

Taxon: *Werauhia gladioliflora* (H. Wendl.) J. R. Grant

Family: Bromeliaceae

Common Name(s):
gladiolus-flowered plant
gladiolus-glower werauhia
sword-spike bromeliad

Synonym(s):
Tillandsia gladioliflora H.Wendl.
Tillandsia pachychlamys Baker
Vriesea gladioliflora (H.Wendl.)
Antoine
Vriesea gladioliflora var.
purpurascens Antoine
Vriesea pachychlamys (Baker) Mez
Vriesea pachyspatha Mez & Wercklé
Vriesea princeps É.Morren ex Regel

Assessor: Chuck Chimera

Status: Approved

End Date: 3 Sep 2026

WRA Score: 14.0

Designation: H(HPWRA)

Rating: High Risk

Keywords: Epiphytic, Naturalized, Self-Fertile, Wind-Dispersed, Prolific Seeder

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	y
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	n
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	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed		
305	Congeneric weed		
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

Qsn #	Question	Answer Option	Answer
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)		
411	Climbing or smothering growth habit	y = 1, n = 0	y
412	Forms dense thickets	y = 1, n = 0	n
501	Aquatic	y = 5, n = 0	n
502	Grass	y = 1, n = 0	n
503	Nitrogen fixing woody plant	y = 1, n = 0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y = 1, n = 0	n
601	Evidence of substantial reproductive failure in native habitat	y = 1, n = 0	n
602	Produces viable seed	y = 1, n = -1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	y = 1, n = -1	y
605	Requires specialist pollinators	y = -1, n = 0	n
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)	y = 1, n = -1	n
702	Propagules dispersed intentionally by people	y = 1, n = -1	y
703	Propagules likely to disperse as a produce contaminant	y = 1, n = -1	n
704	Propagules adapted to wind dispersal	y = 1, n = -1	y
705	Propagules water dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y = 1, n = -1	n
801	Prolific seed production (>1000/m2)	y = 1, n = -1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y = 1, n = -1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y = -1, n = 1	n

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[No evidence] "Habitat: Wet and very wet forests. Altitude: Sea level to 1300 m. Conservation areas: ARE, CVC, GUA, HNO, LAP, OSA, PAC, TOR. Range: Mex-Ec and N Brz. Notes: "Tank" bromeliads are those with wide, overlapping leaf bases that collect water. There are 58 species of Werauhia in Costa Rica. They are very similar to one another. Most were formerly combined with Vriesea species, to which they are very similar. They are also very similar to Tillandsia and Guzmania species."
	WRA Specialist. (2026). Personal Communication	Werauhia gladioliflora is not highly domesticated; it remains essentially a wild species despite occasional cultivation.

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2026). 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
	POWO (2026). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/ . [Accessed 1 Sep 2026]	"Werauhia gladioliflora (H.Wendl.) J.R.Grant First published in Trop. Subtrop. Pflanzenwelt 91: 31 (1995) This species is accepted The native range of this species is S. Mexico to S. Tropical America. It is an epiphyte and grows primarily in the wet tropical biome. "

202	Quality of climate match data	High
	Source(s)	Notes
	POWO (2026). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/ . [Accessed 1 Sep 2026]	"The native range of this species is S. Mexico to S. Tropical America. It is an epiphyte and grows primarily in the wet tropical biome. "

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). Flora Neotropica, 14(2), 663-1492	""Distribution. Terrestrial and epiphytic in forest, near sea level to 1300 malt, southern Mexico to French Guiana, northern Brazil, and Ecuador." [Elevation range >1000 m]
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Habitat: Wet and very wet forests. Altitude: Sea level to 1300 m." [Elevation range >1000 m]

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). Werauhia gladioliflora and Werauhia sanguinolenta (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	"On Kaua'i, W. gladioliflora was observed at elevations ranging from 600-700 ft (182-213 m) above sea level. Plants were recorded growing epiphytically on a variety of trees, primarily on Falcateria moluccana, but also seen on Persea americana, Psidium cattleianum, Eucalyptus sp. (only on the lower trunk sections with rough bark and abundant moss), and Sphaeropteris cooperi."
	POWO (2026). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. Published on the Internet; https://powo.science.kew.org/ . [Accessed 2 Sep 2026]	"The native range of this species is S. Mexico to S. Tropical America. It is an epiphyte and grows primarily in the wet tropical biome. "
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	"Werauhia gladioliflora (H. Wendl.) J.R. Grant Both a terrestrial and epiphytic bromeliad in its home range from southern Mexico to French Guiana, Werauhia gladioliflora [a name sometimes considered to be a synonym of Vriesea gladioliflora (H. Wendl.) Antoine] is able to grow at elevations extending from sea level up to 1300 m. on o'ahu, it has begun to colonize localized areas around a botanical garden."

