

Taxon: <i>Richardia scabra</i> L.	Family: Rubiaceae
Common Name(s): Mexican clover	Synonym(s): <i>Richardsonia scabra</i> (L.) A. St.-Hil.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 9 Feb 2017
WRA Score: 12.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Annual Herb, Disturbance Weed, Crop Weed, Fodder, Seed Bank

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	n=0, y = 2*multiplier (see Appendix 2)	n
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		
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	n
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		

Qsn #	Question	Answer Option	Answer
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		
604	Self-compatible or apomictic		
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)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	n
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	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m ²)		
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		
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
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	[Not domesticated] " <i>Richardia scabra</i> is widely distributed in the American tropics, where the species is undoubtedly native, and it extends into the warmer temperate regions of the United States"

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2017. 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. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 8 Feb 2017]	"Native: Northern America Northern Mexico: Mexico - Sinaloa, - Tamaulipas South-Central U.S.A.: United States - Texas Southeastern U.S.A.: United States - Alabama, - Arkansas, - Florida, - Georgia, - Louisiana, - Mississippi, - North Carolina, - South Carolina, - Virginia Southern Mexico: Mexico - Campeche, - Guerrero, - Jalisco, - Michoacan, - Oaxaca, - Puebla, - Tabasco, - Veracruz Southern America Caribbean: Cuba; Jamaica; Puerto Rico Central America: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Venezuela Western South America: Bolivia; Colombia; Ecuador; Peru"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 8 Feb 2017]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	[Broad distribution and elevation range] " <i>Richardia scabra</i> is widely distributed in the American tropics, where the species is undoubtedly native, and it extends into the warmer temperate regions of the United States. It inhabits savannas and grasslands in sandy soil from high tropical mountains to sea level, often as a waif."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Feb 2017]	"Native: Northern America Northern Mexico: Mexico - Sinaloa, - Tamaulipas South-Central U.S.A.: United States - Texas Southeastern U.S.A.: United States - Alabama, - Arkansas, - Florida, - Georgia, - Louisiana, - Mississippi, - North Carolina, - South Carolina, - Virginia Southern Mexico: Mexico - Campeche, - Guerrero, - Jalisco, - Michoacan, - Oaxaca, - Puebla, - Tabasco, - Veracruz Southern America Caribbean: Cuba; Jamaica; Puerto Rico Central America: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Venezuela Western South America: Bolivia; Colombia; Ecuador; Peru"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"Discontinuous and presumed adventive distributions are recorded for the United States (Indiana) and Africa (Rhodesia, Tanzania, Transvaal). <i>Richardia scabra</i> is not as yet a pantropic weed, for it has not been found in the West Indies beyond Cuba and Jamaica nor east of Guyana in South America. Outside of the New World it is known only in eastern and southern Africa."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Oppenheimer, Hank L. 2003. New plant records from Maui and Hawai'i Counties. <i>Bishop Museum Occasional Papers</i> . 73: 3-30	"First reported as naturalized in the Pacific, Lorence et al. (1995:50-51) cited specimens collected on Kaua'i. Recently this species has been collected on Maui. Material examined: MAUI: West Maui, Lahaina Dist, Mo'omoku, at edge of pineapple field, 366 m, 29 Mar 2001, Oppenheimer & G. Shea H30147."

