Taxon: Heliconia stricta Huber **Family:** Heliconiaceae

Common Name(s): 'Dwarf Jamaican'
firebird heliconia
small lobster claw

Synonym(s): Bihai stricta (Huber) Griggs
Heliconia tricolor Abalo & G.Morales

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 29 Sep 2017

WRA Score: 7.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Herb, Naturalized, Shade-Tolerant, Rhizomatous, Bird-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?	y=1, n=-1	n
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	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		
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		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
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	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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	y
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	2
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	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
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**
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"Heliconia stricta is widely cultivated throughout the world, and over 200 cultivars of the species are known. It has been recorded as naturalized in Puerto Rico (Acevedo-Rodríguez & Strong 2005), but worldwide, few records of naturalization exist for this species. The 'Dwarf Jamaican' cultivar of this bird-dispersed species was collected in Waimea Valley, where it is a recognized weed of the area, naturalized and scattered throughout the understory of the botanical collection, usually in dense shade." [Unknown if any cultivars possess traits that would reduce invasion risk. This assessment refers primarily to the naturalized H. stricta]

102	**Has the species become naturalized where grown?**	**n**
	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 20 Sep 2017]	"Native: Southern America Brazil: Brazil Northern South America: Guyana; Suriname; 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 20 Sep 2017]	

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Dave's Garden. 2017. Heliconia 'Dwarf Jamaican' - Heliconia stricta. http://davesgarden.com/guides/pf/go/113733/. [Accessed 20 Sep 2017]	"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)"
	Tropicos.org. 2017. Tropicos [Online Database]. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 20 Sep 2017]	Collected from 0 m - 1500 m elevation, but primarily at latitudes near the equator

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 20 Sep 2017]	"Native: Southern America Brazil: Brazil Northern South America: Guyana; Suriname; 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**
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"Heliconia stricta is widely cultivated throughout the world, and over 200 cultivars of the species are known."
	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	"Perhaps a dozen cultivars of H stricta are currently found in Hawaii."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Heliconia stricta ... Distribution in Puerto Rico: In swamps and wet forests. Recorded as a cultivated plant in the Jardín Botánico, Río Piedras and as naturalized in Río Grande, Bo. Jiménez in the Sierra de Luquillo, in disturbed secondary rain-forest at 210-240 m elevation."

Qsn #	Question	Answer
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"Heliconia stricta is widely cultivated throughout the world, and over 200 cultivars of the species are known. It has been recorded as naturalized in Puerto Rico (Acevedo-Rodríguez & Strong 2005), but worldwide, few records of naturalization exist for this species. The 'Dwarf Jamaican' cultivar of this bird-dispersed species was collected in Waimea Valley, where it is a recognized weed of the area, naturalized and scattered throughout the understory of the botanical collection, usually in dense shade. This species can be easily confused with the similar-looking H. bihai, from which it differs in having dark green flowers with white tips (Staples & Herbst 2005). A key to the species of Heliconia in Hawai'i, as well as a description of the species and the common cultivars grown here, can be found in A Tropical Garden Flora (Staples & Herbst 2005). Material examined. O'AHU: Waimea Valley Botanical Garden, mesic lowland cultivated setting, herbs to 75 cm tall, established throughout understory areas in the garden, often growing in deep shade, 14 Jan 2014, A. Lau & D. Frohlich 2014011404."

302	Garden/amenity/disturbance weed	
	Source(s)	**Notes**
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"The 'Dwarf Jamaican' cultivar of this bird-dispersed species was collected in Waimea Valley, where it is a recognized weed of the area, naturalized and scattered throughout the understory of the botanical collection, usually in dense shade." [Regarded as a weed]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"H. bihai can behave as a pioneer species. It is able to rapidly invade and colonize open and disturbed areas forming monocultures and avoiding the establishment of other plant species (Kress 1990; Andersson, 1998; Every 2013)."
	Argel, M., Pedro, J., Villegas, C., & Doll, J. D. (1977). Control químico de tacana (Helicona bihai) en potreros. Revista COMALFI 1: 32-44	Heliconia bihai is considered a weed and subjected to control

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	[No evidence] "Plants slender to rather stout, (0.75-) 1-3 (-4) m tall. Petioles slender, 25-90 cm long; leaf blades ovate to obovate, or oblong, 28-75 × 7-20 cm, sharply acuminate at the apex, obtuse to acute or shortly attenuate at the base, green on both sides."

