

**Family:** *Amaranthaceae*

**Taxon:** *Gomphrena globosa*

**Synonym:** NA

**Common Name:** Globe amaranth  
Bachelor's button  
Bozu  
Lehua mau loa

<b>Questionnaire :</b>	current 20090513	<b>Assessor:</b>	Chuck Chimera	<b>Designation:</b> H(HPWRA)
<b>Status:</b>	Assessor Approved	<b>Data Entry Person:</b>	Chuck Chimera	<b>WRA Score 8</b>
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
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	n
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)	n
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		y=1, n=0	n
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	y
406	Host for recognized pests and pathogens		y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle		y=1, n=0	n
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	
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	y=1, n=-1	
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
803	Well controlled by herbicides	y=-1, n=1	
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 8

## Supporting Data:

101	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Is the species highly domesticated? No] "Probably native to tropical America and long transported around the world as an ornamental." [Although widely cultivated, there is no evidence that this species has been selected for less weedy traits]
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Species suited to tropical or subtropical climate(s) 2-high] "Probably native to the Neotropics although originally described from India, now cultivated and escaped in many parts of the world;"
202	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Quality of climate match data? 2-high] "Probably native to the Neotropics although originally described from India, now cultivated and escaped in many parts of the world;"
203	2011. Floridata. <i>Gomphrena globosa</i> . <a href="http://www.floridata.com/ref/g/gomp_glo.cfm">http://www.floridata.com/ref/g/gomp_glo.cfm</a>	[Broad climate suitability (environmental versatility)? No] "Hardiness: Globe amaranth is an annual grown as a summer bedding plant. It cannot tolerate frost, but it is quite tolerant of summer heat."
204	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Native or naturalized in regions with tropical or subtropical climates? Yes] "Probably native to the Neotropics although originally described from India, now cultivated and escaped in many parts of the world; in Hawaii a popular garden annual (Neal, 1965) and sparingly naturalized at least on O`ahu."
205	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Does the species have a history of repeated introductions outside its natural range? Yes] "...native to tropical America but is widely cultivated in the tropics and temperate regions as a garden herb or is grown in planters for its attractive globose, dark pink or sometimes white or yellow inflorescences."
301	1961. Duke, J.A.. Flora of Panama. Part IV. Fascicle IV. Annals of the Missouri Botanical Garden. 48(1): 1-106.	[Naturalized beyond native range? Yes] "Cultivated and escaped in many regions of the world, this species may be a native of America although it was originally described from India."
301	1995. Lorence, D.H./Flynn, T.W./Wagner, W.L.. Contributions to the flora of Hawai'i. III. New additions, range extensions, and rediscoveries of flowering plants. Bishop Museum Occasional Papers. 41: 19-58.	[Naturalized beyond native range? Yes] "This common garden annual is widely cultivated on Kauai as well as the other main islands, but previously has been reported as being naturalized only on Oahu (Wagner et al. 1990: 193). Material examined. Kauai: Koloa District, about 1.5 miles E of Makawehi Point, Poipu, on cliffs, 25 May 1988, L. Hume et al. 349 (PTBG)."
301	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Naturalized beyond native range? Yes] "Probably native to the Neotropics although originally described from India, now cultivated and escaped in many parts of the world; in Hawaii a popular garden annual (Neal, 1965) and sparingly naturalized at least on O`ahu."
301	2000. Liogier, A.H./ Martorell, L.F.. Flora of Puerto Rico and adjacent islands: a systematic synopsis. La Editorial, UPR, San Juan, Puerto Rico	[Naturalized beyond native range? Yes] "Cultivated and occasionally escaped in Puerto Rico;..."
301	2011. Gardener, M./Guézou, A./Atkinson, R./Buddenhagen, C.. CDF Checklist of Galapagos Introduced Plants. In: Bungartz, F. et al. (eds.). Charles Darwin Foundation Galapagos Species Checklist. Charles Darwin Foundation, Puerto Ayora, Galapagos <a href="http://www">http://www</a> .	[Naturalized beyond native range? Yes, but no evidence in Galapagos] "Origin: Introduced, Cultivated."
302	1978. Womersley, J.S (ed.). Handbooks of the flora of Papua New Guinea, vol. 1.. Melbourne University Press, Melbourne, Australia	[Garden/amenity/disturbance weed? Yes] "occurring as a weed on waste lands but possibly not fully naturalized, at 0-600(?) m altitude"
302	1979. Holm, L. G./Pancho, J.V./Herberger, J.P./Plucknett, D.L.. A Geographical Atlas of World Weeds. John Wiley and Sons, New York, NY	[Garden/amenity/disturbance weed? Yes] Listed as "Present as a weed (the species is present and behaves as a weed, but its rank of importance is unknown) in Ghana and the Philippines
303	2007. Randall, R.P.. Global Compendium of Weeds - <i>Gomphrena globosa</i> [Online Database]. <a href="http://www.hear.org/gcw/species/gomphrena_globosa/">http://www.hear.org/gcw/species/gomphrena_globosa/</a>	[Agricultural/forestry/horticultural weed? No] No evidence