Qsn #	Question	Answer
	<p>Lorence, D.H., Flynn, T.W. & Wagner, W.L. 1995. Contributions to the flora of Hawai'i. III. New additions, range extensions, and rediscoveries of flowering plants. Bishop Museum Occasional Papers 41: 19-58</p>	<p>"Lewis & Oliver (1974: 282) recorded <i>Richardia scabra</i> as being native to tropical America and elsewhere adventive in the continental U.S.A. (Indiana) and Africa. This is a new state record and, indeed, the first record of it on any Pacific island. On Kauai it was found growing in a sugarcane field, suggesting it was introduced as a weed. <i>Richardia brasiliensis</i> Gomes, also naturalized in the Hawaiian archipelago, has mericarps that are adaxially broadly and openly concave with a slim median keel, whereas those of <i>R. scabra</i> are adaxially closed to a narrow groove or sulcus. These 2 species are otherwise similar in morphology. Material examined. KAUAI: Lihue District, sugar cane road E of Omoe (Hoary Head Mtn. Range), 158–170 m (520–560 ft), 20 Sep 1990, M. Kiehn & T. Flynn MK-900920–1/1 (PTBG, US, WU), MK-900917–2/1 (PTBG, WU); Lihue District, Hulemalu Road near junction with Halehaka Road, along cane ditch [ca. 67 m], 3 Oct 1985, T. Flynn 1245 (PTBG)."</p>
	<p>USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 8 Feb 2017]</p>	<p>"Naturalized: . natzd. in paleotropics & perhaps in some parts of Western Hemisphere"</p>
	<p>Pratt, L. W. & Bio, K. F. 2012. New plant records from Hawai'i Island. Bishop Museum Occasional Papers 113: 75-80</p>	<p>"<i>Richardia scabra</i> L. New island record <i>Richardia scabra</i>, a weedy herb with no common name, was first reported as a new state record in 1995 from collections made on the island of Kaua'i (Lorence et al. 1995). Subsequently, the species was documented from Maui (Oppenheimer 2003). After review of specimens identified as <i>R. brasiliensis</i> in the Bishop Museum Herbarium Pacificum, several vouchered specimens were reassigned to <i>R. scabra</i> (Imada et al. 2008), and <i>Richardia scabra</i> was recognized as present on O'ahu and Moloka'i, as well as Kaua'i and Maui. The species is now known also from Hawai'i Island, where the following specimen was collected in a disturbed area near buildings at the Kahuku Unit of Hawai'i Volcanoes National Park in 2005. Material examined. HAWAII: Hawai'i Volcanoes National Park, Kahuku Unit, in grounds of ranch house, Ka'u distr, elevation ca 700 m, uncommon between house and jeep road, prostrate weed, 11 Oct 2005, L.W. Pratt 3556."</p>

Qsn #	Question	Answer
	<p>Imada, C.T., James, S.A., Kennedy, B.H. (2008). New plant records from Herbarium Pacificum for 2007. Bishop Museum Occasional Papers 100: 12-16</p>	<p>"Wagner et al. (1990) recognized a single naturalized species of <i>Richardia</i> in Hawai'i, <i>R. brasiliensis</i> Gomes. Previous Hawaiian botanists had identified the weed locally as <i>R. scabra</i> L. (Hillebrand 1888 [as <i>Richardsonia scabra</i> (L.) St. Hil.]; Degener 1937). Wagner et al. (1990) however, referred to this binomial as a misapplication to <i>R. brasiliensis</i>, whose distribution in the State was given as Kaua'i, O'ahu, Lāna'i, Maui, and Hawai'i [and later recorded from Moloka'i as well (Oppenheimer 2006:13)]. Lorence et al. (1995: 50–51) subsequently reported true <i>R. scabra</i> naturalized on Kaua'i, and Oppenheimer (2003: 23) added a new record for Maui. Lorence et al. (1995) described the essential differences between the two taxa: "<i>Richardia brasiliensis</i> . . . has mericarps that are adaxially broadly and openly concave with a slim median keel, whereas those of <i>R. scabra</i> are adaxially closed to a narrow groove or sulcus. These 2 species are otherwise similar in morphology." Subsequent careful examination of specimens identified as <i>R. brasiliensis</i> in Herbarium Pacificum has led to the reidentification of some O'ahu, Moloka'i, and Maui vouchers as <i>R. scabra</i>. As a result, new island records of <i>R. scabra</i> are here reported for O'ahu and Moloka'i, and its current distribution now includes Kaua'i, O'ahu, Moloka'i, and Maui. The single voucher of <i>R. brasiliensis</i> from Moloka'i and all but one of those from Maui were reassigned to <i>R. scabra</i>, leaving the current distribution of <i>R. brasiliensis</i> as Kaua'i, O'ahu, Lāna'i, Maui, and Hawai'i."</p>
	<p>Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis</p>	<p>"Wastelands; sea level to 200 m. Naturalized in Guangdong, Hainan, and Taiwan [native to the Antilles and North and South America; adventive and naturalized occasionally throughout Old World tropics]."</p>