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2017. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Plants slender to rather stout, (0.75-) 1-3 (-4) m tall. Petioles slender, 25-90 cm long; leaf blades ovate to obovate, or oblong, 28-75 × 7-20 cm, sharply acuminate at the apex, obtuse to acute or shortly attenuate at the base, green on both sides." [Heliconiaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	Southern Living. 2017. Lobster Claw, False Bird-of-Paradise. http://www.southernliving.com/plants/lobster-claw-false-bird-of-paradise. [Accessed 29 Sep 2017]	"Deer don't seem to care for them." [Possibly unpalatable]

Qsn #	Question	Answer
405	**Toxic to animals**	**n**
	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	No evidence
	NIH U.S. National Library of Medicine. 2017. TOXNET Toxicology Data Network. https://toxnet.nlm.nih.gov/. [Accessed 28 Sep 2017]	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	**Notes**
	Sewake, K. T., & Uchida, J. Y. (1995). Diseases of Heliconia in Hawaii. Research Extension Series 159. Hawaii Institute of Tropical Agriculture and Human Resources, Honolulu, HI	"Calonectria spathiphylli has been isolated from diseased heliconia throughout the state. This common pathogen attacks Heliconia species and cultivars ..." ... "Heliconia stricta cv. Dwarf Jamaican, H. orthotricha, H. chartacea, and H. mutisiana are susceptible to Bipolaris species (Uchida and Aragaki, unpublished). With further testing, many other susceptible cultivars are likely to be identified. Various Bipolaris species commonly occur on grasses, causing severe diseases of corn, rice, wheat, oats, and sorghum. In Hawaii, Bipolaris species cause significant diseases of corn, turf, and palms. Bipolaris setariae and B. incurvata are frequently found on grasses surrounding heliconia fields (Uchida and Aragaki, unpublished). In addition, they have been isolated from diseased orchids, bromeliads, proteas, and other plants." ... "Nematodes have been recovered from roots of H. angusta cv. Yellow Christmas; H. farinosa cv. Rio; H. chartacea cv. Sexy Pink; H. stricta cv. Bucky; H. caribaea cv. Purpurea; H. psittacorum cv. Andromeda; H. rostrata; and more (Sewake and Ogata, unpublished)."

407	Causes allergies or is otherwise toxic to humans	n
	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	No evidence
	NIH U.S. National Library of Medicine. 2017. TOXNET Toxicology Data Network. https://toxnet.nlm.nih.gov/. [Accessed 28 Sep 2017]	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Large perennial rhizomatous herbs with erect pseudostems and distichous, petiolate leaves with broad simple blades." ... "Distribution in Puerto Rico: In swamps and wet forests." [No evidence. Herbaceous plant of wet habitats]

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	**y**
	Source(s)	**Notes**
	Dave's Garden. 2017. Heliconia 'Dwarf Jamaican' - Heliconia stricta. http://davesgarden.com/guides/pf/go/113733/. [Accessed 20 Sep 2017]	"Sun Exposure: Full Sun Sun to Partial Shade Light Shade Partial to Full Shade"
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"The 'Dwarf Jamaican' cultivar of this bird-dispersed species was collected in Waimea Valley, where it is a recognized weed of the area, naturalized and scattered throughout the understory of the botanical collection, usually in dense shade."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	
	Source(s)	**Notes**
	Rauch, F.D. & Weissich, P.R. 2000. Plants for Tropical Landscapes: A Gardener's Guide. University of Hawaii Press, Honolulu, HI	"It does best in a rich, well-drained soil with moisture and protection from the wind."
	Mazza, G. 2017. Heliconia stricta. http://www.photomazza.com/?Heliconia-stricta. [Accessed 28 Sep 2017]	"It requires soils rich of organic substance, acidic or neutral, well draining, maintained almost constantly humid, but without stagnations, and a position sheltered from the wind; in zones with prolonged dry periods, is to be frequently watered, in particular during the warmest months."
	Dave's Garden. 2017. Heliconia 'Dwarf Jamaican' - Heliconia stricta. http://davesgarden.com/guides/pf/go/113733/. [Accessed 28 Sep 2017]	"Soil pH requirements: 5.6 to 6.0 (acidic) 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Plants slender to rather stout, (0.75-) 1-3 (-4) m tall. Petioles slender, 25-90 cm long; leaf blades ovate to obovate, or oblong, 28-75 × 7-20 cm, sharply acuminate at the apex, obtuse to acute or shortly attenuate at the base, green on both sides."

