

<b>Taxon:</b> Hedychium greenii W. W. Sm.	<b>Family:</b> Zingiberaceae
<b>Common Name(s):</b> red butterfly ginger red ginger red leaf ginger scarlet ginger	<b>Synonym(s):</b>

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Approved	<b>End Date:</b> 31 Jul 2024
<b>WRA Score:</b> 5.0	<b>Designation:</b> L	<b>Rating:</b> <span style="background-color: yellow;">Low Risk</span>

**Keywords:** Rhizomatous Herb, Naturalized, Ornamental, Produces Bulbils, Vegetative Propagation

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	y
302	Garden/amenity/disturbance weed	y = 1*multiplier (see Appendix 2), n = 0	n
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	n
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	n
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	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

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y = 1, n = 0	n
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	y
601	Evidence of substantial reproductive failure in native habitat		
602	Produces viable seed		
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)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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)	y = 1, n = -1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m <sup>2</sup> )	y = 1, n = -1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y = -1, n = 1	y
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
	<b>Source(s)</b>	<b>Notes</b>
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	[No evidence] "Low hills in Western Bhutan. The plant was brought to Sikkim by native collectors and flowered in cultivation at the residence of Mr. H. F. Green who was the first to observe that it differed from any known Sikkim form. The lip is dark red while the linear lobes of the corolla are much lighter. The plant is now in cultivation in the Royal Botanic Garden, Calcutta and it is hoped that it will shortly be introduced to European gardens. It forms bulbils very freely."

102	Has the species become naturalized where grown?	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2024). Personal Communication	NA

103	Does the species have weedy races?	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2024). 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
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch">https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch</a> . [Accessed 24 Jul 2024]	"Native Asia-Tropical INDIAN SUBCONTINENT: Bhutan"

202	Quality of climate match data	High
	<b>Source(s)</b>	<b>Notes</b>
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch">https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch</a> . [Accessed 24 Jul 2024]	"Native Asia-Tropical INDIAN SUBCONTINENT: Bhutan"

203	Broad climate suitability (environmental versatility)	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Ross, N. (2016). In season. New Zealand Gardener. March 2016: 66-69	"Outside of the stir-fry or the biscuit tin, gingers have a bad reputation in the garden but the red ginger ( <i>Hedychium greenii</i> ) has an exemplary report card. Neither too big or spready - it doesn't have the delicious smell of many of the tribe but makes up for it with petals as plump as a Mick Jagger kiss and bronzy backed leaves. The plump rhizomes will need plenty of protection in cold areas rather like the hardy heliconias which do well only in hot areas."
	Shoot Gardening. (2024). <i>Hedychium greenii</i> (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii/">https://www.shootgardening.com/plants/hedychium-greenii/</a> . [Accessed 25 Jul 2024]	"USDA zones Zone 8, Zone 9, Zone 10, Zone 11"
	Plant Lust. (2024). <i>Hedychium greenii</i> . <a href="https://plantlust.com/plants/3958/hedychium-greenii/">https://plantlust.com/plants/3958/hedychium-greenii/</a> . [Accessed 29 Jul 2024]	"USDA Zones: 8a - 11"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	" <i>Hedychium greenii</i> was commonly seen around Volcano on Hawai'i Island; many were in the vicinity of houses and may have been planted, but most were found in overgrown areas and seemed rather unlikely to have been planted. However, one plant was found growing in a roadside ditch over 20 m from any house and was entirely surrounded by weeds, giving a high confidence that this plant dispersed and germinated in place (Figure 21). Further colonies were later found in 'O'hia Estates across the Highway from Volcano village also found not in immediate proximity to houses. As such <i>Hedychium greenii</i> should now be considered naturalized on Hawai'i Island. This species was imported to Hawai'i as an ornamental and can be distinguished from other <i>Hedychium</i> by its bright orange flowers and pink to purple leaf undersides. <i>Hedychium greenii</i> has been cultivated in Hawai'i since at least 1958 at Foster Botanical Garden on O'ahu (C. Potter s.n., BISH 147214) Material examined. HAWAI'I: Volcano, Kawailehua Rd, roadside ditch, partly sunny area, flowers reddish orange, underside of leaves purple, 1127 m, 19.449714, -155.233682, 13 Aug 2022, K. Faccenda 2624."
	KewScience. (2024). Plants of the World Online - <i>Hedychium greenii</i> . <a href="http://powo.science.kew.org/">http://powo.science.kew.org/</a> . [Accessed 29 Jul 2024]	"Native to: Assam, East Himalaya Introduced into: Hawaii"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	" <i>Hedychium greenii</i> has been cultivated in Hawai'i since at least 1958 at Foster Botanical Garden on O'ahu (C. Potter s.n., BISH 147214)"
	GBIF Secretariat (2024). <i>Hedychium greenii</i> W.W.Sm. GBIF Backbone Taxonomy. Checklist dataset. <a href="https://www.gbif.org/species/2758765">https://www.gbif.org/species/2758765</a> . [Accessed 29 Jul 2024]	Introduced to a number of locations globally