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	The National Gardening Association. 2017. Florida Pusley (<i>Richardia scabra</i>). https://garden.org/plants/view/123201/Florida-Pusley-Richardia-scabra/ . [Accessed 9 Feb 2017]	"This annual is a real nuisance in both cultivated fields and lawns. Emerges in numbers and becomes a large spreading plant. Fortunately, it is easy to pull or remove by mechanical cultivation. Unless it is controlled it will choke down most vegetable plants and create holes in the lawn. I don't know how far north it goes, but it is a problem in middle Georgia."
	Lorenzi, H. 1991. Plantas Daninhas do Brasil: Terrestres, Aquáticas, Parasitas, Tóxicase Medicinais. 2nd ed. Plantarum Press, Nova Odessa, Brazil	"This nuisance plant is quite frequent, principally infesting...roadsides and vacant lots."
	Dave's Garden. 2017. Florida Pusley <i>Richardia scabra</i> . http://davesgarden.com/guides/pf/go/71314/ . [Accessed 9 Feb 2017]	[Yard and garden weed] "On Aug 21, 2004, xyris from Sebring, FL (Zone 9b) wrote: You think you have it bad in Georgia with this one ... in central Florida it is a PERENNIAL weed! Even the slightest pieces of its thick fleshy taproots left in the ground will resprout, in addition to its prolific seeding. I have seen single plants forming mats up to three feet across. Constantly having to weed this out of my gardens in dry to moist deep sandy soil. " ... "On Aug 11, 2004, deedeeb from DeLand, FL (Zone 9b) wrote: This weed is a big nuisance. It pops up everywhere and I'm constantly pulling it out. " ... "On Aug 6, 2004, Farmerdill from Augusta, GA (Zone 8a) wrote: This is a persistant annual weed. Most complaints are from lawns, but it is a major weed in cultivated crops."

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	Fast, B., Ferrell, J. and Sellers, B. 2015. Florida Pusley Control in Pastures. Publication #SS-AGR-314. University of Florida IFAS Extension, Gainesville, FL	"Florida pusley (<i>Richardia scabra</i> L.) is a common and troublesome weed found in pastures, cultivated fields, waste areas, and roadsides throughout Florida." ... "Florida pusley grows low to the ground and rarely infests fields with good grass cover. However, Florida pusley can become a prevalent weed in open areas during grass establishment or in areas where grass has died. The dense, mat-like nature of this weed makes it difficult for desirable grasses to grow in its presence."

304	Environmental weed	n
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	No evidence. Primarily a weed of agriculture and disturbed sites.

305	Congeneric weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	[Listed as a weed in multiple references] " <i>Richardia brasiliensis</i> (Moq.) Gómez Araceae Cultivated Arid - Refs: 56 1278-N, 1254-A, 1247-N, 1199-A, 1173-A, 1127-W, 1068-W, 1049-N, 956- N, 945-N, 923-A, 876-NI, 869-W, 868- N, 856-N, 853-W, 839-N, 825-N, 822- W, 810-W, 794-N, 777-N, 622-AC, 603- A, 575-A, 407-W, 382-W, 368-E, 362- W, 359-A, 354-N, 301-N, 295-W, 287- N, 269-W, 255-W, 249-G, 245-A, 243- A, 237-W, 236-A, 218-W, 179-W, 170- A, 161-W, 158-W, 121-AZW, 87-W, 85- N, 84-E, 55-A, 51-W, 50-W, 14-A, 13- A, 7-N"
	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	<i>R. brasiliensis</i> is a principal weed of agriculture in Brazil, Rhodesia (Zimbabwe), and Swaziland, and it is a common weed in Argentina, Hawaii, Indonesia, and South Africa.