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	iNaturalist. (2026). Gladiolus-flowered Werauhia Werauhia gladioliflora. https://www.inaturalist.org/taxa/277332-Werauhia-gladioliflora . [Accessed 2 Sep 2026]	Observed in Hawaii and within native range
	GBIF Secretariat (2026). Werauhia gladioliflora (H.Wendl.) J.R.Grant. GBIF Backbone Taxonomy. https://www.gbif.org/taxon/5BXBD . [Accessed 2 Sep 2026]	Outside native range, the only records occur in the Hawaiian Islands

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	[Kaua'i] "Bromeliaceae <i>Werauhia gladioliflora</i> Grant New island record; confirmation of naturalization In January 2023 a colony of epiphytic bromeliads was observed to be naturalizing by one of the authors in non-native trees along both sides of the Kuilau Ridge Trail in the Lihue- Kōloa Forest Reserve, East Kaua'i. A population of thousands, ranging from seedlings to fully mature plants, was observed in the mid- to upper canopy of the secondary forest dominated by 40 m tall albizia trees (<i>Falcataria moluccana</i>), with only seedlings and immature plants accessible from the ground. Returning to the site in June 2023, an appropriate tree was selected and climbed to a height of approximately 40 ft (12 m) using rope and harness. Three mature specimens were collected for identification and herbarium records (one with infructescence [A. M. Williams & J. Jablonski AMW 799, PTBG], two with inflorescence [J. Jablonski 12, PTBG], and seedling establishment was observed on lower tree trunk sections along the trail and on mossy trunks throughout the tree canopies. The species was identified as <i>Werauhia gladioliflora</i> using the key in the Manual de Plantas de Costa Rica (Morales 2003). <i>Werauhia</i> (subf. Tillandsioideae) has a center of diversity in mountainous habitats of Costa Rica to western Panama, though the broader range extends from southern Mexico through Central America to the West Indies, Peru, and northeastern Brazil (Morales 2003). The genus has synapomorphies that include plants with mostly nocturnal anthesis and a lack of brilliant coloration, fleshy floral bracts, dactyloid petal appendages, a cupulate stigma, and stout, dark-colored capsules (Grant 1997). Seeds are adapted for wind dispersal, with long chalazal appendages and absent micropylar appendages (Leme et al. 2020). <i>Werauhia gladioliflora</i> is epiphytic or terrestrial, and has dark green, thin, waxy leaves up to 67 cm long, forming a funnelform rosette. The inflorescence is simple, erect to 65 cm tall, with broadly ovate floral bracts and broadly elliptic and obtuse sepals. It is morphologically similar to some other species in the genus (<i>W. barrii</i> , <i>W. tonduziana</i> , <i>W. viridiflora</i> , etc.) but is differentiated from these allied species by its overall size, floral bracts that are rugose to rugulose, a simple cylindrical inflorescence, and its ecological preference in its native range for humid lowlands. It is the most common <i>Werauhia</i> species at lower elevations in Costa Rica (Morales 2003). On Kaua'i, <i>W. gladioliflora</i> was observed at elevations ranging from 600-700 ft (182-213 m) above sea level. Plants were recorded growing epiphytically on a variety of trees, primarily on <i>Falcataria moluccana</i> , but also seen on <i>Persea americana</i> , <i>Psidium cattleianum</i> , <i>Eucalyptus</i> sp. (only on the lower trunk sections with rough bark and abundant moss), and <i>Sphaeropteris cooperi</i> . Consultation with two South American Bromeliaceae specialists, Dr. Elton Martinez Carvalho Leme and Dr. Juan Francisco Morales, proved congruous identification after reviewing photographs of the fresh plant material (E. Leme and J. F. Morales, pers. comm., Jan 2024). <i>Werauhia gladioliflora</i> was first documented naturalizing on O'ahu in 2010 at the Lyon Arboretum (Frohlich & Lau 2012). It was described as adventive, establishing on branches of a longan tree 30 ft (9 m) from planted individuals. Material examined. KAUA'I: Lihue Distr, Lihue-Kōloa Forest Reserve, along Kuilau Trail, disturbed lowland wet forest, epiphytic on albizia, 1.2 m tall (incl. infructescence), leaves medium green top and bottom, inflorescence green, single mature flower observed at anthesis barely poking out past floral bract, petals and sepals green, mature-looking fruits (undehisced) hard, bright reddish purple, oriented slightly downward, 182-213 m, 20 Jun 2023, A. M. Williams & J. Jablonski AMW 799 (PTBG); same location and date, epiphytic bromeliad growing on many different species with suitable substrate, 1.5 m tall (incl. inflorescence), 4 ft (1.2 m) diam, inflorescence goopy, leaking clear slime, J. Jablonski 12 (PTBG)."