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	[Hawaii Island] "Hedychium greenii was commonly seen around Volcano on Hawai'i Island; many were in the vicinity of houses and may have been planted, but most were found in overgrown areas and seemed rather unlikely to have been planted. However, one plant was found growing in a roadside ditch over 20 m from any house and was entirely surrounded by weeds, giving a high confidence that this plant dispersed and germinated in place (Figure 21). Further colonies were later found in 'O'hia Estates across the Highway from Volcano village also found not in immediate proximity to houses. As such Hedychium greenii should now be considered naturalized on Hawai'i Island. This species was imported to Hawai'i as an ornamental and can be distinguished from other Hedychium by its bright orange flowers and pink to purple leaf undersides. Hedychium greenii has been cultivated in Hawai'i since at least 1958 at Foster Botanical Garden on O'ahu (C. Potter s.n., BISH 147214) Material examined. HAWAI'I: Volcano, Kawailehua Rd, roadside ditch, partly sunny area, flowers reddish orange, underside of leaves purple, 1127 m, 19.449714, -155.233682, 13 Aug 2022, K. Faccenda 2624."

302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Ross, N. (2016). In season. New Zealand Gardener. March 2016: 66-69	"Hedychium greenii The red butterfly ginger is a non-invasive beauty notable for its showy, scentless flowers, compact size and leaves tinted copper-brown, which complement the flowers perfectly."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	CABI. (2024). CABI Compendium Invasive Species. <a href="https://www.cabidigitallibrary.org/product/qi">https://www.cabidigitallibrary.org/product/qi</a> . [Accessed 29 Jul 2024]	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
	CABI. (2024). CABI Compendium Invasive Species. <a href="https://www.cabidigitallibrary.org/product/qi">https://www.cabidigitallibrary.org/product/qi</a> . [Accessed 29 Jul 2024]	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
	WRA Specialist. (2024). Personal Communication	No evidence found elsewhere in the world, and no documented negative environmental impacts in the Hawaiian Islands to date

305	Congeneric weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Kahili ginger is the most troublesome invader of the genus Hedychium, able to invade closed-canopy rainforests. The fleshy and red seeds are dispersed by frugivorous birds and feral pigs, carrying seeds into new sites of intact vegetation (Blood, 2001; Staples and Cowie, 2004). The plant forms large and dense thickets eliminating almost all other species. The rhizome tubers form a dense and thick mat; such mats can become heavy during rain and cause slides on steep slopes, promoting soil erosion (Blood, 2001). The large leaves shade out other plants. Once established, this highly shade-tolerant plant persists and prevents any natural forest regeneration and succession (Minden et al., 2010a). Kahili ginger builds a layer of its own, stretching over large areas within a forest at the expense of the natural herb and bryophyte layer (Minden et al., 2010b). In Hawaii, kahili ginger invades wet habitats from sea level to 1700 m altitude (Smith, 1985). The plant may favour another invasive tree, Psidium cattleianum, because kahili ginger does not affect growth of Psidium (Minden et al., 2010a). Litter of kahili ginger decomposes faster than litter from native species, which may affect nutrient cycling (Funk, 2005)."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	[Translation from Latin] "Stem 60-180 cm. Leaves 20-25 cm. long, 5 cm. wide, oblong acuminate, slightly pubescent beneath. Spike to 12 cm. , densiflora Bracts 5-7 cm. long, 3-4 cm. wide, ovate, pointed, overlapping, flowers 2-3. Calyx to 4.5 cm. long, tubular, with tridentate hairy tip, ad the base clothed with a few silver hairs. Corolla tube 4-15 cm. long lobes long, linear, to 4 cm. long, with a subspatulato tip. Staminodia 3-4 cm. long, linear, red; thread 3-4 cm. long, with a red thread; lip 3.5-4 cm. long, 3-4 cm. broad, shortly bifid, red. Ovary above hairy with two epigynous glands. Ripe seeds not seen"

