

**Taxon:** *Persicaria capitata* (Buch.-Ham. ex D. Don) H. Gross

**Family:** Polygonaceae

**Common Name(s):** heartweed  
Japanese knotweed  
pink-head knotweed  
pink-head persicaria  
smartweed

**Synonym(s):** *Polygonum capitatum* Buch.-Ham. ex D. Don

**Assessor:** Chuck Chimera

**Status:** Assessor Approved

**End Date:** 23 Mar 2016

**WRA Score:** 22.0

**Designation:** H(HPWRA)

**Rating:** High Risk

**Keywords:** Crop Weed, Ground Cover, Mat-Forming, Spreads Vegetatively, Small-Seeded

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)	High
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	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
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	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
407	Causes allergies or is otherwise toxic to humans		
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
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	y
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		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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)	y=1, n=-1	y
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	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	y
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		
801	Prolific seed production (>1000/m <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
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., Raven, P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	No evidence of domestication

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. 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"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 22 Mar 2016]	"Native: Asia-Temperate China: China - Guangdong, - Guangxi, - Guizhou, - Hubei, - Hunan, - Jiangxi, - Sichuan, - Xizang, - Yunnan Asia-Tropical Indian Subcontinent: Bhutan; India; Nepal; Sri Lanka Indo-China: Myanmar; Thailand; Vietnam Malesia: Malaysia"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 22 Mar 2016]	

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

Qsn #	Question	Answer
	Dave's Garden. 2016. <i>Persicaria capitata</i> . <a href="http://davesgarden.com/guides/pf/go/363/">http://davesgarden.com/guides/pf/go/363/</a> . [Accessed 22 Mar 2016]	"Hardiness: USDA Zone 7a: to -17.7 °C (0 °F) USDA Zone 7b: to -14.9 °C (5 °F) USDA Zone 8a: to -12.2 °C (10 °F) USDA Zone 8b: to -9.4 °C (15 °F) USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Mountain slopes, shaded places in valleys; 600-3500 m"
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"now naturalized in wet forest, open lava fields, and along roadsides, 600- 1,770 m, on Hawai'i." [Elevation range exceeds 1000 m, demonstrating environmental versatility]

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Mountain slopes, shaded places in valleys; 600-3500 m. Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Malaysia, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam]."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"now naturalized in wet forest, open lava fields, and along roadsides, 600- 1,770 m, on Hawai'i."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to the Himalayas and western China, widely cultivated"

301	Naturalized beyond native range	y
	Source(s)	Notes
	Hsu, T. W., Ku, S. M., & Peng, C. I. (2004). <i>Persicaria capitata</i> (Buchanan-Hamilton ex D. Don) H. Gross (Polygonaceae), a newly naturalized plant in Taiwan. <i>Taiwania</i> , 49(3): 183-187	"ABSTRACT: <i>Persicaria capitata</i> (Buchanan-Hamilton ex D. Don) H. Gross, a species of the Polygonaceae widespread in mainland China and neighboring countries, has recently naturalized at ca. 2,000 m altitude in central Taiwan. Morphologically, <i>P. capitata</i> resembles <i>P. chinensis</i> , both belonging to section <i>Cephalophilon</i> , but can be easily distinguished from <i>P. chinensis</i> by accrescent and fleshy perianth in fruit. This paper provides a description of the species, line drawings, and color photographs to aid in identification."