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Herbs, annual, decumbent or suberect, to 80 cm or longer; stems flattened to subterete, hirsute. Petiole 5–10 mm, hirsute to glabrescent; leaf blade drying membranous to thickly papery, ovate, elliptic, or lanceolate, 1–5 × 0.5–3.5 cm, both surfaces scabrous to glabrescent, base acute to cuneate, apex acute to obtuse; stipule sheaths 1–4 mm, pilose to pilosulous, with 3–15 setae 2–5 mm."

402	Allelopathic	n
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Herbs, annual, decumbent or suberect, to 80 cm or longer; stems flattened to subterete, hirsute." [Rubiaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Hanelt, P. (ed.). 2001. Mansfeld's Encyclopedia of Agricultural and Horticultural Crops, Volume 4. Springer-Verlag, Berlin, Heidelberg, New York	"In southern USA cultivated as forage plant, as green manure, and as soil cover."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Trop. & Subtrop. America. Hispid herb, white flowers, edible by cattle"

405	Toxic to animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	Hanelt, P. (ed.). 2001. Mansfeld's Encyclopedia of Agricultural and Horticultural Crops, Volume 4. Springer-Verlag, Berlin, Heidelberg, New York	"In southern USA cultivated as forage plant, as green manure, and as soil cover." [No evidence]
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Trop. & Subtrop. America. Hispid herb, white flowers, edible by cattle" [No evidence]

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Jackson, C. R., & Simmons, E. G. (1968). Blight of <i>Richardia scabra</i> caused by <i>Alternaria multirostrata</i> sp. n. <i>Phytopathology</i> , 5 (8), 1139-1142	"Abstract : <i>A. multirostrata</i> Simmons & C. R. Jackson is described, causing circular brown leaf spots (9-12 mm diam.) on <i>R. scabra</i> , a common weed in agricultural areas. This is the 1st record of an <i>A. sp.</i> infecting a member of the Rubiaceae. Of 11 plant spp. tested, only <i>R. scabra</i> was susceptible. "

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Useful Tropical Plants Database. 2017. <i>Richardia scabra</i> . http://tropical.theferns.info/viewtropical.php?id=Richardia+scabra . [Accessed 9 Feb 2017]	"Known Hazards None known" ... "The root has been used as a substitute for Ipecac[46]. Known as 'undulated', 'amylaceous', or 'white' Ipecac, it does not contain more than 6 percent, of the active ingredient[460]. The roots of Ipecac contain a number of medically active constituents including isoquinoline alkaloids, tannins and glycosides[254]. They have a violently irritant action, stimulating the gastric and bronchial systems, lowering fevers and preventing cyst formation in amoebic dysentery[238]"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence. Unlikely given habit & habitat] "Herbs, annual, decumbent or suberect, to 80 cm or longer; stems flattened to subterete, hirsute." ... "Wastelands; sea level to 200 m."

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Useful Tropical Plants Database. 2017. <i>Richardia scabra</i> . http://tropical.theferns.info/viewtropical.php?id=Richardia+scabra . [Accessed 9 Feb 2017]	"Prefers a sunny position."