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown

403	Parasitic	n
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	[Translation from Latin] "Stem 60-180 cm. Leaves 20-25 cm. long, 5 cm. wide, oblong acuminate, slightly pubescent beneath. Spike to 12 cm. , densiflora Bracts 5-7 cm. long, 3-4 cm. wide, ovate, pointed, overlapping, flowers 2-3. Calyx to 4.5 cm. long, tubular, with tridentate hairy tip, ad the base clothed with a few silver hairs. Corolla tube 4-15 cm. long lobes long, linear, to 4 cm. long, with a subspatulato tip. Staminodia 3-4 cm. long, linear, red; thread 3-4 cm. long, with a red thread; lip 3.5-4 cm. long, 3-4 cm. broad, shortly bifid, red. Ovary above hairy with two epigynous glands. Ripe seeds not seen"

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Shoot Gardening. (2024). Hedychium greenii (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii">https://www.shootgardening.com/plants/hedychium-greenii</a> . [Accessed 25 Jul 2024]	"Toxicity Not toxic "
	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

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Nickel, E. (2011). Hedychium greenii: Fire up garden with red ginger. Pick Of The Week. <a href="https://www.sfgate.com/homeandgarden/pickoftheweek/article/hedychium-greenii-fire-up-garden-with-red-ginger-2308418.php">https://www.sfgate.com/homeandgarden/pickoftheweek/article/hedychium-greenii-fire-up-garden-with-red-ginger-2308418.php</a> . [Accessed 30 Jul 2024]	"Pests & diseases. Leaf spots and root rot can afflict plants. Aphids may be an occasional pest."
	Shoot Gardening. (2024). Hedychium greenii (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii">https://www.shootgardening.com/plants/hedychium-greenii</a> . [Accessed 25 Jul 2024]	"Pests and diseases - Pests, Glasshouse red spider mite, Aphids Diseases - Generally disease free"
	Plant Delights Nursery. (2024). Hedychium - A Hardy Ginger Plant for the Garden. <a href="https://www.plantdelights.com/blogs/articles/ginger-plant-lily-variegated-hedychium-lilies">https://www.plantdelights.com/blogs/articles/ginger-plant-lily-variegated-hedychium-lilies</a> . [Accessed 30 Jul 2024]	"Pests and Diseases of Hedychium: Luckily, hedychium are not bothered by many pests. Slugs and snails, which attack the unfurling leaves, are the worst of them. In hot, dry climates caterpillars and grasshoppers can be a problem, but then hardy ginger plants don't flower well in these climates anyway. In a greenhouse, mealy bugs and spider mites may become a problem, so keep an eye out for them."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Shoot Gardening. (2024). Hedychium greenii (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii">https://www.shootgardening.com/plants/hedychium-greenii</a> . [Accessed 25 Jul 2024]	"Toxicity Not toxic "
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Clough, P. & Browse, P. M. (2004). Gardening on the Edge: Drawing on the Cornwall Experience. Alison Hodge, Cornwall	[No evidence. Unlikely given habitat and herbaceous life form] "It is recorded as growing on low hills in Bhutan and northern India, often in marshy ground. For this reason it is sometimes suggested for waterside planting. Although such a position might suit it - and many other species - in some ways, it is likely to be too cool to induce flowering."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes

Qsn #	Question	Answer
	Plant Lust. (2024). <i>Hedychium greenii</i> . <a href="https://plantlust.com/plants/3958/hedychium-greenii/">https://plantlust.com/plants/3958/hedychium-greenii/</a> . [Accessed 29 Jul 2024]	"Sun exposure: mostly sun - mostly shade"
	The National Gardening Association. (2024). Red Butterfly Ginger ( <i>Hedychium greenii</i> ). <a href="https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/">https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/</a> . [Accessed 29 Jul 2024]	"Sun Requirements: Full Sun to Partial Shade"
	Shoot Gardening. (2024). <i>Hedychium greenii</i> (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii/">https://www.shootgardening.com/plants/hedychium-greenii/</a> . [Accessed 25 Jul 2024]	"Sunlight: Partial Shade, Full Sun"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	Notes
	Nickel, E. (2011). <i>Hedychium greenii</i> : Fire up garden with red ginger. Pick Of The Week. <a href="https://www.sfgate.com/homeandgarden/pickoftheweek/article/hedychium-greenii-fire-up-garden-with-red-ginger-2308418.php">https://www.sfgate.com/homeandgarden/pickoftheweek/article/hedychium-greenii-fire-up-garden-with-red-ginger-2308418.php</a> . [Accessed 30 Jul 2024]	"Grow in partial sun in moist, fertile soil. This ginger can handle more sun than some other gingers but doesn't want to dry out. Mulch soil to retain moisture."
	Plant Lust. (2024). <i>Hedychium greenii</i> . <a href="https://plantlust.com/plants/3958/hedychium-greenii/">https://plantlust.com/plants/3958/hedychium-greenii/</a> . [Accessed 29 Jul 2024]	"Soil needs: rich and well-drained"
	Shoot Gardening. (2024). <i>Hedychium greenii</i> (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii/">https://www.shootgardening.com/plants/hedychium-greenii/</a> . [Accessed 25 Jul 2024]	"Soil type: Chalky Loamy Sandy Soil pH: Acid Alkaline Neutral"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Ray, A., Jena, S., Kar, B., Patnaik, J., Panda, P. C., & Nayak, S. (2019). Chemical composition and antioxidant activities of essential oil of <i>Hedychium greenii</i> and <i>Hedychium gracile</i> from India. <i>Natural Product Research</i> , 33(10), 1482-1485	" <i>H. greenii</i> , commonly known as the Red ginger lily, is a perennial herb, 1-1.5 m in height and bears butterfly-like, bright red flowers with cylindrical spikes 12 cm long. Leaves are oblong shaped, mid-green, 25 cm long."

412	Forms dense thickets	n
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown. Other <i>Hedychium</i> species can form dense monocultures that exclude other vegetation.

501	Aquatic	n
	Source(s)	Notes
	Ray, A., Jena, S., Kar, B., Patnaik, J., Panda, P. C., & Nayak, S. (2019). Chemical composition and antioxidant activities of essential oil of <i>Hedychium greenii</i> and <i>Hedychium gracile</i> from India. <i>Natural Product Research</i> , 33(10), 1482-1485	[Terrestrial] " <i>H. greenii</i> , commonly known as the Red ginger lily, is a perennial herb, 1-1.5 m in height and bears butterfly-like, bright red flowers with cylindrical spikes 12 cm long. Leaves are oblong shaped, mid-green, 25 cm long."

502	Grass	n
	Source(s)	Notes



Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch">https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch</a> . [Accessed 30 Jul 2024]	"Family: Zingiberaceae Subfamily: Zingiberoideae Tribe: Zingibereae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch">https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch</a> . [Accessed 30 Jul 2024]	"Family: Zingiberaceae Subfamily: Zingiberoideae Tribe: Zingibereae"

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y
	Source(s)	Notes
	Shoot Gardening. (2024). <i>Hedychium greenii</i> (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii">https://www.shootgardening.com/plants/hedychium-greenii</a> . [Accessed 25 Jul 2024]	" <i>H. greenii</i> is a tender, clump-forming, rhizomatous, evergreen perennial with oblong, sharp-pointed, mid- to dark green leaves and cylindrical racemes of butterfly-like, bright red flowers in summer. " [Functionally a geophyte]

601	Evidence of substantial reproductive failure in native habitat	
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2024). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch">https://npgsweb.ars-grin.gov/gringlobal/taxon/taxonomysearch</a> . [Accessed 30 Jul 2024]	[Unknown] "Native Asia-Tropical INDIAN SUBCONTINENT: Bhutan"