Qsn #	Question	Answer
	Auld, B., Morita, H., Nishida, T., Ito, M., & Michael, P. 2003. Shared exotica: plant invasions of Japan and south eastern Australia. <i>Cunninghamia</i> , 8(1): 147-152	"Most of these invasive species originated from either the broad regions of Europe/Mediterranean/ Eurasia or the Americas. Five species are of South African origin and only two, <i>Persicaria capitata</i> and <i>Lilium formosanum</i> are from eastern Asia." ... "Appendix 1. Invading plant species (mostly regarded as weeds) common to Japan and eastern Australia that are exotic to both countries." [Includes <i>Persicaria capitata</i> ]
	Frohlich, D. & Lau, A. 2010. New plant records from O'ahu for 2008. <i>Bishop Museum Occasional Papers</i> 107: 3-18	"Native to the Himalayan region of Asia, <i>P. capitata</i> is widely cultivated in Hawai'i and previously reported as naturalized on Maui and the Big Island (Herbst & Wagner 1999; Oppenheimer & Bartlett 2002). on Hawai'i island, it can be seen colonizing open roadsides and lava fields from 600–1770 m. It can be distinguished from other commonly seen members of its genus by its mat-forming habit, globose flowering heads, and distinctive purple V-shaped bands on the leaves (Wagner et al. 1999; Staples & Herbst 2005). Material examined. O'AHU: Nu'uuanu Valley, on Sherman Park PI (UTM 619795, 2359724), wet to mesic lowland roadside, prostrate herb with pink-tinged stems and leaves, rooting at nodes, sparingly naturalized in this location, 18 Jul 2008, OED 200807180."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to the Himalayas and western China, widely cultivated; in Hawai'i cultivated on O'ahu, Maui, and Hawai'i, now naturalized in wet forest, open lava fields, and along roadsides, 600- 1,770 m, on Hawai'i. First collected in 1960 (Mrs. Thaanum s.n., BISH)."
	Oppenheimer, H. L. & Bartlett, R. T. 2002. New plant records from the main Hawaiian Islands. <i>Bishop Museum Occasional Papers</i> . 69: 1-14	"Wagner et al. (1999: 1063) stated that this species was cultivated on O'ahu, Maui, and Hawai'i (as <i>Polygonum capitatum</i> Buch.-Ham.), but was only naturalized on the latter island. The change in taxonomy was by Ronse Decraene & Akeroyd (1988). The specimen cited here was collected from a small population in an area miles away from any homes or parks and cannot be considered to be under cultivation. Material examined. MAUI: East Maui, Makawao Distr., Ka'ono'ulu, along Waipoli Rd., in pasture, 1725 m, 7 Jul 2000, Oppenheimer H70069 (BISH, PTBG)."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Dave's Garden. 2016. <i>Persicaria capitata</i> . <a href="http://davesgarden.com/guides/pf/go/363/">http://davesgarden.com/guides/pf/go/363/</a> . [Accessed 22 Mar 2016]	"On Apr 22, 2009, ejanelli (/members/ejanelli/) from San Francisco, CA wrote: In a benign climate like ours, this plant is so invasive it will choke out almost anything, and it will not respect any form of boundary because the tiny seeds spread everywhere. I suppose if your purpose were to cover an old asphalt roadway that you didn't want to tear up you could plant a few seeds in the cracks and let this take care of it. It is not easy to get rid of because of the profuse seeding. BEWARE!"
	Mathias, M.E.. 1985. <i>Flowering Plants in the Landscape</i> . University of California Press, Berkeley and Los Angeles, CA	"Somewhat weedy, it is best in isolated areas where it can be confined and where there will be no foot traffic. Often it will reseed itself naturally after a freeze."

303	Agricultural/forestry/horticultural weed	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Thapa, C. B. (2015). Weed Flora of Maize Field in Pokhara, Nepal. Nepal Journal of Science and Technology, 3(1): 9-14	"A total of 95 common weeded species were collected from the maize field of Pokhara, central part of Nepal. Seventy-two species belonged to dicots representing 26 families and 56 genera, 22 species belonged to monocots representing 5 families and 18 genera and one species belonged to pteridophyte." [Includes <i>Polygonum capitatum</i> ]
	Singh, R. D., Venugopal, K., Gupta, R. K., & Singh, G. B. 1985. Study of weed flora, crop weed competition and chemical weed control for wheat in Sikkim. In Abstracts of papers, annual conference of Indian Society of Weed Science, 1985. (pp. 82-83).	"The influence of the weed free duration and relative effectiveness of 2,4-D Na, Weedone 48 [2,4-D] and tribunil on wheat were studied. The main weed flora consisted of <i>Polygonum capitatum</i> , <i>Cyperus rotundus</i> , <i>Chenopodium album</i> , <i>Amaranthus viridis</i> and <i>Phalaris minor</i> . Max. weed population and weed DW were observed in the unweeded control. The highest grain yield (5.07 t/ha) was obtained when plots were kept weed free till harvest followed by weed free until 60 days after sowing (4.79 t) and this increased the yield by 43 and 35%, resp. In another experiment, max. yield (3 t) was obtained with tribunil at 1.5 kg a/ha followed by 2 hand weedings (2.74 t/ha) with an increase of 29.3 and 18.3, resp. Tribunil gave the highest net return."