Qsn #	Question	Answer
412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Distribution in Puerto Rico: In swamps and wet forests." [No evidence]
	Rauch, F.D. & Weissich, P.R. 2000. Plants for Tropical Landscapes: A Gardener's Guide. University of Hawaii Press, Honolulu, HI	"This wide spreading northern South American cultivar develops dense clumps 2 feet high, bearing its flowers below the foliage most of the year."
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"Waimea Valley Botanical Garden, mesic lowland cultivated setting, herbs to 75 cm tall, established throughout understory areas in the garden, often growing in deep shade" [Cultivated in Hawaiian Islands. No evidence to date]

501	Aquatic	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	[Terrestrial] "Plants slender to rather stout, (0.75-) 1-3 (-4) m tall." ... "In swamps and wet forests."

502	Grass	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 20 Sep 2017]	Family: Heliconiaceae

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 20 Sep 2017]	Family: Heliconiaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Large perennial rhizomatous herbs with erect pseudostems and distichous, petiolate leaves with broad simple blades." [Rhizomes are quite large -- presumably function as an underground storage organ]

601	Evidence of substantial reproductive failure in native habitat	n

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 29 Sep 2017]	[No evidence] "Native: Southern America Brazil: Brazil Northern South America: Guyana; Suriname; Venezuela Western South America: Bolivia; Colombia; Ecuador; Peru"

602	Produces viable seed	y
	Source(s)	**Notes**
	Maciel, N., & Mogollón, N. (1998) Germination in six ornamental Zingiberales. Proceedings of the Interamerican Society for Tropical Horticulture, 41: 55-61	"In Heliconia stricta cv. Dwarf Jamaican, E was initiated in week 17 and reached 44%; T50 occurred at week 24 and T10-90 was 13 weeks; this was the species with the most irregular pattern of germination."
	Mazza, G. 2017. Heliconia stricta. http://www.photomazza.com/?Heliconia-stricta. [Accessed 28 Sep 2017]	"The fruits are dark blue globose drupes, containing 1-3 seeds. It reproduces by seed, previously scarified and kept in water for 3 days to soften the tegument, in organic loam with addition of siliceous sand or agri-perlite for a 30%, maintained humid at the temperature of 26-28 °C, with germination times variable from some months to one year"

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. 2004. Personal Communication	"Hybridization between heliconia species is probably uncommon in nature (a notable exception being hybrids between Heliconia bihai and H. caribaea species in the Caribbean), but is becoming more common in cultivation as species that would not naturally be exposed to each other come into close proximity, and share pollinators" [Information reported from original 2004 assessment]
	Isaza, L., Marulanda, M. L., & López, A. M. (2012). Genetic diversity and molecular characterization of several Heliconia species in Colombia. Genetics and Molecular Research 11(4): 4552-4563	"The existence of interspecific hybrids, such as H. caribaea x H. bihai, can be determined by the fact that hummingbirds are the sole pollinators of heliconias in the Americas, influencing the hybridization phenomenon between heliconias."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Both self-compatibility and self-incompatibility have been demonstrated in Heliconia (Kress 1983a,b, 198Sb). Of the species examined, the majority was found to be self-compatible."
	Shashank, K. D. 2011. Variability studies in seedlings of Heliconia. MSc Thesis. Kerala Agricultural University, Kerala, India	"Most species of Heliconia that have been tested so far are self-compatible; that is, a flower will produce seed following self-pollination. Seed set by transfer of pollen by pollinator is also seen (Berry and Kress, 1991). According to them small bird like the humming bird and some ants act as pollinating agents."

Qsn #	Question	Answer
	Kress, W. (1983). Self-Incompatibility in Central American Heliconia. Evolution, 37(4), 735-744	[Unknown for H. stricta. Self-compatibility common in genus] "Self-incompatibility was studied in populations of 19 species of Central American Heliconia." ... "Responses ranged from total self-rejection in one species to full self-compatibility in the majority of taxa studied. Partial self-incompatibility, as expressed in the number of styles accepting self-pollen and the number of pollen tubes penetrating these styles, was found in one species. Levels of autogamy in excess of 25% were detected in five species. The prevalence of self-compatibility in these herbaceous members of the under- story of tropical wet forests contrasts with the common occurrence of obligate out- crossers in the canopy layers. The availability of long distance pollinators and low daily flower output may promote outcrossing despite the scarcity of physiological self-incompatibility in these plants."

