

Taxon: <i>Alpinia vittata</i> W. Bull	Family: Zingiberaceae
Common Name(s): variegated ginger	Synonym(s): <i>Alpinia sanderae</i> hort. Sander ex

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 16 Aug 2016
WRA Score: 3.0	Designation: L	Rating: Low Risk

Keywords: Rhizomatous, Tropical, Herb, Ornamental, Shade-Tolerant

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	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	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
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		
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)		

Qsn #	Question	Answer Option	Answer
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
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		
707	Propagules dispersed by other animals (externally)		
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)		
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
	Smith, A.C. (1979). Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only). Volume 1. Pacific Tropical Botanical Garden, Lawai, HI	[Possibly a cultivar, but no evidence that plant is highly domesticated] " <i>Alpinia vittata</i> , usually known as <i>A. sanderae</i> , is widely grown for its unusual, streaked leaves. As noted by R.M. Smith, it otherwise scarcely differs from <i>A. oceanica</i> Burkill (1896), probably indigenous in the Solomon Islands and perhaps in adjacent archipelagoes. <i>Alpinia vittata</i> may be merely a cultivar of <i>A. oceanica</i> , over which it has nomenclatural priority."

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

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	Smith, A.C. (1979). Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only). Volume 1. Pacific Tropical Botanical Garden, Lawai, HI	"The original home of <i>Alpinia vittata</i> was doubtless somewhere in eastern Malesia or adjacent Melanesia, but it is known only from cultivated plants, some of them from tropical America." [Exact area of origin unknown, but suitable for tropical regions]

202	Quality of climate match data	High
	Source(s)	Notes
	Smith, A.C. (1979). Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only). Volume 1. Pacific Tropical Botanical Garden, Lawai, HI	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Dave's Garden. 2016. Ginger - <i>Alpinia vittata</i> . http://davesgarden.com/guides/pf/go/55977/ . [Accessed 16 Aug 2016]	"Hardiness: USDA Zone 9a: to -6.6 °C (20 °F) USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	GingersRus. 2016. <i>Alpinia vittata</i> . http://www.gingersrus.com/cart/index.php?productID=310 . [Accessed 16 Aug 2016]	"This plant is not outdoors hardy in areas with freezing winter temperatures, and most sources rate it as only zone 10 hardy."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Smith, A.C. (1979). <i>Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only)</i> . Volume 1. Pacific Tropical Botanical Garden, Lawai, HI	"The original home of <i>Alpinia vittata</i> was doubtless somewhere in eastern Malesia or adjacent Melanesia, but it is known only from cultivated plants, some of them from tropical America."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	" <i>A. vittata</i> is occasionally cultivated in Hawaii for its attractive foliage."
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"It is often grown as a border plant in the tropics and as a potted plant in the greenhouse in temperate climates."
	Imada, C.T., Staples, G.W. & Herbst, D.R. 2005. <i>Annotated Checklist of Cultivated Plants of Hawai'i</i> . http://www2.bishopmuseum.org/HBS/botany/cultivatedplants/ . [Accessed 16 Aug 2016]	First Collected: 1936 Locations: Foster Botanical Garden Harold L. Lyon Arboretum Harold L. Lyon Arboretum (Confirmed) Waimea Arboretum & Botanical Garden (Confirmed)

301	Naturalized beyond native range	n
	Source(s)	Notes
	Vander Velde, N. 2003. <i>The Vascular Plants of Majuro Atoll, Republic of the Marshall Islands</i> . <i>Atoll Research Bulletin</i> 503: 1-141	" <i>Alpinia vittata</i> Bull Syn. <i>Alpinia sanderæ</i> Sand." ... "Recent introduction. New Guinea. Rare. Ornamental in household garden in Rita (NVV 2000; RRT 2000AB, 2001) (DPMJ0003, DPMJ0739).**"
	McCormack, G. 2007. <i>Cook Islands Biodiversity Database, Version 2007.2</i> . Cook Islands Natural Heritage Trust, Rarotonga. http://cookislands.bishopmuseum.org . [Accessed 16 Aug 2016]	"COOK ISLANDS STATUS: Introduced - Recent, Not naturalised; Land, lowlands"