304	Environmental weed	
	Source(s)	Notes
	T.E.R:R.A.I.N. 2016. <i>Persicaria capitata</i> (Pink Knotweed). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/pink-knotweed-polygonum-capitatum.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/pink-knotweed-polygonum-capitatum.html</a> . [Accessed 23 Mar 2016]	" <i>Persicaria capitata</i> is found growing on roadsides, dry banks & slopes, open areas preferring full sun. Its impact on environment is that it forms a dense carpet replacing most native vegetation. It spreads locally from trailing stems that root easily and also garden dumping."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. Primarily listed as naturalized or as a general weed of gardens or crops

305	Congeneric weed	y
	Source(s)	Notes
	Lake, E. C., Hough-Goldstein, J., & D'Amico, V. (2014). Integrating Management Techniques to Restore Sites Invaded by Mile-a Minute Weed, <i>Persicaria perfoliata</i> . Restoration Ecology, 22(2), 127-133	" <i>Persicaria perfoliata</i> is a spiny annual vine of Asian origin that established in York County, Pennsylvania, in the 1930s (Moul 1948) and has since invaded 13 states in the eastern United States (Hough-Goldstein et al. 2008a, 2012). Mile-a-minute weed can form dense monocultures and outcompete native plants in a variety of habitats and thus poses a threat to natural ecosystems (Mountain 1989; Hough-Goldstein et al. 2008a)."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	A number of species are listed as naturalized and/or weeds

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

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Mat-forming perennial herbs from a stout woody root; stems prostrate, sometimes rooting at the nodes, 0.5-3.5 dm long, many-branched. Leaves with a conspicuous purple V-shaped band, occasionally also tinged red or purple, elliptic-ovate to elliptic, 1-4(-6.2) cm long, 0.6-2.5(-3.3) cm wide, both surfaces sparsely strigillose, margins glandular ciliate, petioles 1-4 mm long, glandular villous, usually with an auricle that clasps the stem, ocreae reddish brown, tubular, to 6-10 mm long, glandular hirsute, apex glandular ciliate."

402	Allelopathic	
	Source(s)	Notes
	Shiraishi, S., Watanabe, I., Kuno, K., & Fujii, Y. (2002). Allelopathic activity of leaching from dry leaves and exudate from roots of ground cover plants assayed on agar. <i>Weed Biology and Management</i> , 2(3), 133-142	"Table 1. Radicle and hypocotyl elongation of lettuce grown on agar gel containing cover plants leaves tested by the Sandwich Method." [Leaf exudates of <i>Polygonum capitatum</i> demonstrate some allelopathic potential]

403	Parasitic	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Herbs perennial. Stems creeping, tufted, ligneous at base, sparsely glandular hairy or nearly glabrous, much branched, rooting from nodes, internodes shorter than leaf blades; branchlet suberect, angulate, sparsely glandular hairy." [Polygonaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Looking at Plants. 2016. <i>Persicaria capitata</i> . <a href="http://looking-at-plants.com/plants_a_z/persicaria_capitata">http://looking-at-plants.com/plants_a_z/persicaria_capitata</a> . [Accessed 23 Mar 2016]	"DEER: Will feed on the foliage"
	Shrestha, B., Kindlmann, P., & Jnawali, S. R. (2012). Interactions Between the Himalayan Tahr, Livestock and Snow Leopards in the Sagarmatha National Park. In <i>Himalayan Biodiversity in the Changing World</i> (pp. 115-143). Springer Netherlands	[Palatable to tahr] "Of the 24 species of plant in the droppings of tahr, 53% were grasses and sedges belonging to 6 taxa: <i>Carex anomoea</i> , <i>Avena</i> sp., <i>Poa</i> sp., <i>Trisetum spicatum</i> , <i>Cyperaceae</i> sp. and <i>Imperata</i> sp. They were followed by <i>Gueldenstaedtia himalaica</i> and <i>Potentilla</i> sp., whereas <i>Pedicularis siphonantha</i> , <i>Persicaria capitata</i> ..."