605	Requires specialist pollinators	y
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"New World Heliconia are pollinated by hummingbirds (Linhart 1973; Stiles 1975, 1979; Kress 1985a)."
	Rodriguez-Flores, C. I., Stiles, F. G., & Arizmendi, M. C. (2012). Pollination network of a hermit hummingbird community (Thochilidae, Phaetornitidae) and their nectar resources in the Colombian Amazon. Ornitologia Neotropical, 23, 85-100	"TABLE 1. Interaction matrix of hermit hummingbirds and their nectar resources in PNNA. The interactions represent the data get during the direct observations and pollen loads. 1= presence of interaction, 0=lack of interaction." [Heliconia stricta visited by 5 species of hummingbirds]
	Mazza, G. 2017. Heliconia stricta. http://www.photomazza.com/?Heliconia-stricta. [Accessed 28 Sep 2017]	"the flowers are pollinated by the hummingbirds."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	Exotic Tropical Plants. 2017. Heliconia Information Page. http://members.iinet.net.au/~meckms/Heliconia%20Information%20Page.html. [Accessed 29 Sep 2017]	"A species is 'spreading' when the new shoot breaks the ground far, 8 inches or more away from the mother plant. 'Spreaders are good for large expansive areas, but can become invasive if not controlled, moving into other garden areas where you may not want them. You can control their spread by growing them in large pots, or by installing a root barrier into the soil. Alternatively, plant them in an area where you can easily remove unwanted new shoots - for example, where you can mow over unwanted growth." [H. stricta 'Firebird' described as spreading]
	Mazza, G. 2017. Heliconia stricta. http://www.photomazza.com/?Heliconia-stricta. [Accessed 29 Sep 2017]	"usually and easily by division of the rhizomes in spring, with each section provided with several vegetative buds." [Propagated vegetatively]

607	Minimum generative time (years)	2

Qsn #	Question	Answer
	Source(s)	**Notes**
	Exotic Tropical Plants. 2017. Heliconia Information Page. http://members.iinet.net.au/~meckms/Heliconia%20Information%20Page.html. [Accessed 29 Sep 2017]	"Growing speed-heliconias are fairly quick growers if given plenty of good rich soil and fertilizer. Most of the larger species will take 12-24 months to flower when grown from a rhizome." [time required to flowering after rhizome planting, reproduction by seed must be longer - minimum estimate is given for a rhizomatous perennial herb]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Fruit a capsule or drupe-like, separating into 3 cocci or dehiscent, usually blue or black. Seeds stony, grayish, without an aril." [Generic description. No evidence. Fruits & seeds lack means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Lau, A. & Frohlich, D. 2015. New plant records for the Hawaiian Islands 2014. Bishop Museum Occasional Papers 116: 35–40	"Heliconia stricta is widely cultivated throughout the world, and over 200 cultivars of the species are known."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	WRA Specialist. 2004. Personal Communication	Not a food crop. Commercial propagation in Heliconias is mostly by rhizomes and not seeds; stems used in floral arrangements do not contain seeds and do not root. [Comments from original 2004 assessment]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Fruit a capsule or drupe-like, separating into 3 cocci or dehiscent, usually blue or black. Seeds stony, grayish, without an aril." [Generic description. H. stricta is adapted for vertebrate dispersal]

705	Propagules water dispersed	
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Distribution in Puerto Rico: In swamps and wet forests." [Rhizome fragments or seeds could potentially be moved by water in riparian habitat]

706	Propagules bird dispersed	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Link, A. & Stevenson, P.R. (2004). Fruit dispersal syndromes in animal disseminated plants at Tinigua National Park, Colombia. Revista Chilena de Historia Natural 77: 319-334	"APPENDIX 1 Animal dispersed plant species in Tinigua National Park, that were included in the analyses of dispersal syndromes." [List includes Heliconia stricta]
	Kricher, J. 2011. Tropical Ecology. Princeton University Press. Princeton, NJ	"Heliconias produce green fruits that ripen and become blue-black in approximately three months. Each fruit contains three large, hard seeds. Birds attracted to heliconia fruits are important in the plant's seed dispersal."
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"The fleshy drupes of Heliconia are dispersed by birds in the neotropics and a wide variety of birds have been reported (Stiles 1979) to feed on them."