304	2000. Staples, G.W./Herbst, D.R./Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Agricultural/forestry/horticultural weed? No. Included as a potential environmental weed, but no evidence of environmental impacts are given]
305	1979. Holm, L. G./Pancho, J.V./Herberger, J.P./Plucknett, D.L.. A Geographical Atlas of World Weeds. John Wiley and Sons, New York, NY	[Congeneric weed? Yes] <i>G. celosioides</i> is considered a serious weed of agriculture in Taiwan and Thailand.
305	2001. North West Weeds. Khaki weed. <a href="http://www.northwestweeds.nsw.gov.au/khaki_weed.htm">http://www.northwestweeds.nsw.gov.au/khaki_weed.htm</a>	[Congeneric weed? Yes] "Also included in these photos is another plant with some similarities to khaki weed, commonly called gomphrena weed, or "soft khaki weed" - <i>Gomphrena celosioides</i> Mart. <i>Gomphrena</i> weed is invasive, and is quite widespread in the north west. Unlike khaki weed, gomphrena does not have annoying "burrs", but it's still a nuisance weed in lawns."
305	2008. Weber, E./Sun, S.-G./Li, B.. Invasive alien plants in China: diversity and ecological insights. Biological Invasions. 10: 1411-1429.	[Congeneric weed? Yes] "Appendix 1 Invasive alien plant species in China" [List includes <i>Gomphrena celosioides</i> ]
305	2011. Save Our Waterways Now. Weeds to Whack - <i>Gomphrena celosioides</i> (AMARANTHACEAE) Gomphrena Weed. <a href="http://www.saveourwaterwaysnow.com.au/01 cms/details_pop.asp?ID=1194">http://www.saveourwaterwaysnow.com.au/01 cms/details_pop.asp?ID=1194</a>	[Congeneric weed? Yes] " <i>Gomphrena celosioides</i> is an annual or perennial herb, sparsely branched, with white hairs, prostrate or sprawling, white flowers, prefers sandy soils. Originally from South America, it has spread rapidly. Usually a weed of lawns, parks, roadsides and disturbed areas."
401	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces spines, thorns or burrs? No] "Annual herbs; stems erect, 1.5-6 dm long, young parts and nodes appressed pilose. Leaves oblong-elliptic to oblong-obovate, 5-15 cm long, 2-6 cm wide, moderately pilose, petioles 1-1.5 cm long, the upper 1-2 sets of leaves sessile."
402	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Allelopathic? No] "...widely cultivated in the tropics and temperate regions as a garden herb or is grown in planters for its attractive globose, dark pink or sometimes white or yellow inflorescences." [Popular cultivated plant with no anecdotal evidence of allelopathic properties]
403	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Parasitic? No] "Annual herbs; stems erect," [Amaranthaceae]
404	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	[Unpalatable to grazing animals? No] "Palatability: Moderate."
405	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	[Toxic to animals? Yes] "Toxicity to Goats: Toxic, low risk. Toxicity to Other Species: Toxic to sheep, cattle, horses and donkeys. Palatability: Moderate. Poisonous Principle: Oxalates. Effects: Signs and symptoms; Acute oxalate poisoning causes muscle tremors, staggering gait, collapse and rapid death. Health and production problems; Chronic kidney disease with associated ill thrift is possible when large amounts of these plants are eaten over long periods."
406	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Gomphrena globosa</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=A115">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=A115</a>	[Host for recognized pests and pathogens? No] "Problems: No serious insect or disease problems. Taller plants may need staking. Mildew may attack drought-stressed plants."
407	1961. Duke, J.A.. Flora of Panama. Part IV. Fascicle IV. Annals of the Missouri Botanical Garden. 48(1): 1-106.	[Causes allergies or is otherwise toxic to humans? No evidence] "Several species are widely cultivated, as is the "bachelor's button", <i>G. globosa</i> , a rather handsome ornamental with edible leaves."
408	1961. Duke, J.A.. Flora of Panama. Part IV. Fascicle IV. Annals of the Missouri Botanical Garden. 48(1): 1-106.	[Creates a fire hazard in natural ecosystems? No] No evidence in Panama
408	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Creates a fire hazard in natural ecosystems? No] No evidence in Hawaii
408	2000. Liogier, A.H./ Martorell, L.F.. Flora of Puerto Rico and adjacent islands: a systematic synopsis. La Editorial, UPR, San Juan, Puerto Rico	[Creates a fire hazard in natural ecosystems? No] No evidence in Puerto Rico
409	2011. Floridata. <i>Gomphrena globosa</i> . <a href="http://www.floridata.com/ref/g/gomp_glo.cfm">http://www.floridata.com/ref/g/gomp_glo.cfm</a>	[Is a shade tolerant plant at some stage of its life cycle? No] "Light: Full sun."