Qsn #	Question	Answer
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	[O'ahu] "Bromeliaceae <i>Werauhia gladioliflora</i> (H. Wendl.) J.R. Grant Both a terrestrial and epiphytic bromeliad in its home range from southern Mexico to French Guiana, <i>Werauhia gladioliflora</i> [a name sometimes considered to be a synonym of <i>Vriesea gladioliflora</i> (H. Wendl.) Antoine] is able to grow at elevations extending from sea level up to 1300 m. on o'ahu, it has begun to colonize localized areas around a botanical garden. Material examined. O'AHU: Lyon Arboretum, economic Section H33. UTM 623946, 2359844. in lowland wet/mesic secondary forest. Growing in <i>Dimocarpus longan</i> tree, forming dense covering over trunk/branches in more or less dense shade. epiphyte to about 0.5 m tall; leaves purple on underside, green above; fruiting bracts dried brown on live plants; seeds with silky hairs, many per capsule. Spreading adventively by seed about 30 ft away from planted individuals, 16 April 2010, OED 2010041601."
	iNaturalist. (2026). Gladiolus-flowered <i>Werauhia</i> <i>Werauhia gladioliflora</i> . https://www.inaturalist.org/taxa/277332-Werauhia-gladioliflora . [Accessed 2 Sep 2026]	Multiple observations outside of cultivated settings on windward Hawai'i Island suggest <i>Werauhia gladioliflora</i> is naturalized or naturalizing in several locations

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	"in lowland wet/mesic secondary forest. Growing in <i>Dimocarpus longan</i> tree, forming dense covering over trunk/branches in more or less dense shade." [May negatively impact supporting trees with epiphytic burden]
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	"On Kaua'i, <i>W. gladioliflora</i> was observed at elevations ranging from 600-700 ft (182-213 m) above sea level. Plants were recorded growing epiphytically on a variety of trees, primarily on <i>Falcateria moluccana</i> , but also seen on <i>Persea americana</i> , <i>Psidium cattleianum</i> , <i>Eucalyptus</i> sp. (only on the lower trunk sections with rough bark and abundant moss), and <i>Sphaeropteris cooperi</i> ." [Ability to establish on several trees species suggest this plant may negatively impact host through]
	WRA Specialist. (2026). Personal Communication	<i>Werauhia gladioliflora</i> has escaped cultivation and established in garden-associated and disturbed habitats in Hawai'i. On O'ahu it has colonized localized areas around Lyon Arboretum and spread by seed from planted individuals, while on Kaua'i it has been documented in disturbed lowland wet forest. A dense covering of <i>Werauhia gladioliflora</i> could potentially increase the host tree's physical load, shade foliage, and compete for light and canopy space, potentially reducing vigor and contributing to branch damage if infestations become extensive. Such impacts could detrimentally affect agriculture and horticulture, resulting of classification of this species as an agricultural weed. Until such impacts are documented, it is being classified as a "Garden/amenity/disturbance weed".

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Although <i>Werauhia gladioliflora</i> is not currently documented as a significant agricultural, forestry, or horticultural weed, its ability to establish epiphytically on a range of host species suggests that it has the potential to impact agricultural crops, commercial forestry, or horticultural production systems if it becomes sufficiently abundant.

304	Environmental weed	
	Source(s)	Notes

Qsn #	Question	Answer
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	" <i>Werauhia</i> belongs to a group of bromeliads often referred to as "tank" bromeliads. This is due to their capacity to retain considerable amounts of water within a rosette of overlapping leaves. The additional weight on tree limbs from mature, water-retaining tank bromeliads may exacerbate damage to infrastructure and property, especially in stands of invasive albizia trees (<i>Falcateria moluccana</i>), a species already infamous for sudden limb shear (Watson 2018). Additional negative effects of <i>Werauhia</i> establishment across the landscape could include an increase in breeding habitat for invasive animal species, like coqui frogs (<i>Eleutherodactylus coqui</i>) (Hara & Niino-DuPonte 2016), and arthropods such as mosquitos. One study on Kaua'i (Yang et al. 2003) documented <i>Vriesea</i> aff. <i>regina</i> , a tank bromeliad in a genus closely allied to <i>Werauhia</i> , to be a significant breeding site for three noxious mosquito species: <i>Wyeomyia mitchellii</i> (Theobald), <i>Aedes albopictus</i> (Skuse), and <i>Culex quinquefasciatus</i> (Say). One of these mosquitos, <i>C. quinquefasciatus</i> , is considered to be a grave threat to Hawaiian forest birds as a vector of avian malaria, which is already menacing the last surviving endemic honeycreeper populations of several species on both Kaua'i and Maui (Glad & Crampton 2015; Pratt et al. 2009). Given that the native range of these bromeliads includes observations well over 1200 m above sea level, we suspect no elevational barrier for their proliferation on Kaua'i, and that only diminishing rainfall may inhibit their spread into the uppermost forests of Maui."
	WRA Specialist. (2026). Personal Communication	Possibly. <i>Werauhia gladioliflora</i> may form dense epiphytic populations that compete with native epiphytes for space and resources, add substantial weight to tree limbs, potentially increase breeding habitat for invasive mosquitoes and coqui frogs, and pose risks to native forest ecosystems and infrastructure.