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Shrestha, B., Kindlmann, P., & Jnawali, S. R. (2012). Interactions Between the Himalayan Tahr, Livestock and Snow Leopards in the Sagarmatha National Park. In Himalayan Biodiversity in the Changing World (pp. 115-143). Springer Netherlands	[No evidence of toxicity. Palatable to tahr] "Of the 24 species of plant in the droppings of tahr, 53% were grasses and sedges belonging to 6 taxa: Carex anomoea, Avena sp., Poa sp., Trisetum spicatum, Cyperaceae sp. and Imperata sp. They were followed by Gueldenstaedtia himalaica and Potentilla sp., whereas Pedicularis siphonantha, Persicaria capitata ... "
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	Notes
	Pradhanang, P. M., Elphinstone, J. G., & Fox, R. T. V. (2000) Identification of crop and weed hosts of Ralstonia solanacearum biovar 2 in the hills of Nepal. Plant Pathology, 49(4), 403-413	"AB: Common agricultural weeds and crops that grow in the high hills of Nepal were examined following inoculation with biovar 2 of R. solanacearum under natural conditions in the UK and Nepal. Bacterial populations in the roots were determined 1 and 2 months after artificial inoculation, and at various intervals after harvesting infected potato crops under natural conditions in Nepal in 1995. Inoculated roots of the summer weeds Drymaria cordata and Polygonum capitata [P. capitatum ] and the winter weeds Cerastium glomeratum and Stellaria media yielded 102-107 colony-forming units per g root. High populations of the bacterium were recovered from these plants even after partial surface sterilization, indicating that systemic infection had occurred. R. solanacearum populations were recovered from root extracts of 75% of naturally growing D. cordata plants when sampled 3 months after harvest of a potato crop with bacterial wilt. Similarly, root extracts of 25% of P. capitata plants carried the bacterium. No potential winter weed hosts were infected under natural conditions when sampled 5 and 6 months after harvest of infected potato, indicating that winter conditions in the high hills of Nepal are not conducive to infection. Among crops, [Indian] mustard (Brassica juncea cv. Fine White) developed typical wilt symptoms following artificial inoculation in warm glasshouse conditions (20-28 deg C). Neither mustard (B. juncea cv. Lumle Tori) nor barley (cv. Bonus), both winter crops in Nepal, was infected when planted into heavily infested plots under natural conditions. The results indicated that the role of non-solanaceous summer weeds in the persistence of biovar 2 of R. solanacearum in the environment may have been previously underestimated. "



Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Gardening123. 2016. Polygonum capitatum. www.gardening123.com	"Sap may cause stomach upset and contact with all parts of the plant may cause skin irritation."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"now naturalized in wet forest, open lava fields, and along roadsides" [An herb that does not generally occur in fire prone habitats]
	Kubiak, P. J. 2009. Fire responses of bushland plants after the January 1994 wildfires in northern Sydney. <i>Cunninghamia</i> , 11(1): 131-165	No evidence of increased fire risk

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Knotweed thrives in shade on dry or moist soil, forming a dense carpet of green foliage interspersed with knobby heads of pale to bright pink flowers."
	Pienaar, K. 2003. The South African 'What Flower is That'? Struik Publishers, Cape Town. South Africa	"This is invasive, spreading ground cover, good for covering large areas in both sun and semi-shade. In shade, the leaf colouring is green; in sun, reddish."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Looking at Plants. 2016. <i>Persicaria capitata</i> . <a href="http://looking-at-plants.com/plants_a_-_z/persicaria_capitata">http://looking-at-plants.com/plants_a_-_z/persicaria_capitata</a> . [Accessed 23 Mar 2016]	"It prefers a moist, rich soil, but it will grow on a wide range of well-drained soils. It has a moderate drought tolerance once established, but it will look better with some irrigation in dry spells."
	Gardening123. 2016. Polygonum capitatum. www.gardening123.com	"Soil Type: Tolerates most soil types"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Mat-forming perennial herbs from a stout woody root"

412	Forms dense thickets	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	T.E.R.:R.A.I.N. 2016. <i>Persicaria capitata</i> (Pink Knotweed). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/pink-knotweed-polygonum-capitatum.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/pink-knotweed-polygonum-capitatum.html</a> . [Accessed 23 Mar 2016]	"Its impact on environment is that it forms a dense carpet replacing most native vegetation. It spreads locally from trailing stems that root easily and also garden dumping."
	Foo, C. L., Harrington, K. C., & MacKay, M. B. (2011). Weed suppression by twelve ornamental ground cover species. <i>New Zealand Plant Protection</i> , 64, 149-154	" <i>Persicaria capitatum</i> was the fastest establishing ground cover and formed dense swards over summer. It appeared to perform badly in the present trials because of its susceptibility to frost. But in warmer parts of the country it may be the best of the species assessed, although its prolific seeding and rampant growth may result in this becoming a weed itself in such environments."

<b>501</b>	<b>Aquatic</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Herbs perennial." ... "Mountain slopes, shaded places in valleys; 6003500 m."