Qsn #	Question	Answer
	Guézou, A., Trueman, M., Buddenhagen, C. E., Chamorro, S., Guerrero, A. M., Pozo, P., & Atkinson, R. (2010). An extensive alien plant inventory from the inhabited areas of Galapagos. <i>PLoS One</i> , 5(4), e10276	"Cu) Cultivated (introduced for cultivation, not naturalized"
	The Charles Darwin Foundation. 2013. Galapagos Species Checklist - <i>Alpinia vittata</i> . www.darwinfoundation.org/datazone/checklists/15742/	"Taxon introduced for agricultural or domestic use; not naturalized."
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed 16 Aug 2016]	No evidence

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	Congeneric weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	CABI, 2016. <i>Alpinia zerumbet</i> . In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	" <i>A. zerumbet</i> is listed as an 'environmental weed' and 'cultivation escape' in the Global Compendium of Weeds (Randall, 2012). The species forms dense thickets and can reproduce through rhizome fragmentation or by seed, producing as many as 1000 seeds per square foot (PIER, 2013). <i>A. zerumbet</i> is listed as a "potential transformer" in South Africa, invading watercourses, forest margins, roadsides, and urban open space (Henderson, 2001). In Hawaii, it is generally an occasional escape from cultivation (Wagner et al., 1999) but invasive on Moloka'i and Maui Islands (Oppenheimer, 2008). <i>A. zerumbet</i> is listed as native to northeastern India, Burma (Myanmar), Indo-China, China and Japan, and has been actively cultivated as an ornamental across Southeast Asia and many tropical and subtropical countries (Ibrahim, 2001). It is considered a noxious weed in Cuba (Oviedo Prieto et al., 2012), and invasive in many Pacific countries including Fiji, French Polynesia, Palau, and New Caledonia (PIER, 2013). The Global Invasive Species Programme lists <i>A. zerumbet</i> as an invasive weed in South Africa (Macdonald et al., 2003)."
	Foxcroft, L. C., Richardson, D. M., & Wilson, J. R. 2008. Ornamental plants as invasive aliens: problems and solutions in Kruger National Park, South Africa. <i>Environmental Management</i> , 4 (1): 32-51	"Considerable effort was also invested in educating residents as to the damage caused by invasive alien species. This included some species present in these villages and not yet invasive in South Africa but invasive elsewhere in the world. Despite this, problems were still experienced when scheduling removal of established alien plants from gardens; especially well established or large plants that formed prominent features in gardens (e.g. <i>Alpinia zerumbet</i> [shell ginger],..."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	A number of species are listed as naturalized, and a few are included in references of weeds

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	[No evidence] "Leafy shoots 7-12 feet tall. Leaves sessile; blades elliptic-lanceolate, 15-25 x 4-6 inches, green variegated white. Inflorescence pendent, 7-10 inches long, rachis reddish turning green; bracts 1.25-1.75 inches long, pink-variegated, persistent, enclosing 1-2 flowers, bractlets 0.8-1 inch long, pink-variegated. Flower corolla white, lobes 0.6-0.8 inch long, often reflexed; labellum white, oblong, 0.6-0.8 inch long; stamens shorter than labellum, white"

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	Xuan, T. D., & Teschke, R. (2015). Dihydro-5, 6-dehydrokavain (DDK) from <i>Alpinia zerumbet</i> : Its Isolation, Synthesis, and Characterization. <i>Molecules</i> , 20(9), 16306-16319	[Unknown. Potential allelopathic chemical identified in other members of genus] "Kavalactones have been identified in other <i>Alpinia</i> species such as <i>Alpinia kumatake</i> [37], <i>Alpinia galangal</i> [38,39], and <i>Alpinia oxyphyllae</i> . However, DDK and DK coexist only in <i>Alpinia zerumbet</i> [18,19] and <i>Alpinia kumatake</i> [37], and not in <i>Alpinia galangal</i> and <i>Alpinia oxyphyllae</i> [39,40];" ... "It can be proposed that DDK and DK may play an important role in allelopathy of <i>alpinia</i> to suppress growth of other plants in its vicinity and expands its population in the plant ecosystem."

