuals, 07.03.2014, R. Otto 20907 (pers. herb. RO)."
704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	"Although seed production is not very high and short-distance dispersal is prevalent, there is also a remarkable capacity for long-distance dispersal: In each capsule, one seed remains tightly attached inside and is dispersed with the whole capsule, easily transported by wind because of its flat shape (HARTL 1968)."
	Harris, G. R., & Lovell, P. H. (1980). Growth and Reproductive Strategy in <i>Veronica</i> Spp. <i>Annals of Botany</i> , 45(4), 447-458	"longer distance seed dispersal in <i>V. persica</i> and <i>V. agrestis</i> may occur when the plant senesces and becomes detached from its root system. The dead material, including capsules with viable seed, is often blown distances of over 100 m by strong, gusting winds. This is especially noticeable on more open habitats."
705	Propagules water dispersed	
	Source(s)	Notes

Qsn #	Question	Answer
	Harris, G. R., & Lovell, P. H. (1980). Growth and Reproductive Strategy in <i>Veronica</i> Spp. <i>Annals of Botany</i> , 45(4), 447-458	[No direct evidence. Water could secondarily disperse seeds during periods of heavy rain] "longer distance seed dispersal in <i>V. persica</i> and <i>V. agrestis</i> may occur when the plant senesces and becomes detached from its root system. The dead material, including capsules with viable seed, is often blown distances of over 100 m by strong, gusting winds. This is especially noticeable on more open habitats."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Green, A. J., Soons, M. B., Brochet, A. L., & Kleyheeg, E. (2016). Dispersal of plants by waterbirds. Pp. 174-195 in <i>Why birds matter: Avian Ecological Function and Ecosystem Services</i> . University of Chicago Press, Chicago, IL	[May be dispersed by ducks] "Table 6.1 Seeds (oogonia for algae) found in digestive tracts of eight dabbling duck species in Europe (gadwall, garganey, mallard, marbled teal, pintail, shoveler, common teal, and wigeon)." [Includes <i>Veronica persica</i>]

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Susheela, K. & Sathyanarayana, N. (2015). <i>Illustrative Guide for Detection & Identification of Regulated Weeds</i> . National Institute of Plant Health Management, Rajendranagar, Hyderabad	[Ant dispersed] "Seed is spread as an impurity in crop seed, manure and fodder. Ants are said to transport the seeds. Earthworms ingest common speedwell seeds and viable seeds have been recovered from worm cast soil."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Susheela, K. & Sathyanarayana, N. (2015). <i>Illustrative Guide for Detection & Identification of Regulated Weeds</i> . National Institute of Plant Health Management, Rajendranagar, Hyderabad	"Earthworms ingest common speedwell seeds and viable seeds have been recovered from worm cast soil."
	Green, A. J., Soons, M. B., Brochet, A. L., & Kleyheeg, E. (2016). Dispersal of plants by waterbirds. Pp. 174-195 in <i>Why birds matter: Avian Ecological Function and Ecosystem Services</i> . University of Chicago Press, Chicago, IL	"Table 6.1 Seeds (oogonia for algae) found in digestive tracts of eight dabbling duck species in Europe (gadwall, garganey, mallard, marbled teal, pintail, shoveler, common teal, and wigeon)." [Includes <i>Veronica persica</i>]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Fischer, M. A. (1987). On the origin of <i>Veronica persica</i> (Scrophulariaceae)—a contribution to the history of a neophytic weed. <i>Plant systematics and evolution</i> , 155, 105-132	"Although seed production is not very high and short-distance dispersal is prevalent, there is also a remarkable capacity for long-distance dispersal: In each capsule, one seed remains tightly attached inside and is dispersed with the whole capsule, easily transported by wind because of its flat shape (HARTL 1968)."
	Harris, G. R., & Lovell, P. H. (1980). Growth and Reproductive Strategy in <i>Veronica</i> Spp. <i>Annals of Botany</i> , 45(4), 447-458	"Seed numbers ranged from 430 per plant in <i>V. hederifolia</i> to 6500 seeds in <i>V. persica</i> . The seed weight shows a similar range from 390 mg per 100 seed for <i>V. hederifolia</i> to 38 mg per 100 seed for <i>V. persica</i> . This compares with 39 seeds per plant in naturally growing <i>V. hederifolia</i> (Salisbury, 1942) and a range from 5000-7000 seeds per plant in <i>V. persica</i> (Salisbury, 1962)."