409	2011. Missouri Botanical Garden. Kemper Center for Home Gardening PlantFinder - <i>Gomphrena globosa</i> . <a href="http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=A115">http://www.mobot.org/gardeninghelp/plantfinder/plant.asp?code=A115</a>	[Is a shade tolerant plant at some stage of its life cycle? No] "Easily grown in average, well-drained soils in full sun."
410	2009. Lemke, C.. Cal's Plant of the Week - <i>Gomphrena globosa</i> - Globe Amaranth. University of Oklahoma Department of Botany & Microbiology, <a href="http://www.plantoftheweek.org/week493.shtml">http://www.plantoftheweek.org/week493.shtml</a>	[Tolerates a wide range of soil conditions? Yes] "They are not fussy about soil type and will even grow in very poor soils."
410	2011. Floridata. <i>Gomphrena globosa</i> . <a href="http://www.floridata.com/ref/g/gomp_glo.cfm">http://www.floridata.com/ref/g/gomp_glo.cfm</a>	[Tolerates a wide range of soil conditions? Yes] "It tolerates poor soils, heat and drought, and was once a favorite in British gardens."
411	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Climbing or smothering growth habit? No] "Annual herbs; stems erect, 1.5-6 dm long, young parts and nodes appressed pilose."
412	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Forms dense thickets? No] No evidence in Hawaii
412	2000. Liogier, A.H./ Martorell, L.F.. Flora of Puerto Rico and adjacent islands: a systematic synopsis. La Editorial, UPR, San Juan, Puerto Rico	[Forms dense thickets? No] No evidence in Puerto Rico
412	2011. Gardener, M./Guézou, A./Atkinson, R./Buddenhagen, C.. CDF Checklist of Galapagos Introduced Plants. In: Bungartz, F. et al. (eds.). Charles Darwin Foundation Galapagos Species Checklist. Charles Darwin Foundation, Puerto Ayora, Galapagos <a href="http://www">http://www</a> .	[Forms dense thickets? No] No evidence in the Galapagos
501	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Aquatic? No] "Annual herbs; stems erect..." [Terrestrial]
502	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Grass? No] Amaranthaceae
503	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Nitrogen fixing woody plant? No] Amaranthaceae
504	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)? No] "Annual herbs; stems erect, 1.5-6 dm long, young parts and nodes appressed pilose." [Amaranthaceae not known to be geophytes]
601	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Evidence of substantial reproductive failure in native habitat? Unknown] "Probably native to the Neotropics although originally described from India..."
602	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Produces viable seed? Yes] "Utricles 1.5-2.5 mm long. Seed reddish brown, 1.5-2 mm long"
602	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Produces viable seed? Yes] "Fruit a tiny, dry, one-seeded utricle. Propagate by seeds."
602	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Produces viable seed? Yes] "Propagation is usually from seed."
603	2011. WRA Specialist. Personal Communication.	[Hybridizes naturally? Unknown]

