

Family: *Begoniaceae*

Taxon: *Begonia foliosa*

Synonym: *Begonia elegans* Kunth **Common Name** Fuchsia begonia
Begonia foliosa var. *australis* L.B. Sm. & B.G. Fern Begonia
Begonia foliosa var. *putzeysiana* (A. DC.) L.E. Fern-Leaf Begonia
Begonia foliosa var. *rotundata* L.B. Sm. & B.G.
Begonia jamesoniana A. DC.
Begonia putzeysiana A. DC.

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	9
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)		
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		
405	Toxic to animals		y=1, n=0		n
406	Host for recognized pests and pathogens		y=1, n=0		n
407	Causes allergies or is otherwise toxic to humans		y=1, n=0		n
408	Creates a fire hazard in natural ecosystems		y=1, n=0		n

409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	
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	
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
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	
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	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 9

Supporting Data:

101	2010. WRA Specialist. Personal Communication. No evidence that species is highly domesticated.	
102	2010. WRA Specialist. Personal Communication. NA	
103	2010. WRA Specialist. Personal Communication. NA	
201	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.	"Native to Venezuela and Colombia"
202	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.	"Native to Venezuela and Colombia"
203	2010. Backyard Gardener. Begonia foliosa (Foliola Begonia). http://www.backyardgardener.com/plantname/pda_ab4d.html	"USDA Hardiness Zone: 10 - 11"
203	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"Hardiness: 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)"
204	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.	"Native to Venezuela and Colombia"
205	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.	"a popular hanging basket specimen" [cultivated as an ornamental in Hawaii and elsewhere]
205	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"This plant has been said to grow in the following regions: Alameda, California Berkeley, California Los Angeles, California San Francisco, California San Leandro, California Fort Lauderdale, Florida"
301	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.	"Unfortunately, it has escaped from cultivation to become sparingly naturalized in moist valleys on the Big Island."
301	2007. Imada, C.T.. New Hawaiian plant records for 2005–2006. Bishop Museum Occasional Papers. 96: 34-41.	"Previously reported as naturalized on Hawai'i (Wagner et al. 1999), <i>B. foliosa</i> is now recorded from O'ahu in very wet native dominated habitat at Mount Ka'ala. This mat-forming herb is described as having brittle stems, making it difficult to remove. The fragmenting stems probably allow it to spread vegetatively. <i>Begonia foliosa</i> var. <i>miniata</i> , the name originally applied to this taxon in Hawai'i (Wagner et al. 1999), has subsequently been determined to be a misapplied name (Staples & Herbst 2005). Material examined. O'AHU:Wai'anae Mts, slopes on SE side of Mt Ka'ala, 1040 m, wet walls just south of stream and waterfall, localized, 4 Jul 1999, S. Perlman & B. Garnett 16703."
301	2007. Tassin, J./Triolo, J./Lavergne, C.. Ornamental plant invasions in mountain forests of Re'union (Mascarene Archipelago): a status review and management directions. African Journal of Ecology. 45(3): 444–447.	"Table 1 List of the ornamental species threatening mountain forests on Reunion. Invasiveness status is evaluated as highly invasive (+++), invasive (++) or potentially invasive but detected only in gardens (+). Some of these species have been detected and eliminated when recorded in mountain forests where they were not present before [<i>Begonia foliosa</i> var. <i>miniata</i> listed as invasive]
302	2007. Tassin, J./Triolo, J./Lavergne, C.. Ornamental plant invasions in mountain forests of Re'union (Mascarene Archipelago): a status review and management directions. African Journal of Ecology. 45(3): 444–447.	"Table 1 List of the ornamental species threatening mountain forests on Reunion. Invasiveness status is evaluated as highly invasive (+++), invasive (++) or potentially invasive but detected only in gardens (+). Some of these species have been detected and eliminated when recorded in mountain forests where they were not present before [<i>Begonia foliosa</i> var. <i>miniata</i> listed as invasive, but insufficient description of impacts to be listed as an environmental weed]
303	2007. Randall, R.P.. Global Compendium of Weeds - <i>Begonia foliosa</i> [Online Database]. Hawaii Ecosystems at Risk Project (HEAR), http://www.hear.org/gcw/species/begonia_foliola/	No evidence of invasiveness in agriculture, horticulture or forestry