<b>502</b>	<b>Grass</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 22 Mar 2016]	Family: Polygonaceae Subfamily: Polygonoideae Tribe: Persicarieae

<b>503</b>	<b>Nitrogen fixing woody plant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Herbs perennial. Stems creeping, tufted, ligneous at base, sparsely glandular hairy or nearly glabrous, much branched, rooting from nodes, internodes shorter than leaf blades" [Polygonaceae]

<b>504</b>	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. <i>Flora of China</i> . Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Herbs perennial. Stems creeping, tufted, ligneous at base, sparsely glandular hairy or nearly glabrous, much branched, rooting from nodes"
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Mat-forming perennial herbs from a stout woody root; stems prostrate, sometimes rooting at the nodes,"

<b>601</b>	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangxi, Sichuan, Xizang, Yunnan [Bhutan, N India, Malaysia, Myanmar, Nepal, Sikkim, Sri Lanka, Thailand, Vietnam]."

602	Produces viable seed	y
	<b>Source(s)</b>	<b>Notes</b>
	Joshi, M., Joshi, H., & Singh, S. P. (1992). Response of water, temperature and light on germination behaviour of some successional species. <i>Tropical Ecology</i> , 33(1), 54-62	"AB: The response of water, temp. and light on the germination of <i>Bidens biternata</i> , <i>Cnicus argyranthus</i> , <i>Cynoglossum furcatum</i> , <i>Galinsoga ciliata</i> , <i>Oenothera rosea</i> , <i>Polygonum capitatum</i> , <i>Rumex hastatus</i> , <i>Stachys serricea</i> and <i>Viola serpens</i> , collected as seed from the Kumaun region of central Himalaya [Uttar Pradesh] in 1984, was investigated in laboratory experiments. None of the species showed seed dormancy. In each species, increasing water stress decreased the rate and percentage of germination. <i>B. biternata</i> and <i>S. serricea</i> (species of later successional communities) were the most sensitive to water stress, while <i>C. argyranthus</i> and <i>V. serpens</i> (species of early successional communities) were the most tolerant. Increasing temp. generally had an inhibitory effect on the germination of each species, although <i>C. argyranthus</i> , <i>O. rosea</i> , <i>R. hastatus</i> and <i>V. serpens</i> (all species of early successional communities) showed wider responses compared to other species. Exposure to red and continuous light promoted germination, whereas far red light inhibited germination. The suppression of germination caused by continuous dark was greatest in <i>C. argyranthus</i> , <i>O. rosea</i> and <i>V. serpens</i> ."
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Nuts dark reddish brown, trigonous, ca. 2 mm long, apex beaked, the surface somewhat striate, glossy."
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Propagation is by seed."

603	Hybridizes naturally	n
	<b>Source(s)</b>	<b>Notes</b>
	Kim, S. T., & Donoghue, M. J. (2008). Molecular phylogeny of <i>Persicaria</i> (Persicarieae, Polygonaceae). <i>Systematic Botany</i> , 33(1), 77-86	"Finally, there is significant conflict between our cpDNA markers and nrITS sequences in the placement of <i>P. punctata</i> , which may reflect hybridization in its ancestry. These analyses set the stage for more detailed studies of the role of hybridization and polyploidy in the evolution of <i>Eupersicaria</i> and its relatives." [No evidence of hybridization in <i>P. capitata</i> ]

Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown] "Flowers in subglobose or capitate spikes, these 1 to several at the ends of the branches, peduncles with purple glandular hairs; tepals pink, 2-2.5 mm long."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Bista, S., & Shivakoti, G. P. (2001). Honeybee Flora at Kabre, Dolakha District. Nepal Agriculture Research Journal, 4 & 5, 18-25	"Annex 1. Different plant species of honeybee flora identified in Kabre area of Dolakha district" [Persicaria capitata utilized as a nectar & pollen source]
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Inflorescence terminal, capitate, solitary or geminate, 610 mm in diam.; peduncle glandular hairy; bracts narrowly ovate, membranous. Pedicel very short. Perianth pinkish, 5-parted; tepals elliptic, 23 mm. Stamens 8, included. Styles 3, connate to below middle, equaling perianth; stigmas capitate."
	Colteaux, B. C., McDonald, C., Kolipinski, M., Cunningham, J. B., & Ghosh, S. (2013). A survey of pollinator and plant interactions in meadow and grassland habitats of Marin County, California. Bios, 84(1): 1-7	"Table 2. Identifications of the bee genera and the plant species they were found on." [Apis mellifera found on Polygonum capitatum]

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Mat-forming perennial herbs from a stout woody root; stems prostrate, sometimes rooting at the nodes,"