602	Produces viable seed	
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Semina matura non visa." [Translation: "Ripe seeds not seen"] ... "It forms bulbils very freely."
	Ashokan, A., & Gowda, V. (2018). Describing terminologies and discussing records: More discoveries of facultative vivipary in the genus <i>Hedychium</i> J. Koenig (Zingiberaceae) from Northeast India. <i>PhytoKeys</i> , (96): 21-34	"The authors' efforts to summarise vivipary sensu lato across Zingiberaceae from published literature showed that vivipary sensu stricto is absent and that all reported cases of vivipary in other gingers can also only be identified as "facultative vivipary" or pseudovivipary, as in the case of <i>Hedychium</i> . Other genera that display facultative vivipary (except in <i>A. mutica</i> ) also show similar characters as observed in <i>Hedychium</i> that favour this reproductive strategy, such as persistent bracts, bract structure that may retain the seeds, and recalcitrant seeds. It was found that both facultative vivipary and pseudovivipary are common amongst gingers with pseudovivipary being more frequent only in <i>Globba</i> (Table (Table)).1). Finally, in the genus <i>Hedychium</i> , pseudovivipary is only reported in <i>H. greenii</i> (Fig. (Fig.55))."

Qsn #	Question	Answer
	Shoot Gardening. (2024). <i>Hedychium greenii</i> (Red ginger). <a href="https://www.shootgardening.com/plants/hedychium-greenii">https://www.shootgardening.com/plants/hedychium-greenii</a> . [Accessed 25 Jul 2024]	[Unclear if seed production occurs in cultivation. Other sources mention bulbils production and vegetative propagation] "Propagation methods Seed, Division Propagation Sow seed at 21-24C when ripe. Divide in spring. "

603	Hybridizes naturally	
	Source(s)	Notes
	Sakhanokho, H. F., & Rajasekaran, K. (2010). Pollen biology of ornamental ginger ( <i>Hedychium</i> spp. J. Koenig). <i>Scientia Horticulturae</i> , 125(2), 129-135	"Self-sterility is common in <i>Hedychium</i> , so species of this genus hybridize readily, which may have contributed to the current taxonomic confusion of <i>Hedychium</i> species (Wood et al., 2000; Gao et al., 2005)."
	WRA Specialist. (2024). Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	
	Source(s)	Notes
	Sakhanokho, H. F., & Rajasekaran, K. (2010). Pollen biology of ornamental ginger ( <i>Hedychium</i> spp. J. Koenig). <i>Scientia Horticulturae</i> , 125(2), 129-135	[Unknown] "Self-sterility is common in <i>Hedychium</i> , so species of this genus hybridize readily, which may have contributed to the current taxonomic confusion of <i>Hedychium</i> species (Wood et al., 2000; Gao et al., 2005)."

605	Requires specialist pollinators	
	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	[Red flowers may be an adaptation for bird pollination] "Flws red, odorless; cor tube and bracts ca equal length, lobes 1.5-2" long; labellum firm, 2" x 2", base tapering, apex notched, ruffled, red, center flushed orange-yellow, lateral sterile stam narrowly obovate, 1.6-2" long, fertile stam length not exceeding labellum, red, anth red."
	Ashokan, A., Leong-Škorničková, J., Suksathan, P., Newman, M., Kress, W. J., & Gowda, V. (2022). Floral evolution and pollinator diversification in <i>Hedychium</i> : Revisiting Darwin's predictions using an integrative taxonomic approach. <i>American Journal of Botany</i> , 109(9), 1410-1427	[Unknown] " <i>Hedychium</i> flowers are known for their abundant supply of nectar and pollen that might attract a wide variety of floral visitors and pollinators (Saryan, 2021)."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. <i>Records of the Botanical Survey of India</i> 4: 261-272	"It forms bulbils very freely."
	The National Gardening Association. (2024). Red Butterfly Ginger ( <i>Hedychium greenii</i> ). <a href="https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/">https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/</a> . [Accessed 29 Jul 2024]	"It puts up meager flower heads with just a few buds, then proceeds to make many offsets on the flower spikes. The offsets do root and come true to the mother plant."