304	2007. Tassin, J./Triolo, J./Lavergne, C.. Ornamental plant invasions in mountain forests of Re'union (Mascarene Archipelago): a status review and management directions. African Journal of Ecology. 45(3): 444–447.	"Table 1 List of the ornamental species threatening mountain forests on Reunion. Invasiveness status is evaluated as highly invasive (+++), invasive (++) or potentially invasive but detected only in gardens (+). Some of these species have been detected and eliminated when recorded in mountain forests where they were not present before [Begonia foliosa var. miniata listed as invasive. Potential to be an environmental weed, but not information or description of impacts]
305	2001. Strahm, W.. Invasive species in Mauritius: examining the past and charting the future. Pp. 325-348 in Sandlund et al. (eds.). Invasive Species and Biodiversity Management. Kluwer Academic Publishers, Norwell, MA	"Table 22.5. Other invasive and naturalized species in the Mascarenes" [Begonia cucullata listed as invasive in Reunion]
305	2006. Baret, S./Rouget, M./Richardson, D.M./Lavergne, C./Egoh, B./Dupont, J./Strasberg, D.. Current distribution and potential extent of the most invasive alien plant species on La Réunion (Indian Ocean, Mascarene islands). Austral Ecology. 31: 47–758.	"Appendix I: List of the 46 most widespread invasive alien plants (sensu Richardson et al. 2000) on La Réunion" [list includes Begonia cucullata]
305	2009. Center for Aquatic and Invasive Plants. Wax begonia - Begonia cucullata. University of Florida, http://plants.ifas.ufl.edu/node/65	"Wax begonia has been found in Florida, particularly from the northern and central peninsula west to central panhandle and also in Georgia. Begonias will invade disturbed areas such as roadsides, harvested forests, old fields, overgrazed pastures, and waste places. Because begonias are such prolific seed producers, seeds are thought to be the primary mechanism of dispersal. Begonias can also root very easily, but this mechanism of reproduction may not play a major role under natural conditions."
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.	"Monoecious, succulent subshrubs 3-12 dm tall, from fibrous roots; stems erect, many branched, subglabrous. Leaves numerous, distichous, closely spaced, blades in line with petioles, oblong-obovate to oblong elliptic, slightly asymmetrical, 1.2-5 cm long, 0.8-1.5 (2) cm wide, glabrous or with a few hairs along the veins, margins crenate-serrate and sparsely ciliate, petioles 0.3-0.5 (-0.8) cm long, stipules brown, oblong-lanceolate, 0.4-1 cm long, somewhat persistent."
402	2010. WRA Specialist. Personal Communication.	No evidence of allelopathy
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.	Not parasitic
404	2010. WRA Specialist. Personal Communication.	Palatability unknown
405	2010. WRA Specialist. Personal Communication.	No evidence of toxicity to animals
406	2010. Backyard Gardener. Begonia foliosa (Foliola Begonia). http://www.backyardgardener.com/plantname/pda_ab4d.html	No important pests or pathogens mentioned
407	2010. Backyard Gardener. Begonia foliosa (Foliola Begonia). http://www.backyardgardener.com/plantname/pda_ab4d.html	No mention of toxicity to humans
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.	"Monoecious, succulent subshrubs 3-12 dm tall, from fibrous roots; stems erect, many-branched, subglabrous" [succulent plant unlikely to create fire hazards in natural ecosystems]
409	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"Sun Exposure: Partial to Full Shade"
410	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)"
411	2007. Imada, C.T.. New Hawaiian plant records for 2005–2006. Bishop Museum Occasional Papers. 96: 34-41.	"This mat-forming herb is described as having brittle stems, making it difficult to remove. The fragmenting stems probably allow it to spread vegetatively." [mat-forming habit gives this species the potential to smother other vegetation]