607	Minimum generative time (years)	1
	Source(s)	Notes
	Petry, C., Scaloni, F. M., Ventura, M. E., Dall'Agnese, L., Tedesco, C. D., & Garcia, N. B. U. (2014). The propagation of <i>Persicaria capitata</i> in different substrates for green roof use. In XXIX International Horticultural Congress on Horticulture: Sustaining Lives, Livelihoods and Landscapes: Proceedings of the V 1108 (pp. 317-322)	" <i>Persicaria capitata</i> is annual and propagated by seeds from 21 to 27°C, germinating in three weeks."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"naturalized in wet forest, open lava fields, and along roadsides, 600-1770m, on Hawai'i." [along roadsides]

Qsn #	Question	Answer
	Grøstad, T., & Halvorsen, R. (2002). Rare plants from a new waste dump in Horten. <i>Blyttia</i> , 60(4), 203-208	"Several unusual anthropochorous plants were found on a recently "discovered" waste dump in Horten (Vestfold county, South East Norway), not far from the harbour, including one species new to Norway: <i>Persicaria capitata</i> [ <i>Polygonum capitatum</i> ]. Most of the species must have been dispersed by waste from gardens and plant nurseries, or from bird seeds. The substrate masses include bark and wood chips, soil masses from market-gardens and waste masses from demolished houses. As such areas often are used for a short time only and thereafter built down, most alien species are normally rapidly lost."
	Tsujimoto, M., & Imura, S. (2012). Does a new transportation system increase the risk of importing non-native species to Antarctica?. <i>Antarctic Science</i> , 24(05), 441-449	"Table IV. Seed taxa identified and total number of each species found on sampled cargo in JARE49 and JARE 51." [Includes seeds of <i>Persicaria capitata</i> . May be a contaminant of cargo]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"...widely cultivated and naturalized." ... "It is also grown to a limited extent as an ornamental, primarily as a ground cover."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Tsujimoto, M., & Imura, S. (2012). Does a new transportation system increase the risk of importing non-native species to Antarctica?. <i>Antarctic Science</i> , 24(05), 441-449	"Table IV. Seed taxa identified and total number of each species found on sampled cargo in JARE49 and JARE 51." [Includes seeds of <i>Persicaria capitata</i> . May be a contaminant of cargo]
	WRA Specialist. 2016. Personal Communication	As a crop weed, has the potential to become a produce contaminant

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Esler, A. E. (1988). The naturalisation of plants in urban Auckland, New Zealand 5. Success of the alien species. <i>New Zealand Journal of Botany</i> , 26(4), 565-584	"Seeds without structures aiding ready dispersal are a feature of ... <i>Polygonum capitatum</i> ..."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No adaptations for wind dispersal] "Nuts dark reddish brown, trigonous, ca. 2 mm long, apex beaked, the surface somewhat striate, glossy."

705	Propagules water dispersed	y
	Source(s)	Notes
	Rolfe, J. (2008). New exotic plant records and range extensions for naturalised plants in the southern North Island. <i>Wellington Botanical Society Bulletin</i> 51: 31-50	" <i>Persicaria capitata</i> " ... "Notes: Casual, Cultivation Escape. Single plant growing in river bed. Another specimen was collected from long grass on the river bank some distance from the plant in the river bed (AK 296922)."

Qsn #	Question	Answer
	de Queiroz, L. P., Rapini, A. & Giuletta, A. M. (eds.) (2006). Towards greater knowledge of the Brazilian Semi-arid Biodiversity. Ministério da Ciência e Tecnologia, Brasília, Brazil	[Seeds transported by water remain viable in sediment for an unspecified period of time] "Seeds can remain viable on the soil for a long time so that some species, such as <i>Rumex crispus</i> , <i>R. obtusifolius</i> , <i>Polygonum capitatum</i> and <i>P. punctatum</i> are often found in abandoned lands, river beds and lakes where the seeds were taken to."