607	Minimum generative time (years)	
	Source(s)	Notes

Qsn #	Question	Answer
	The National Gardening Association. (2024). Red Butterfly Ginger ( <i>Hedychium greenii</i> ). <a href="https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/">https://garden.org/plants/view/128311/Red-Butterfly-Ginger-Hedychium-greenii/</a> . [Accessed 30 Jul 2024]	"Life cycle: Perennial"
	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	[Time to reproduction unknown] "Plantlets sometimes develop from the old inflorescences and provide a convenient method of propagation."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Faccenda, K. (2024). Report of 24 new naturalized weeds across the islands of Hawai'i. Bishop Museum Occasional Papers 156: 71-110	[Dispersal vector unknown. Possibly through localized dispersal of bulbils or rhizomes in soil or as dumped garden waste] " <i>Hedychium greenii</i> was commonly seen around Volcano on Hawai'i Island; many were in the vicinity of houses and may have been planted, but most were found in overgrown areas and seemed rather unlikely to have been planted. However, one plant was found growing in a roadside ditch over 20 m from any house and was entirely surrounded by weeds, giving a high confidence that this plant dispersed and germinated in place (Figure 21). Further colonies were later found in 'O'hia Estates across the Highway from Volcano village also found not in immediate proximity to houses."

702	Propagules dispersed intentionally by people	y
	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	"Today <i>H. greenii</i> is occasionally cultivated in Hawai'i for its bright red flowers and attractive foliage."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Ripe seeds not seen" ... "It forms bulbils very freely."
	WRA Specialist. (2024). Personal Communication	No documented evidence of produce contamination anywhere in the world

704	Propagules adapted to wind dispersal	n
	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	"Our knowledge of dispersal is as sparse as is that of pollination. <i>Hedychium</i> has fleshy capsules, the valves of which roll back on opening and expose the orange inner wall of the capsule and the deep red aril of the seeds. This strongly suggests bird dispersal. In many species the arillate seeds are shed onto the ground and dispersal by ants, or mice or squirrels (Ridley 1899) is suggested."
	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	"Plantlets sometimes develop from the old inflorescences and provide a convenient method of propagation."
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Ripe seeds not seen" ... "It forms bulbils very freely."

Qsn #	Question	Answer
705	Propagules water dispersed	
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Ripe seeds not seen" ... "It forms bulbils very freely."
	WRA Specialist. (2024). Personal Communication	Unknown. Bulbils or rhizome fragments might be moved by water or flooding streams if cultivated in riparian areas, as are other <i>Hedychium</i> species

706	Propagules bird dispersed	
	Source(s)	Notes
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Ripe seeds not seen" ... "It forms bulbils very freely."
	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	[Unknown for <i>H. greenii</i> ] "Our knowledge of dispersal is as sparse as is that of pollination. <i>Hedychium</i> has fleshy capsules, the valves of which roll back on opening and expose the orange inner wall of the capsule and the deep red aril of the seeds. This strongly suggests bird dispersal. In many species the arillate seeds are shed onto the ground and dispersal by ants, or mice or squirrels (Ridley 1899) is suggested."

707	Propagules dispersed by other animals (externally)	n
	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	"Our knowledge of dispersal is as sparse as is that of pollination. <i>Hedychium</i> has fleshy capsules, the valves of which roll back on opening and expose the orange inner wall of the capsule and the deep red aril of the seeds. This strongly suggests bird dispersal. In many species the arillate seeds are shed onto the ground and dispersal by ants, or mice or squirrels (Ridley 1899) is suggested."
	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 that seeds of this species, if produced, are dispersed by ants. Plantlets may be moved in garden waste or soil, but do not have means of external attachment] "Plantlets sometimes develop from the old inflorescences and provide a convenient method of propagation."

708	Propagules survive passage through the gut	
	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	[Possibly if seeds are produced] "Our knowledge of dispersal is as sparse as is that of pollination. <i>Hedychium</i> has fleshy capsules, the valves of which roll back on opening and expose the orange inner wall of the capsule and the deep red aril of the seeds. This strongly suggests bird dispersal. In many species the arillate seeds are shed onto the ground and dispersal by ants, or mice or squirrels (Ridley 1899) is suggested."

801	Prolific seed production (>1000/m2)	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	"Plantlets sometimes develop from the old inflorescences and provide a convenient method of propagation." [No mention of seed production]

Qsn #	Question	Answer
	Smith, W. W. (1911) Some additions to the Flora of Eastern Himalaya. Records of the Botanical Survey of India 4: 261-272	"Ripe seeds not seen" ... "It forms bulbils very freely."
	WRA Specialist. (2024). Personal Communication	The limited sources discussing propagation of this species refer to plantlets or bulbils produced in the inflorescences as a means of vegetative reproduction. Seed production is rarely, or never, mentioned, suggesting seeds are not produced, or produced in low numbers.