403	Parasitic	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Leafy shoots 7-12 feet tall. Leaves sessile; blades elliptic-lanceolate, 15-25 x 4-6 inches, green variegated white. Inflorescence pendent, 7-10 inches long, rachis reddish turning green; bracts 1.25-1.75 inches long, pink-variegated, persistent, enclosing 1-2 flowers, bractlets 0.8-1 inch long, pink-variegated." [Zingiberaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. Several <i>Alpinia</i> species are consumed by humans

405	Toxic to animals	n
	Source(s)	Notes
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence
	Wagstaff, D.J. 2008. <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	The Garden Geeks. 2016. <i>Alpinia vittata</i> . http://thegardengeeks.net/plant-guide/3429-alpinia_vittata . [Accessed 16 Aug 2016]	"Pests and Diseases: Variegated ginger (<i>alpinia vittata</i>) is susceptible to whitefly. Root rot can occur but is rare."
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"This species is resistant to most pest and diseases. However, it is susceptible to thrips which can be controlled by applying malathion."

407	Causes allergies or is otherwise toxic to humans	n
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Qsn #	Question	Answer
	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
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Growth Form: Herbaceous rhizomatous perennial that occurs in dense clumps. Habitat: Occurs in wet tropical forests, along the margins or in forest openings. Stem: Stem is thick, round and herbaceous." [No evidence & unlikely. A herb of wet habitats]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Although this species grows well in the shade, leaves will lose their variegation and become more green in deep shade."
	Dave's Garden. 2016. Ginger - <i>Alpinia vittata</i> . http://davesgarden.com/guides/pf/go/55977/ . [Accessed 16 Aug 2016]	"Sun Exposure: Light Shade Partial to Full Shade Full Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Plant in fertile, slightly acidic soil that has good drainage and is enriched with organic matter."
	GingersRus. 2016. <i>Alpinia vittata</i> . http://www.gingersrus.com/cart/index.php?productID=310 . [Accessed 16 Aug 2016]	"Soil Type: Variegated ginger (<i>alpinia vittata</i>) prefer moist, fertile, humus rich soil"
	Plants Rescue. 2016. <i>Alpinia vittata</i> . http://www.plantsrescue.com/alpinia-vittata/ . [Accessed 16 Aug 2016]	"Soil: <i>Alpinia vittata</i> thrive in loose, but moist rich soil. A sandy soil that has a lot of organic matter is ideal. Before starting the plant, incorporate a layer of compost into it to promote soil moisture retention and provide nutrients. The soil should be mildly acidic (6.0-6.5 pH) to mildly alkaline (7.0-7.5 pH)."

Qsn #	Question	Answer
411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Leafy shoots 7-12 feet tall. Leaves sessile; blades elliptic-lanceolate, 15-25 x 4-6 inches, green variegated white."
412	Forms dense thickets	
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Herbaceous rhizomatous perennial that occurs in dense clumps." [Unknown if able to form dense stands]
501	Aquatic	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"Leafy shoots 7-12 feet tall. [Terrestrial]"
502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Aug 2016]	Family: Zingiberaceae Subfamily: Alpinioideae Tribe: Alpinieae
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 16 Aug 2016]	Family: Zingiberaceae Subfamily: Alpinioideae Tribe: Alpinieae
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Herbaceous rhizomatous perennial that occurs in dense clumps."
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"This question is specifically to deal with plants that have specialized organs and should not include plants merely with rhizomes" [<i>Alpinia vittata</i> is rhizomatous, and can likely can spread vegetatively]

Qsn #	Question	Answer
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Smith, A.C. (1979). Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only). Volume 1. Pacific Tropical Botanical Garden, Lawai, HI	[No evidence of substantial reproductive failure, although native range uncertain] "The original home of <i>Alpinia vittata</i> was doubtless somewhere in eastern Malesia or adjacent Melanesia, but it is known only from cultivated plants, some of them from tropical America."

602	Produces viable seed	y
	Source(s)	Notes
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit a many-seeded capsule."
	The Garden Geeks. 2016. <i>Alpinia vittata</i> . http://thegardengeeks.net/plant-guide/3429-alpinia_vittata . [Accessed 16 Aug 2016]	"Propagation: Sow variegated ginger (<i>alpinia vittata</i>) seed as soon as ripe at 68f/20c, or divide in spring"