Qsn #	Question	Answer
	Miller, J. H. & Miller, K. V. 2005. Forest Plants of the Southeast and Their Wildlife Uses. University of Georgia Press, Athens, GA	"Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year." [Exploits disturbed habitats. High light environments]
	Dave's Garden. 2017. Florida Pusley <i>Richardia scabra</i> . http://davesgarden.com/guides/pf/go/71314/ . [Accessed 9 Feb 2017]	"Sun Exposure: Full Sun"
	Le Bourgeois, T. et al. 2015. WIKWIO - Weed Identification and Knowledge in the Western Indian Ocean - Web 2.0 participatory portal. European Union programme ACP S&T II, Cirad, IFP, MCIA/MSIRI, FOFIFA, CNDRS eds. http://portal.wikwio.org . [Accessed 9 Feb 2017]	"The species develops on the rich or degraded soils: ferralitic soils, ferruginous soils and alluvial soils, along roadsides and near houses on sunny plots."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"It inhabits savannas and grasslands in sandy soil from high tropical mountains to sea level, often as a waif."
	Useful Tropical Plants Database. 2017. <i>Richardia scabra</i> . http://tropical.theferns.info/viewtropical.php?id=Richardia+scabra . [Accessed 9 Feb 2017]	"Sandy soils, especially in cultivated fields"
	Le Bourgeois, T. et al. 2015. WIKWIO - Weed Identification and Knowledge in the Western Indian Ocean - Web 2.0 participatory portal. European Union programme ACP S&T II, Cirad, IFP, MCIA/MSIRI, FOFIFA, CNDRS eds. http://portal.wikwio.org . [Accessed 9 Feb 2017]	"The species develops on the rich or degraded soils: ferralitic soils, ferruginous soils and alluvial soils, along roadsides and near houses on sunny plots."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"Annuals erect to decumbent, the often sprawling stems to 8 dm long, loosely branching, hirsute, not usually rooting at the nodes."

412	Forms dense thickets	y
	Source(s)	Notes
	Miller, J. H. & Miller, K. V. 2005. Forest Plants of the Southeast and Their Wildlife Uses. University of Georgia Press, Athens, GA	"Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year."

501	Aquatic	n
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	[Terrestrial] "It inhabits savannas and grasslands in sandy soil from high tropical mountains to sea level, often as a waif."

502	Grass	n
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Qsn #	Question	Answer
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 8 Feb 2017]	Family: Rubiaceae Subfamily: Rubioideae Tribe: Spermacoceae
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 8 Feb 2017]	Family: Rubiaceae Subfamily: Rubioideae Tribe: Spermacoceae
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"Annuals erect to decumbent, the often sprawling stems to 8 dm long, loosely branching, hirsute, not usually rooting at the nodes."
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Feb 2017]	No evidence. Widespread native and introduced ranges
602	Produces viable seed	y
	Source(s)	Notes
	Useful Tropical Plants Database. 2017. <i>Richardia scabra</i> . http://tropical.theferns.info/viewtropical.php?id=Richardia+scabra . [Accessed 9 Feb 2017]	"Propagation Seed -"
	Miller, J. H. & Miller, K. V. 2005. <i>Forest Plants of the Southeast and Their Wildlife Uses</i> . University of Georgia Press, Athens, GA	"Spreads by animal-dispersed seeds. Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year."
603	Hybridizes naturally	
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	[Unknown if natural hybridization currently occurs] "The atypical populations of both species on the edges of tropical Amazonia may represent earlier partially sympatric distributions from a time when hybridization could occur, with subsequent restriction of distribution to the north for <i>R. scabra</i> and to the south for <i>R. grandiflora</i> to more suitable habitats."

Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Ramírez, N. (2005). Plant sexual systems, dichogamy, and herkogamy in the Venezuelan Central Plain. <i>Flora-Morphology, Distribution, Functional Ecology of Plants</i> , 200(1), 30-48	[Herkogamy may promote outcrossing] "Floral features that have been commonly interpreted as mechanisms promoting outcrossing include self-incompatibility, unisexuality, dichogamy, and herkogamy (Lloyd and Webb, 1986)." ... "Other strategies that may reduce self-pollination include temporal separation of sexual expression (dichogamy) and spatial separation of sexual organs (herkogamy), which are widespread in outcrossing angiosperms and play a vital role in the successful functioning of blossoms (Webb and Lloyd, 1986)." [Appendix A - <i>Richardia scabra</i> - Sexual system: H, hermaphrodite; Temporal variation in sex expression: A, adichogamy (= homogamy); Herkogamy: HE, herkogamy]
	Cruz, R. M., & Martins, C. F. (2015). Pollinators of <i>Richardia grandiflora</i> (Rubiaceae): an Important Ruderal Species for Bees <i>Neotropical Entomology</i> , 44(1), 21-29	[Related species presumably self-incompatible] "In this study, the low results of hand self-pollination indicate that <i>R. grandiflora</i> is self-incompatible. Moreover, in <i>R. grandiflora</i> , the stigma is positioned above the anthers, which characterizes herkogamy—spatial separation of anthers and stigmas in hermaphrodite flowers—that can be interpreted as a morphological adaptation to avoid self-pollination (Richards 1997)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Cruz, R. M., & Martins, C. F. (2015). Pollinators of <i>Richardia grandiflora</i> (Rubiaceae): an Important Ruderal Species for Bees <i>Neotropical Entomology</i> , 44(1), 21-29	"For <i>Richardia scabra</i> , visits by Africanized honeybees and species of <i>Augochloropsis</i> were observed (Deyrup et al 2002). Finally, there are records for Africanized honeybees, <i>T. spinipes</i> , and <i>Melissoptila</i> in <i>Richardia</i> spp. (Lorenzon et al 2003, Krug 2007)."
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. <i>Flora of China</i> . Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Inflorescences ca. 1 cm in diam. (not including leaflike bracts or subtending leaves). Calyx with ovary portion obovoid, 1–1.5 mm, papillose to hispidulous; lobes 6, lanceolate or narrowly lanceolate, 1.5–3.5 mm, glabrescent, margins ciliate, apex acute. Corolla white, glabrous inside and outside; tube 2–8 mm; lobes 6, triangular, 1–3 mm."
	Pellett, F. C. 1920. American Honey Plants: Together with Those which are of Special Value to the Beekeeper as Sources of Pollen. <i>American Bee Journal</i> , Hamilton, Illinois	"MEXICAN CLOVER (<i>Richardia scabra</i>). The name clover is a misnomer, for this plant does not belong to the clovers but to an entirely different group. It is a luxuriant annual weed growing to a height of two feet or more. The bees are reported as working upon it quite late in the season. The plant was introduced from the tropics and has become naturalized in Georgia, Florida, Alabama and Mississippi."

606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"Annuals erect to decumbent, the often sprawling stems to 8 dm long, loosely branching, hirsute, not usually rooting at the nodes." [Unknown. Possibly infrequent mode of reproduction]

607	Minimum generative time (years)	1
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Qsn #	Question	Answer
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	"Annuals erect to decumbent, the often sprawling stems to 8 dm long, loosely branching, hirsute, not usually rooting at the nodes."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Le Bourgeois, T. et al. 2015. WIKWIO - Weed Identification and Knowledge in the Western Indian Ocean - Web 2.0 participatory portal. European Union programme ACP S&T II, Cirad, IFP, MCIA/MSIRI, FOFIFA, CNDRS eds. http://portal.wikwio.org . [Accessed 9 Feb 2017]	" <i>Richardia scabra</i> is an annual to shortly perennial herb depending on conditions, which is propagated by seeds. These are dispersed by water and the soil working tools."

702	Propagules dispersed intentionally by people	n
	Source(s)	Notes
	Lewis, W., & Oliver, R. (1974). Revision of <i>Richardia</i> (Rubiaceae). <i>Brittonia</i> , 26(3), 271-301	" <i>Richardia scabra</i> is not as yet a pantropic weed, for it has not been found in the West Indies beyond Cuba and Jamaica nor east of Guyana in South America. Outside of the New World it is known only in eastern and southern Africa." [No evidence of intentional dispersal, but widely distributed as a weed]

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Miller, J. H. & Miller, K. V. 2005. Forest Plants of the Southeast and Their Wildlife Uses. University of Georgia Press, Athens, GA	"Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year." [Potentially. No documented evidence, but commonly found as a weed in pastures and croplands]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Fruit schizocarpous, subglobose to obovoid or tricocous, dry, bony, with calyx limb deciduous; mericarps 3 or 4, indehiscent, 1-celled with 1 seed, ellipsoid to angled, usually papillose to muricate on dorsal surface (i.e., abaxially) and with 1 or more grooves and sometimes papillose to muricate on ventral surface (i.e., adaxially); seeds medium-sized, ellipsoid to plano-convex; endosperm corneous; cotyledon leaflike; radicle cylindrical, hypogeous."