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown. Seed production may be rare or absent. Longevity of rhizomes or plantlets in soil unknown

803	Well controlled by herbicides	y
	Source(s)	Notes
	Santos, G. L., Kageler, D., Gardner, D. E., & Stone, C. P. (1986). Herbicidal control of selected alien plant species in Hawaii Volcanoes National Park: a preliminary report. Technical Report 60. Cooperative National Park Resources Studies Unit. Honolulu, HI	[Herbicides effected on <i>H. gardnerianum</i> would presumably work on <i>H. greenii</i> ] "Among ginger plots treated with undiluted herbicides injected into the rhizomes, only the AMITROL T and TORDON 22K treatments showed significant control of ginger (Table 1). With the TORDON 22K treatments, resprouts were observed on any of the 5 clumps during the study period. At one year, rhizomes were decayed and control was With the AMITROL T treatments, clumps resprouted with severely chlorotic shoots. The shoots gradually declined in vigor, and at one year both shoots and rhizomes were advanced decay. All visible portions of the rhizomes appeared dead at one year, and control effectiveness was rated at 100%. Treatments with the other injected herbicides showed considerably less control of ginger. Results demonstrated that while ROUNDUP and TORDON RTU suppressed regrowth for up to 8 months, clumps were producing apparently healthy regrowth at one year (Table 1)."
	Weber, E. (2017). Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	[Methods to control <i>Hedychium gardnerianum</i> would presumably be effective if needed for control of <i>H. greenii</i> ] "Small plants can be hand-pulled or dug out; roots and rhizomes must be removed to prevent any regrowth. Larger plants can be cut at ground level and regrowth treated chemically. An effective herbicide is metsulfuron (ISSG, 2014)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Plant Lust. (2024). <i>Hedychium greenii</i> . <a href="https://plantlust.com/plants/3958/hedychium-greenii/">https://plantlust.com/plants/3958/hedychium-greenii/</a> . [Accessed 30 Jul 2024]	"Frost hardy, resprouting from "temperatures as low as 0 °F, USDA zone 7 with mulch for winter protection."
	Plant This. (2024). <i>Hedychium greenii</i> . <a href="http://www.plantthis.com.au/plant-information.asp?gardener=15923">http://www.plantthis.com.au/plant-information.asp?gardener=15923</a> . [Accessed 30 Jul 2024]	"Pruning: Remove spent flower stems & leaves as they form. Cut old canes to their base. Plant offsets."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown

**Summary of Risk Traits:**

*Hedychium greenii* (red butterfly ginger) is native to the Himalayan region, where it thrives at elevations of 3,000-5,000'. It is cultivated in Hawaii and other locations for its bright red flowers and attractive foliage with a dull reddish underside. It is unclear if seeds are produced in cultivated plants. Plants are propagated vegetatively using bulbils or plantlets produced on the old inflorescences. It was recently reported as naturalized in the Volcano area of Hawaii island, although negative impacts have not been reported to date.

**High Risk / Undesirable Traits**

- Thrives and spreads in regions with tropical climates
- Naturalized on Hawaii Island
- Other species are invasive weeds
- Shade tolerant
- A functional geophyte, capable of persisting from rhizomes
- Reproduces vegetatively by plantlets produced in old inflorescences
- Seeds, if produced, are probably bird-dispersed
- Plantlets dispersed through intentional cultivation, and possibly as dumped garden waste or by water
- Tolerates and resprouts from cutting and pruning
- Gaps in knowledge about the reproductive biology may reduce the accuracy of the risk prediction

**Low Risk Traits**

- No reports of invasiveness or negative impacts associated with cultivation
- Unarmed (no spines, thorns, or burrs)
- Reported to be non-toxic
- Seed production is rarely mentioned and may be limited or absent in cultivated plants. Propagated vegetatively with plantlets.
- Bulbils or plantlets may have limited dispersibility, minimizing risk of accidental or long-distance dispersal
- Herbicides may provide effective control

**Second Screening Results for Herbs or Low Stature Shrubby Life Forms**

(A) Reported as a weed of cultivated lands? No  
Outcome = Accept (Low Risk)