604	1961. Duke, J.A.. Flora of Panama. Part IV. Fascicle IV. Annals of the Missouri Botanical Garden. 48(1): 1-106.	[Self-compatible or apomictic? Unknown] "Flowers perfect; bracts persistent, ovate, acuminate, 3-4 mm."
605	1995. Bush, M.B.. Neotropical Plant Reproductive Strategies and Fossil Pollen Representation. The American Naturalist. 145(4): 594-609.	[Requires specialist pollinators? No] "Appendix. Table A1. Reproductive Strategies and Pollination Mechanisms" [Gomphrena genus listed as Hermaphroditic and with bees as the pollinators]
605	2004. Machado, I.C./Lopes, A.V.. Floral Traits and Pollination Systems in the Caatinga, a Brazilian Tropical Dry Forest. Annals of Botany. 94: 365-376.	[Requires specialist pollinators? No] "Bawa et al. (1985) reported that flowers with pale colours visited by small diverse insects were found to be smaller than 10 mm. Among the species we studied, small flowers were found to be pollinated by diverse small insects (sensu Bawa and Opler, 1975; Bawa et al., 1985). However, when small flowers are organized in dense inflorescences it allows visits by medium-large bees, and also by bats and hummingbirds. For this reason, the generalist pollination system should not be inferred based only on the size of the flowers. Examples of species with small flowers which are, nonetheless, broadly attractive due to their organization in dense inflorescences are found in many Leguminosae, such as Anadenanthera colubrina, Mimosa tenuiflora, Acacia farnesiana, and Parapiptadenia zehntneri, as well as in other families such as Combretaceae (Combretum hilarianum and C. pisonioides), and Amaranthaceae (Gomphrena vago)." [Similar floral morphology and ability to set seed suggest that Gomphrena globosa does not require specialized pollinators]
606	2005. Staples, G.W./Herbst, D.R.. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[Reproduction by vegetative fragmentation? No] "Propagation is usually from seed." [No evidence of vegetative spread]
607	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Minimum generative time (years)? 1] "Annual herbs..."
701	2000. Staples, G.W./Herbst, D.R./Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)? Potentially] "Curiously, there are rather few cultivated plants that can be cited as examples of adhesive mechanical dispersal. Among those cultivated in Hawai'i we can mention Cuphea spp. and Plumbago auriculata, which have sticky, glandular-hairy floral tubes that enclose the fruits/seeds and provide a carrier for them; Ocimum basilicum, which has dry nutlets (often mistaken for seeds) that exude a sticky mucilage when wetted; Gomphrena globosa, with its chaffy bract and entangling hairs on the outer fruit wall."
702	2000. Whistler, W.A.. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	[Propagules dispersed intentionally by people? Yes] "...native to tropical America but is widely cultivated in the tropics and temperate regions as a garden herb or is grown in planters for its attractive globose, dark pink or sometimes white or yellow inflorescences."
703	2011. WRA Specialist. Personal Communication.	[Propagules likely to disperse as a produce contaminant? No] No evidence
704	2000. Staples, G.W./Herbst, D.R./Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules adapted to wind dispersal? Yes] "Table 2. Annotated checklist of invasive or potentially invasive cultivated plants in Hawai'i with dispersal syndrome" [Gomphrena globosa...Dispersal syndrome: W = wind]
705	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules water dispersed? No] "Utricles 1.5-2.5 mm long. Seed reddish brown, 1.5-2 mm long" [Possible, but unlikely, and no mechanisms for water dispersal]
706	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules bird dispersed? No] "Utricles 1.5-2.5 mm long. Seed reddish brown, 1.5-2 mm long" [Not fleshy-fruited]
707	2000. Staples, G.W./Herbst, D.R./Imada, C.T.. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers. 65: 1-35.	[Propagules dispersed by other animals (externally)? Potentially] "Curiously, there are rather few cultivated plants that can be cited as examples of adhesive mechanical dispersal. Among those cultivated in Hawai'i we can mention Cuphea spp. and Plumbago auriculata, which have sticky, glandular-hairy floral tubes that enclose the fruits/seeds and provide a carrier for them; Ocimum basilicum, which has dry nutlets (often mistaken for seeds) that exude a sticky mucilage when wetted; Gomphrena globosa, with its chaffy bract and entangling hairs on the outer fruit wall."

708	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Propagules survive passage through the gut? Unknown] "Utricles 1.5-2.5 mm long. Seed reddish brown, 1.5-2 mm long" [unknown, but unlikely that seeds would be consumed]
801	2011. WRA Specialist. Personal Communication.	[Prolific seed production (>1000/m2)? Unknown]
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a>	[Evidence that a persistent propagule bank is formed (>1 yr)? Unknown] "Storage Conditions: 45% germination after 6 years storage in a desiccator over calcium chloride at room temperature (Nakamura, 1975); seeds maintained for 3-5 years in commercial storage conditions (Priestley, 1986)" [Seed longevity in field conditions unknown]
803	2011. WRA Specialist. Personal Communication.	[Well controlled by herbicides? Unknown] No information found on chemical control or herbicide efficacy
804	2011. WRA Specialist. Personal Communication.	[Tolerates, or benefits from, mutilation, cultivation, or fire? Unknown]
805	2011. WRA Specialist. Personal Communication.	[Effective natural enemies present locally ? Unknown]