Qsn #	Question	Answer
705	Propagules water dispersed	y
	Source(s)	Notes
	Le Bourgeois, T. et al. 2015. WIKWIO - Weed Identification and Knowledge in the Western Indian Ocean - Web 2.0 participatory portal. European Union programme ACP S&T II, Cirad, IFP, MCIA/MSIRI, FOFIFA, CNDRS eds. http://portal.wikwio.org . [Accessed 9 Feb 2017]	"Richardia scabra is an annual to shortly perennial herb depending on conditions, which is propagated by seeds. These are dispersed by water and the soil working tools."

706	Propagules bird dispersed	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Fruit schizocarpous, subglobose to obovoid or tricocous, dry, bony, with calyx limb deciduous" [Not fleshy-fruited. No evidence]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Miller, J. H. & Miller, K. V. 2005. Forest Plants of the Southeast and Their Wildlife Uses. University of Georgia Press, Athens, GA	"Nutlets leathery, separating into 3-4 parts with seeds 3-3.5 mm long, 2-grooved." [No means of external attachment]

708	Propagules survive passage through the gut	
	Source(s)	Notes
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"edible by cattle" [Unknown if seeds would be consumed by cattle, and if so, whether or not they would remain viable upon excretion]

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Le Bourgeois, T. et al. 2015. WIKWIO - Weed Identification and Knowledge in the Western Indian Ocean - Web 2.0 participatory portal. European Union programme ACP S&T II, Cirad, IFP, MCIA/MSIRI, FOFIFA, CNDRS eds. http://portal.wikwio.org . [Accessed 9 Feb 2017]	"Madagascar: <i>R. scabra</i> is a weed recently introduced in Madagascar; rapidly expanding across all sub-humid areas of the island, it has become a common and locally abundant species. The major seed production with staggered germination early in the cultural season allows the species to adapt and to infest all rainfed farming systems, especially upland rice, maize and cassava." [Seed densities unknown]
	Miller, J. H. & Miller, K. V. 2005. Forest Plants of the Southeast and Their Wildlife Uses. University of Georgia Press, Athens, GA	"Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year." [Densities unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Biswas, P. K., Bell, P. D., Crayton, J. L., & Paul, K. B. (1975). Germination behavior of Florida pusley seeds. I. Effects of storage, light, temperature and planting depths on germination. <i>Weed Science</i> , 23(5): 400-403	"Abstract. Freshly harvested Florida pusley (<i>Richardia scabra</i> L.) seeds do not germinate in continuous dark, but do germinate if exposed to more than 2 hr of light each day. Increasing periods of illumination up to 16 hr per day increases the germination percentages. Scarification increases the rate of germination in the presence of light. Scarification also causes germination of seeds stored for 8 months or longer in total darkness. The seeds fail to germinate at constant temperatures of 15 C or less and at 40 C. Almost complete germination occurs at a constant temperature of 30 C, or at alternating temperatures of 20 and 30 C. The seeds germinate equally well in the pH range of 3 to 8. Increasing depths of planting reduces percent emergence, and none of the seedlings emerge from a depth of 1.5 cm or more. Air-dried seeds can be stored either at 5 or at 25 C without losing viability, at least up to a period of 1 year after harvest. Moist storage of seeds at 5 C reduces germinability." [Not in soil, but no loss of viability for a year]
	Chivinge, O. A., Munjoma, L., & Mashingaidze, A. B. (1997). Germination and seedling emergence in Mexican clover (<i>Richardia scabra</i> L.) and its interference with groundnut (<i>Arachis hypogea</i> L.). <i>Crop Research Hisar</i> 14: 191-198	"Germination, which decreased with seed age, was highest (58.5%) in 1-year-old seeds, whereas 9-year-old seeds failed to germinate." [Probably not in soil, but still a high germination percentage after 1 year]
	Miller, J. H. & Miller, K. V. 2005. <i>Forest Plants of the Southeast and Their Wildlife Uses</i> . University of Georgia Press, Athens, GA	"Seeds persist for long periods on abandoned crop lands and germinate after timber harvesting, site preparation, or burning, yielding dense colonies lasting only a year."