603	Hybridizes naturally	
	Source(s)	Notes
	Hu., J. Z., Ye, Y. S., Zou, P., & Liao, J. P. (2011). Studies on the Hybrid Breeding and Biological Characteristics of Zingiberaceous Plant (<i>Alpinia hainanensis</i> ' Shengzhen'). <i>Journal of Tropical and Subtropical Botany</i> , 3, 015	[Intraspecific hybrid breeding possible in other species] "A new hybrid with high ornamental characteristics, <i>Alpinia hainanensis</i> 'Shengzhen', derived from the generation of the hybrid combination of <i>Alpinia hainanensis</i> K. Schumann, was bred by using hybrid breeding. The female parent with milky white bracteoles was collected from Guangdong in 1975 and the male parent with rose pink bracteoles from Guangxi in 1983. The hybrid is better than the parents in ornamental characters and adaptability, such as tufted leaf shoots, long inflorescences, pink bracteoles and long blooming period, etc., which is of high value in landscape architecture."
	Liu, S. C., & Wang, J. C. (2009). New natural hybrid, <i>Alpinia</i> × <i>ilanensis</i> (Zingiberaceae) in Taiwan. <i>Taiwania</i> , 54 (2), 134-139	[Unknown. Hybridization documented in genus] "The genus <i>Alpinia</i> in Taiwan was very impressed by its frequent hybridization. Four out of 6 indigenous species in Taiwan proper have been reported to be involved in a reticulate hybridization. This paper describes and illustrates a new natural hybrid <i>A. × ilanensis</i> , putatively derived from <i>A. japonica</i> and <i>A. pricei</i> , which is supported by morphological and ecogeographical evidences. Based on sparse distribution mode and serious fertility reduction in these hybrid individuals, we suppose that the hybridization events between <i>A. japonica</i> and <i>A. pricei</i> have been independently occurred multiple times in field. This newly discovered hybrid reveals that all 6 independent species in this island possess the ability to cross each other."

604	Self-compatible or apomictic	
	Source(s)	Notes

Qsn #	Question	Answer
	Yu-Wen, C. U. I., & Qing-Jun, L. I. (2015). Autonomous Self-pollination under Dominant Flexistylous Outcrossing Mechanism in <i>Alpinia galanga</i> (Zingiberaceae). <i>Plant Diversity</i> , 37(06) 793-800	[Unknown. Other species apparently self-compatible, but with mechanisms to prevent selfing] "Here, we studied the breeding system of <i>Alpinia galanga</i> , the results show that (1) <i>Alpinia galanga</i> is self-compatible in which inbreeding depression occurs to some degree; (2) The anaflexistylous (ANA) morph of <i>Alpinia galanga</i> allocates more resource into outcrossing than the CATA morph; (3) The P/O ratio of the ANA morph is significantly lower than that of the CATA morph, as <i>Alpinia galanga</i> has constant six ovules in each ovary, the significant difference in P/O value reflects the contrast in pollen production." ... "In summary, autonomous self-pollination exists in <i>Alpinia galanga</i> , and while flexistylous functions to avoid unnecessary self-pollination and sexual interference, it also provides advantages for delayed autonomous self-pollination as a necessary reproductive assurance and preventing conflict among these three major features by controlling the time of autonomous self-pollination. This peculiar mechanism in <i>Alpinia galanga</i> thoroughly demonstrates its adaptation to unfavorable surrounding during the evolutionary process."

605	Requires specialist pollinators	
	Source(s)	Notes
	Kress, W. J., Liu, A. Z., Newman, M., & Li, Q. J. (2005). The molecular phylogeny of <i>Alpinia</i> (Zingiberaceae): a complex and polyphyletic genus of gingers. <i>American Journal of Botany</i> , 92(1), 167-178	"Although most alpinias are pollinated by large bees, some species attract birds and even bats as pollinators (Zhang et al., 2003; Kress and Specht, in press)." [Unknown for <i>A. vittata</i>]
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	[Unknown] "Inflorescence pendent, 7-10 inches long, rachis reddish turning green; bracts 1.25-1.75 inches long, pink-variegated, persistent, enclosing 1-2 flowers, bractlets 0.8-1 inch long, pink-variegated. Flower corolla white, lobes 0.6-0.8 inch long, often reflexed; labellum white, oblong, 0.6-0.8 inch long; stamens shorter than labellum, white"

606	Reproduction by vegetative fragmentation	Y
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafauanaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Growth Form: Herbaceous rhizomatous perennial that occurs in dense clumps." ... "Propagate by rhizome division."
	Plants Rescue. 2016. <i>Alpinia vittata</i> . http://www.plantsrescue.com/alpinia-vittata/ . [Accessed 16 Aug 2016]	[Presumably Yes] "Growth Form: Herbaceous rhizomatous perennial that occurs in dense clumps."