706	Propagules bird dispersed	y
	Source(s)	Notes
	Ceia, R. S., Sampaio, H. L., Parejo, S. H., Heleno, R. H., Arosa, M. L., Ramos, J. A., & Hilton, G. M. (2011). Throwing the baby out with the bathwater: does laurel forest restoration remove a critical winter food supply for the critically endangered Azores bullfinch?. <i>Biological Invasions</i> , 13(1), 93-104	"In May, fern fronds were the most frequently consumed item in cleared areas, whereas in non-cleared areas, seeds of the herbaceous <i>Persicaria capitata</i> were taken. Seeds of herbaceous plants and fleshy fruits assumed an important role in the diet from June to August and in September, respectively." [Birds consume, & presumably destroy seeds. Unknown if viable seeds can be dispersed]
	Parejo, S. H., Ceia, R. S., Ramos, J. A., Sampaio, H. L., & Heleno, R. H. (2014). Tiptoeing between restoration and invasion: seed rain into natural gaps within a highly invaded relic forest in the Azores. <i>European Journal of Forest Research</i> , 133(2), 383-390	"Table 2 Number and diversity of seeds recovered from the seed traps with perch and from the droppings of mist-netted birds" [17 seeds of <i>Persicaria capitata</i> collected in seed traps & 1 seed collected from the droppings of mist-netted birds]

707	Propagules dispersed by other animals (externally)	y
	Source(s)	Notes
	Pemberton, R. W., & Irving, D. W. (1990). Elaiosomes on weed seeds and the potential for myrmecochory in naturalized plants. <i>Weed Science</i> , 38(6): 615-619	"Table 1. Naturalized species with seeds or seedlike fruit bearing elaiosomes." [Includes <i>Polygonum capitatum</i> . Presumably an adaptation for ant dispersal]

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Shrestha, B., Kindlmann, P., & Jnawali, S. R. (2012). Interactions Between the Himalayan Tahr, Livestock and Snow Leopards in the Sagarmatha National Park. In <i>Himalayan Biodiversity in the Changing World</i> (pp. 115-143). Springer Netherlands	[Plants found in droppings. Unknown if seeds are also consumed] "Based on the prominence value, at Monga, 4 species were found in the droppings of tahr and livestock that are very abundant or abundant ( <i>Avena</i> sp., <i>Carex anomoea</i> , <i>Cotoneaster microphyllus</i> and <i>Rhododendron lepidotum</i> ), 12 species that are common ( <i>Anaphalis contorta</i> , <i>Androsace sarmentosa</i> , <i>Cyananthus hookeri</i> , <i>Fragaria daltoniana</i> , <i>Gerbera gossypina</i> , <i>Habenaria aitchisonii</i> , <i>Notholirionmacrophyllum</i> , <i>Persicaria capitata</i> ..."
	Parejo, S. H., Ceia, R. S., Ramos, J. A., Sampaio, H. L., & Heleno, R. H. (2014). Tiptoeing between restoration and invasion: seed rain into natural gaps within a highly invaded relic forest in the Azores. <i>European Journal of Forest Research</i> , 133(2), 383-390	[Possibly. Viability of gut-passed seeds unspecified] "Table 2 Number and diversity of seeds recovered from the seed traps with perch and from the droppings of mist-netted birds" [17 seeds of <i>Persicaria capitata</i> collected in seed traps & 1 seed collected from the droppings of mist-netted birds]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Nuts dark reddish brown, trigonous, ca. 2 mm long" [Small-seeded, but densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	de Queiroz, L. P., Rapini, A. & Giuliatti, A. M. (eds.) (2006). Towards greater knowledge of the Brazilian Semi-arid Biodiversity. Ministério da Ciência e Tecnologia, Brasília, Brazil	"Seeds can remain viable on the soil for a long time so that some species, such as Rumex crispus, R. obtusifolius, Polygonum capitatum and P. punctatum are often found in abandoned lands, river beds and lakes where the seeds were taken to."
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 23 Mar 2016]	"Storage Behaviour: Orthodox"
	Ma, M., Zhou, X., & Du, G. (2011). Soil seed bank dynamics in alpine wetland succession on the Tibetan Plateau. <i>Plant and Soil</i> , 346(1-2), 19-28	[Present in seed bank. Longevity unspecified] "seed banks contained species of previous successional stages which produce longer-lived seeds (e.g. Chenopodium iljinii, Geranium wilfordii, Polygonum capitatum, and Poa annua)." ... "In WL area, many species were found in the seed bank but were absent in the present-day vegetation (e.g. Chenopodium iljinii, Geranium wilfordii, Polygonum capitatum, and Poa annua)."