803	Well controlled by herbicides	y
	Source(s)	Notes
	Fast, B., Ferrell, J. and Sellers, B. 2015. Florida Pusley Control in Pastures. Publication #SS-AGR-314. University of Florida IFAS Extension, Gainesville, FL	"After Florida pusley has become well established, it can be difficult to control with common pasture herbicides, such as 2,4-D. Several new herbicides have recently been developed for pasture use, but their efficacy on Florida pusley is not known. Research was conducted to determine the efficacy of several commonly used pasture herbicides on Florida pusley plants that were approximately four inches in size when herbicides were applied. Table 1 details Florida pusley control two, four, and eight weeks after treatment (WAT), as well as the approximate costs of treatments. GrazonNext HL, GrazonNext HL used in combination with Vista XRT, and GrazonNext HL used in combination with Pasturegard HL provided excellent Florida pusley control (90% or greater). It should be noted, however, that GrazonNext HL is a relatively slow-acting herbicide and often requires up to four weeks for significant weed control to occur. Control provided by Pasturegard HL was fair (84% at eight WAT), and control provided by Vista XRT (18% at eight WAT) and Weedmaster (70% at eight WAT) was much lower. As mentioned above, control of Florida pusley becomes more difficult as the plant matures. Therefore, if applications are to be made to plants larger than four inches, it is likely that Pasturegard HL and Weedmaster will not provide acceptable levels of control. For larger plants, GrazonNext HL used in combination with Vista XRT or Pasturegard HL will most likely be necessary."

Qsn #	Question	Answer
	Hall, D. W., Vandiver, V. V. and Ferrell, J. A. 2006. Florida Pusley, <i>Richardia scabra</i> . Weeds in Florida, SP 37. University of Florida IFAS Extension, Gainesville, FL	Prowl, Sonalan, and Treflan all provide effective control of Florida pusley

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	The National Gardening Association. 2017. Florida Pusley (<i>Richardia scabra</i>). https://garden.org/plants/view/123201/Florida-Pusley-Richardia-scabra/ . [Accessed 9 Feb 2017]	[Reports effective mechanical control. Anecdotal] "This annual is a real nuisance in both cultivated fields and lawns. Emerges in numbers and becomes a large spreading plant. Fortunately, it is easy to pull or remove by mechanical cultivation. Unless it is controlled it will choke down most vegetable plants and create holes in the lawn. I don't know how far north it goes, but it is a problem in middle Georgia."
	Dave's Garden. 2017. Florida Pusley <i>Richardia scabra</i> . http://davesgarden.com/guides/pf/go/71314/ . [Accessed 9 Feb 2017]	[Reports ineffective mechanical control & resprouting. Anecdotal] "Even the slightest pieces of its thick fleshy taproots left in the ground will resprout, in addition to its prolific seeding. I have seen single plants forming mats up to three feet across. Constantly having to weed this out of my gardens in dry to moist deep sandy soil. "

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown. A widely distributed weed with no significant natural enemies reported

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Thrives in tropical climates
- Widely naturalized (including Hawaiian Islands of Kauai, Oahu, Maui & Molokai)
- A disturbance-adapted weed of lawns, gardens, and crops
- Other *Richardia* species are regarded as weeds
- Forms dense colonies that may exclude other vegetation
- Reproduces by seeds
- Annual, reaching maturity in one growing season
- Seeds dispersed by water, in soil, & possibly by other means
- Seeds form a persistent seed bank

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Provides fodder for livestock & green manure
- May not thrive in shaded positions
- May be self-incompatible
- Herbicides reported to provide effective control