Qsn #	Question	Answer
607	Minimum generative time (years)	2
	Source(s)	Notes
	Plants Rescue. 2016. <i>Alpinia vittata</i> . http://www.plantsrescue.com/alpinia-vittata/ . [Accessed 16 Aug 2016]	"Inflorescence are 18-25cm (7-10 inch) long. They form only on two years old stems consisting in a pendant branched spike carried terminally on a leafy stem. <i>Alpinia vittata</i> is cultivated mainly for its beautiful and striking foliage."
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Plant Growth Rate : Fast" [Probably able to reproduce vegetatively prior to first flowering]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"Fruit a many-seeded capsule. Propagate by rhizome cuttings." [No evidence. Typically propagated with rhizomes]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"It is often grown as a border plant in the tropics and as a potted plant in the greenhouse in temperate climates."
	Staples, G.W. & Herbst, D.R. 2005. <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"occasionally cultivated in Hawaii for its attractive foliage."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Whistler, W.A. 2000. <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	"Fruit a many-seeded capsule. Propagate by rhizome cuttings" [No evidence. Typically propagated with rhizomes]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Fruit Classification : Simple Fruit Fruit Type : Dehiscent Dry Fruit (Capsule)"

705	Propagules water dispersed	
	Source(s)	Notes
	NParks Flora&FaunaWeb. 2016. <i>Alpinia vittata</i> . https://florafaunaweb.nparks.gov.sg/special-pages/plant-detail.aspx?id=1649 . [Accessed 16 Aug 2016]	"Occurs in wet tropical forests, along the margins or in forest openings." [Possible that seeds, if produced, or rhizome fragments could be moved by water if plant grows in riparian areas]

706	Propagules bird dispersed	
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Qsn #	Question	Answer
	Source(s)	Notes
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit a many-seeded capsule" [Dispersal vector unknown]
707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Wu, Z. Y. & Raven, P. H. (eds.). 2000. Flora of China. Vol. 24 (Flagellariaceae through Marantaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Genus description] "Capsule usually globose, dry or fleshy, indehiscent or irregularly dehiscent. Seeds numerous, often angled, arillate." [Unknown. Some Arillate seeds are dispersed externally by ants]
708	Propagules survive passage through the gut	
	Source(s)	Notes
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit a many-seeded capsule." [Dispersal vector unknown. Typically propagated from rhizome cuttings]
801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit a many-seeded capsule." [Unknown. Typically propagated with rhizomes, suggesting seed production may be limited]
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 16 Aug 2016]	Unknown. Some <i>Aplinia</i> species are documented to have orthodox seed storage
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes

Qsn #	Question	Answer
	<p>Plants Rescue. 2016. <i>Alpinia vittata</i>. http://www.plantsrescue.com/alpinia-vittata/. [Accessed 16 Aug 2016]</p>	<p>[Would likely be able to resprout from rhizomes if aboveground vegetation was cut] "Propagation: Propagate <i>Alpinia vittata</i> by dividing overgrown clumps in late spring. These can be broken off or cut with secateurs. Pots of divided rhizomes should be kept in a warm, shaded spot for several weeks before being placed in their permanent position. <i>Alpinia vittata</i> can be started from sections of rhizome in spring using a loose, airy but moist organic potting mixture. Make sure that they are not planted too deep – at most 2.5-5cm (1-2 inch). Avoid overwatering to prevent rhizomes from rotting. After planting, water thoroughly, then do not water again until soil is getting dry. Keep in warm position, evenly moist, but not wet, until shoots grow and leaves start to unfold."</p>

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

Summary of Risk Traits:

High Risk / Undesirable Traits

- Thrives in tropical climates
- Other *Alpinia* species have become invasive weeds
- Shade tolerant
- Reproduces by seeds & rhizomes
- Reaches maturity in 2 years
- Seeds, if produced, possibly dispersed by birds or ants & intentionally by people
- May be able to resprout from cutting of rhizomes
- Limited information reduces accuracy of risk predication

Low Risk Traits

- No reports of invasiveness or negative impacts
- Unarmed (no spines, thorns or burrs)
- Ornamental & medicinal uses
- Limited production of seed may minimize risk of accidental or long-distance dispersal

Second Screening Results for Herbs & Low Stature Plants

(A) Reported as a weed of cultivated lands? No

Outcome = Accept (Low Risk)