803	Well controlled by herbicides	y
	Source(s)	Notes
	Singh, R. V., & Arya, M. P. S. (1995). Chemical weed control in Japanese barnyard millet ( <i>Echinochloa frumentacea</i> ). <i>Indian Journal of Agronomy</i> , 40, 51-54	"Chemical weed control in barnyard millet ( <i>Echinochloa frumentacea</i> ) was studied in a field experiment conducted under rainfed conditions during the rainy season of 1990 and 1991 at Ranichauri. The herbicide treatments were post-em. application of 0.75 or 1.0 kg/ha 2,4-D Na salt, and pre-em. application of 0.5 or 1.0 kg isoproturon, 0.075 or 0.1 kg oxyfluorfen and 0.5 or 1.0 kg pendimethalin. The major weeds were <i>Galinsoga parviflora</i> , <i>Polygonum capitatum</i> , <i>Cyperus rotundus</i> , <i>Digitaria ciliaris</i> and <i>Cynodon dactylon</i> . 2,4-D Na-salt at 1.0 kg applied 15 days after sowing gave the maximum barnyard millet grain (15.73 g/ha) and straw (83.50 g/ha) yields. Maximum weed-control efficiency (74.4%) and monetary returns (Rs 3357.7/ha) were also obtained with the same rate of 2,4-D Na-salt. "
	Loh, R. K., Tunison, T., Zimmer, C., Mattos, R., & Benitez, D (2014). A review of invasive plant management in Special Ecological Areas, Hawai'i Volcanoes National Park, 1984-2007. Technical Report 187. Pacific Cooperative Studies Unit, University of Hawaii, Honolulu, HI	"Table 2. Herbicide Control Methods for Target Invasive Weeds" [Persicaria capitata - Herbicide Control Method = 2-5% Garlon 4 Foliar]

Qsn #	Question	Answer
	<p>Foo, C. L., Harrington, K. C., &amp; MacKay, M. B. (2010). Herbicide tolerance of three ornamental ground cover species: <i>Polygonum capitatum</i>, <i>Sedum mexicanum</i> and <i>Soleirolia soleirolii</i>. Pp. 303-306 In Proceedings of the 17th Australasian weeds Conference.</p>	<p>"The most damaging of the herbicides for <i>P. capitatum</i> was dicamba, and this would be a very suitable chemical for controlling the species should it become troublesome (Table 1). When looking at herbicides that would be useful for controlling weeds selectively within this ground cover species, haloxyfop was successfully tolerated and thus will be useful for grass weed control. Likewise, the tribenuron treatment was tolerated quite well and this gives good general control of a wide range of broadleaved species. A tribenuron/haloxyfop mixture has been useful for weed control in our field plots since this trial. The three residual herbicides tested, simazine, pendimethalin and oxadiazon, were all tolerated quite well and could be used to help get this ground cover species established. However, there was some initial damage from the oxadiazon."</p>

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	<p>Kubiak, P. J. 2009. Fire responses of bushland plants after the January 1994 wildfires in northern Sydney. <i>Cunninghamia</i>, 11(1): 131-165</p>	<p>"Appendix 1. Observations on fire responses (after 100% leaf scorch) of vascular plants in the Lane Cove River (LCR) (observations mainly Jan 1994 – Oct 1999) and Narrabeen Lagoon (NL) (Mar – Oct 1994) catchments, following the fires of January 1994." [*<i>Persicaria capitata</i> - Fire Response - R = majority of adult plants resprouted after the fires]</p>
	<p>Esler, A. E. (1988). The naturalisation of plants in urban Auckland, New Zealand 5. Success of the alien species. <i>New Zealand Journal of Botany</i>, 26(4), 565-584</p>	<p>[Persists from roots despite loss of top growth] "On rock walls <i>Cymbalaria muralis</i>, <i>Polygonum capitatum</i>, <i>Centranthus ruber</i>, <i>Erigeron karvinskianus</i>, <i>Adiantum raddianum</i> (and <i>Cyrtomium falcatum</i> on Mt Eden prison walls) have a stout persistent superficial rootstock producing top growth freely in times of adequate moisture. During drought some leaves or branches cease to function thus minimising maintenance requirements."</p>

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	<p>WRA Specialist. 2016. Personal Communication</p>	<p>Unknown</p>



**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized
- Garden & crop weed
- Potential environmental weed
- Other *Persicaria* species are invasive
- Potentially allelopathic
- Alternate host of pathogens
- Shade-tolerant
- Tolerates many soil types
- Forms dense mats
- Ligneous root
- Reproduces by seeds & vegetatively by rooting from nodes
- Can reach maturity in under 1 growing season
- Seeds dispersed by water, in soil & as garden waste, & intentionally by people
- Seeds can also be dispersed by birds
- Resprouts after fire & from rootstock

Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Palatable to animals
- Ornamental
- Herbicides can provide effective control