Qsn #	Question	Answer
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. (1997). World Weeds: Natural Histories and Distribution. John Wiley and Sons, Inc., New York, NY	[High, but not in excess of 1000/m ²] "The abundant seed production is reflected in high seed populations in the soil. Roberts and Stokes (1966) found up to 3200 and 450 seeds/m ² of <i>V. persica</i> and <i>V. arvensis</i> , respectively, in English vegetable fields. A later survey found <i>V. persica</i> in 40% of the vegetable fields and 20% had more than 250 seeds/m ² and the highest population was 1 650/m ² . Seventeen percent of the fields had <i>V. arvensis</i> ; 7% had more than 250/m ² and the maximum was 1480 seeds/m ² (Roberts and Neilson 1982). In Denmark, densities of 221 seeds/m ² of <i>V. arvensis</i> and 825 seeds/m ² of <i>V. persica</i> were found, but there was little correlation between oil seed reserves and the actual weed vegetation present (Jensen 1969)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Garden Organic. (2024). Common field-speedwell. https://www.gardenorganic.org.uk/expert-advice/garden-management/weeds/weed-datasheets/common-field-speedwell . [Accessed 13 Jun 2024]	"Seed recovered from excavations and dated at 20 years old is reported to have germinated. The annual decline of seed followed in a succession of autumn sown crops, in fields ploughed annually and with seed return prevented, was 46%. The time to 99% decline was calculated at 6.1 years. Annual seedling emergence represented 4% of the seedbank. Under a grass sward, the mean annual seed decline was 18% and the half-life was 3.5 years."
	Wilson, B. J., & Lawson, H. M. (1992). Seedbank persistence and seedling emergence of seven weed species in autumn-sown crops following a single year's seeding. <i>Annals of Applied Biology</i> , 120(1), 105-116	Fig. 3. Weeds in successive years (1987, 1988, 1989, 1990) as a percentage of first year seedbank for (a) 1987 seeding in Experiment 1, (h) 1988 seeding in Experiment 2." [Veronica persica recruits from seedbank in each year after seeding]

803	Well controlled by herbicides	y
	Source(s)	Notes
	Zhenghao Xu & Le Chang. (2017). Identification and Control of Common Weeds: Volume 3. Zhejiang University Press, Hangzhou and Springer Nature Singapore	"Management Chemical control can choose thiameturon and paraquat."
	Landschoot, P., Delvalle, T. & Abbey, T. (2024). Lawn and Turfgrass Weeds: Common Field Speedwell (<i>Veronica persica</i>). The Pennsylvania State University, University Park, PA	"This weed can be suppressed or controlled with various preemergence and postemergence herbicides." [A number of pre- and post-emergent herbicides are listed to control this species]

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	Hilty, J. (2024). Weedy Weedy Wildflowers of Illinois - <i>Veronica persica</i> (Bird's Eye Speedwell). https://www.illinoiswildflowers.info/weeds/plants/be_speedwell.htm . [Accessed 13 Jun 2024]	"Because this species is rather large for an annual <i>Veronica</i> sp., it does not adapt well to regular mowing."
	Landschoot, P., Delvalle, T. & Abbey, T. (2024). Lawn and Turfgrass Weeds: Common Field Speedwell (<i>Veronica persica</i>). The Pennsylvania State University, University Park, PA	"Common field speedwell populations can be reduced by improving turf density through fertilization, regular mowing, and use of turfgrasses well-adapted to site conditions. This weed can be suppressed or controlled with various preemergence and postemergence herbicides."

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown

Summary of Risk Traits:

Veronica persica (birdeye speedwell) is an annual, or sometimes biennial herb native to Eurasia. It has spread widely and can now be found in many parts of the world, including the Waimea region of Hawaii island. *Veronica persica* self-seeds, is dispersed by wind and as a crop contaminant, and has become a weed of disturbed sites, lawns, fields, roadsides, and several agricultural crops. It is also reported to be a host of harmful crop pathogens and insects.

High Risk / Undesirable Traits

- Broad climate suitability
- Widely naturalized, including the Waimea region of Hawaii island.
- A common weed in disturbed sites, lawns, roadsides, and wastelands.
- A weed of several important agricultural crops
- Other *Veronica* species are invasive weeds
- Potentially allelopathic
- Unpalatable to cattle (but consumed by goats, sheep, and other animals)
- Host of crop pathogens and insect pests
- Tolerates many soil types
- Reproduces by seeds
- Self-compatible and often autogamous
- Reaches maturity in one growing season
- Seeds are dispersed by wind, as an impurity in crop seed, manure, and fodder, by ducks and possibly other waterfowl, by ants, earthworms, and possibly other means.
- Seeds form a persistent and long-lived seed bank

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Palatable to goats, sheep, rabbits (but reportedly unpalatable to cattle)
- Non-toxic
- Grows best in high light environments (dense shade may inhibit spread)
- Mowing may provide effective control
- Herbicides may provide effective control