412	2007. Imada, C.T.. New Hawaiian plant records for 2005–2006. Bishop Museum Occasional Papers. 96: 34-41.	"mat-forming" [but no evidence that it forms dense thickets]
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.	"Monoecious, succulent subshrubs" [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.	Begoniaceae
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.	Begoniaceae [not a Nitrogen fixing woody plant]
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.	No evidence that plant is a geophyte
601	2010. WRA Specialist. Personal Communication.	No evidence of substantial reproductive failure in native habitat.
602	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"The seeds of the two type species resemble the ordinary type of begonia seed. They are mostly medium sized, 355 pm x 180 pm and 490 pm x 240 pm, respectively, with distinctly elongated collar cells, variable undulation of the anticlinal testa cells, flat anticlinal boundaries, and a fine, dense cuticular pattern of mainly short linear or undulated striae."
602	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"Propagation Methods: From herbaceous stem cuttings From softwood cuttings From seed; winter sow in vented containers, coldframe or unheated greenhouse"
603	2010. WRA Specialist. Personal Communication.	Ability to hybridize naturally unknown
604	1994. Zomlefer, W.B.. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London	"Cross-pollination is reinforced by the earlier development of the staminate flowers in the cyme" [Family characteristics. Self-compatibility in Begonia foliosa unknown]
605	2010. Dave's Garden. PlantFiles: Fuchsia Begonia, corazon-de-jesus, Shrub Begonia. Dave's Garden, http://davesgarden.com/guides/pf/go/60723/	"These flowers are thought to be pollinated by hummingbirds. " [but documented evidence of pollinators unknown]
606	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.	"Table 2. [Begonia foliosa listed as possibly vegetatively propagating]
606	2007. Imada, C.T.. New Hawaiian plant records for 2005–2006. Bishop Museum Occasional Papers. 96: 34-41.	"This mat-forming herb is described as having brittle stems, making it difficult to remove. The fragmenting stems probably allow it to spread vegetatively."
607	2010. WRA Specialist. Personal Communication.	Time to reproductive maturity unknown
701	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"The seeds of the two type species resemble the ordinary type of begonia seed. They are mostly medium sized, 355 pm x 180 pm and 490 pm x 240 pm, respectively, with distinctly elongated collar cells, variable undulation of the anticlinal testa cells, flat anticlinal boundaries, and a fine, dense cuticular pattern of mainly short linear or undulated striae." [no evidence of unintentional dispersal, and no apparent means of external attachment, although small seed size could make inadvertent transport possible]
702	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.	"a popular hanging basket specimen" [grown & distributed as an ornamental]

703	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"The seeds of the two type species resemble the ordinary type of begonia seed. They are mostly medium sized, 355 pm x 180 pm and 490 pm x 240 pm, respectively, with distinctly elongated collar cells, variable undulation of the anticlinal testa cells, flat anticlinal boundaries, and a fine, dense cuticular pattern of mainly short linear or undulated striae." [small-seeded, but no evidence that these are grown with produce]
704	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"In contrast to the African begonias, the great majority of the Neotropical begonias have anemoballistic dispersal. Seeds may be adapted to wind dispersal by extended micropylar and/or chalaza1 ends with inflated, air-filled cells..."
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.	"Table 2. Annotated checklist of invasive or potentially invasive cultivated plants in Hawai'i with dispersal syndrome" [Begonia foliosa listed as wind dispersed]
705	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"On the basis of fruit and seed morphology, it is rather speculative to suggest other types of dispersal in Neotropical begonias. Secondary seed dispersal by rain-wash may occur in the majority of the begonias, including the wind dispersed ones."
705	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.	"Table 2. Annotated checklist of invasive or potentially invasive cultivated plants in Hawai'i with dispersal syndrome" [Begonia foliosa listed as possibly water-dispersed]
706	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"Moreover, none of the Neotropical begonias have fruits or seeds that seem adapted to frugivores or to ant dispersal. Animal dispersed begonias with fleshy, often colored fruits are known in a number of African sections. These sections show trends toward bigger seeds, loss of cuticular ornamentation, and a thick exotesta, and they may have aril-like appendages (de Lange and Bouman, 1992)."
707	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"Seed dispersal of the Neotropical begonias, and most probably that of the Asian ones, distinctly differs from seed dispersal in African begonias. In the Neotropical begonias wind dispersal is predominant, and alternative types of dispersal are restricted to a limited number of sections. In Africa only about one fifth of the Begonia species are wind dispersed, almost two fifths are animal-dispersed, and over two-fifths are dispersed by a combination of rain-wash and epizoochory (de Lange and Bouman, 1992)." [No apparent means of animal dispersal or external attachment in Begonia foliosa, a neotropical species]
708	2010. WRA Specialist. Personal Communication.	Unknown if seeds can survive gut passage.
801	1999. de Lange, A./Bourman, E.. Seed Micromorphology of Neotropical Begonias. Smithsonian Contributions to Botany. 90: .	"The seeds of the two type species resemble the ordinary type of begonia seed. They are mostly medium sized, 355 pm x 180 pm and 490 pm x 240 pm, respectively, with distinctly elongated collar cells, variable undulation of the anticlinal testa cells, flat anticlinal boundaries, and a fine, dense cuticular pattern of mainly short linear or undulated striae." [no information on seed production]
802	2010. WRA Specialist. Personal Communication.	Unknown [no information found on seed bank longevity]
803	2010. WRA Specialist. Personal Communication.	Unknown [no information found on control with herbicides]
804	2007. Imada, C.T.. New Hawaiian plant records for 2005–2006. Bishop Museum Occasional Papers. 96: 34-41.	"This mat-forming herb is described as having brittle stems, making it difficult to remove. The fragmenting stems probably allow it to spread vegetatively." [may be able to tolerate mutilation, or cutting into pieces, as suggested]
805	2010. WRA Specialist. Personal Communication.	Unknown [no information on natural enemies found]