707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Fruit a capsule or drupe-like, separating into 3 cocci or dehiscent, usually blue or black. Seeds stony, grayish, without an aril." [Generic description. Fruits & seeds lack means of external attachment & lack arils which could facilitate ant dispersal]

708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Kricher, J. 2011. Tropical Ecology. Princeton University Press. Princeton, NJ	"Heliconias produce green fruits that ripen and become blue-black in approximately three months. Each fruit contains three large, hard seeds. Birds attracted to heliconia fruits are important in the plant's seed dispersal." ... "The birds digest the pulp but regurgitate the seed whole." [Effectively functions as internal dispersal]

801	**Prolific seed production (>1000/m2)**	**n**
	Source(s)	**Notes**
	Acevedo-Rodríguez, P. & Strong, M.T. 2005. Monocotyledons and Gymnosperms of Puerto Rico and the Virgin Islands. Contributions from the United States National Herbarium 52: 1-415	"Fruit a capsule or drupe-like, separating into 3 cocci or dehiscent, usually blue or black. Seeds stony, grayish, without an aril." [Generic description. ca. Inflorescences per plant / year - 35 inflorescences; 3 seeds per fruit]

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Kricher, J. 2011. Tropical Ecology. Princeton University Press. Princeton, NJ	"Heliconia seeds have a six- to seven-month dormancy period prior to germination, which ensures that the seeds will germinate at the onset of rainy season." [Unknown if seeds persist in soil beyond 12 months]

803	**Well controlled by herbicides**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Sewake, K. T., & Uchida, J. Y. (1995). Diseases of Heliconia in Hawaii. Research Extension Series 159. Hawaii Institute of Tropical Agriculture and Human Resources, Honolulu, HI	"control measures should include immediate rogueing of infected plants or killing them with herbicide and keeping that area undisturbed." [Refers to sanitary measures for controlling Heliconia diseases but no specifics of an effective herbicide treatment are given]

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	WRA Specialist. 2004. Personal Communication	'... each pseudostem will only flower once, so after flowering it is best to cut that pseudostem out." [Regenerates from rhizome - common cultivation practice. Information for a defunct website cited in original 2004 assessment]
	Southern Living. 2017. Lobster Claw, False Bird-of-Paradise. http://www.southernliving.com/plants/lobster-claw-false-bird-of-paradise. [Accessed 29 Sep 2017]	"Frost will kill plants to the ground, but they will resprout from rhizomes if the cold spell is short."
	Gilman, E.F. & Meerow, A. 1999. Heliconia spp. Heliconia. FPS249. Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL. http://edis.ifas.ufl.edu. [Accessed 29 Sep 2017]	"When these plants are occasionally frozen in the warm parts of Florida, the tops will die back to the ground, but roots will regenerate new shoots with the coming of warm weather."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Sewake, K. T., & Uchida, J. Y. (1995). Diseases of Heliconia in Hawaii. Research Extension Series 159. Hawaii Institute of Tropical Agriculture and Human Resources, Honolulu, HI	"Calonectria spathiphylli has been isolated from diseased heliconia throughout the state. This common pathogen attacks Heliconia species and cultivars ..." ... "Heliconia stricta cv. Dwarf Jamaican, H. orthotricha, H. chartacea, and H. mutisiana are susceptible to Bipolaris species (Uchida and Aragaki, unpublished). With further testing, many other susceptible cultivars are likely to be identified. Various Bipolaris species commonly occur on grasses, causing severe diseases of corn, rice, wheat, oats, and sorghum. In Hawaii, Bipolaris species cause significant diseases of corn, turf, and palms. Bipolaris setariae and B. incurvata are frequently found on grasses surrounding heliconia fields (Uchida and Aragaki, unpublished). In addition, they have been isolated from diseased orchids, bromeliads, proteas, and other plants." ... "Nematodes have been recovered from roots of H. angusta cv. Yellow Christmas; H. farinosa cv. Rio; H. chartacea cv. Sexy Pink; H. stricta cv. Bucky; H. caribaea cv. Purpurea; H. psittacorum cv. Andromeda; H. rostrata; and more (Sewake and Ogata, unpublished)."
	WRA Specialist. 2017. Personal Communication	Unknown if any natural enemies act as limiting factors to spread of this species in the Hawaiian Islands

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Naturalized on Oahu, Hawaiian Islands & Puerto Rico
• Potential weed of botanical garden (impacts unverified)
• Other Heliconia species have naturalized & may be invasive
• Host of several plant pathogens that would impact other ornamental Heliconia species
• Shade tolerant (capable of establishing in forest understory)
• Large rhizomes (functionally a geophyte)
• Reproduces by seeds & vegetatively by rhizomes
• Seeds dispersed by birds & intentionally by people
• Seeds exhibit dormancy, may form a persistent seed bank (longevity unknown)
• Able to resprout from rhizomes after cutting or damage to pseudostem

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Non-toxic
• Ornamental
• Requires specialized pollinators (hummingbirds) which may limit seed set in areas lacking hummingbirds