305	Congeneric weed	
	Source(s)	Notes
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	" <i>Werauhia sanguinolenta</i> was documented as naturalized in East Maui in two separate locations, also a new island record for that species." [Potentially. <i>Werauhia sanguinolenta</i> is a potential congeneric weed of <i>W. gladioliflora</i> , having naturalized on O'ahu and East Maui where it establishes epiphytically on a wide range of native, Polynesian-introduced, and invasive trees, with no apparent host preference. Its ability to establish in degraded wet forest, reproduce from seed, and occur several hundred meters from cultivation demonstrates weedy characteristics that may also be relevant to <i>W. gladioliflora</i> .]

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[No evidence] "Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter. Leaves alternate, in a rosette, purplish when young, becoming yellow green, 38-67 cm long, 4-8 cm wide, broadly strap-shaped, tip rounded with an abrupt point, base broadly sheathing, red brown, surface smooth, margins smooth. Flowers cream white to greenish white, petals 3, rounded, 4-7 cm long, emerging from between bracts, bracts 4-6 cm long, green with purplish tip in flower, becoming pale red brown, tightly overlapping, ranked along floral axis; inflorescence a spike 22-65 cm long, to about 5 cm wide on a stalk 33-59 cm long, covered by overlapping bracts; blooms Mar.-June, Sept.-Dec. Fruit dry, 3-4 cm long, brown and black, splitting open to release plumed seeds."

Qsn #	Question	Answer
402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Unknown. No evidence found
403	Parasitic	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter."
404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Unknown. The species' predominantly epiphytic habit may limit its accessibility to terrestrial grazing and browsing animals.
405	Toxic to animals	n
	Source(s)	Notes
	Plantariy. (2026). Gladiolus-Flowered Werauhia Werauhia Gladioliflora. https://plantariy.com/plant/werauhia-gladioliflora_44048.html . [Accessed 3 Sep 2026]	"Safety & Toxicity Status: Non-toxic. Details: This plant is generally considered safe for cats, dogs, and children. It lacks the sharp, "saw-tooth" spines found on some other bromeliads (like pineapples), making it a much friendlier choice for households with curious pets."
	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	y
	Source(s)	Notes
	Plantariy. (2026). Gladiolus-Flowered Werauhia Werauhia Gladioliflora. https://plantariy.com/plant/werauhia-gladioliflora_44048.html . [Accessed 3 Sep 2026]	"Because it is an epiphyte (a "tree-dweller"), it drinks through its leaves. You must keep the central "cup" filled with fresh water, but be sure to flush it out weekly to prevent the water from stagnating or attracting pests."
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). Werauhia gladioliflora and Werauhia sanguinolenta (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	[Not identified as a host of plant pests or pathogens, but could provide habitat for invasive species that impact native forest bird health, human health and quality of life] "Additional negative effects of Werauhia establishment across the landscape could include an increase in breeding habitat for invasive animal species, like coqui frogs (Eleutherodactylus coqui) (Hara & Niino-DuPonte 2016), and arthropods such as mosquitos."
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes

Qsn #	Question	Answer
	Plantariy. (2026). Gladiolus-Flowered Werauhia Werauhia Gladioliflora. https://plantariy.com/plant/werauhia-gladioliflora_44048.html . [Accessed 3 Sep 2026]	"Safety & Toxicity Status: Non-toxic. Details: This plant is generally considered safe for cats, dogs, and children. It lacks the sharp, "saw-tooth" spines found on some other bromeliads (like pineapples), making it a much friendlier choice for households with curious pets."
	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
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter." ... "Habitat: Wet and very wet forests." [Werauhia gladioliflora is not known to increase fire hazard in natural ecosystems; its fleshy, water-retaining epiphytic growth form is unlikely to substantially increase combustible fuel loads, and it occurs in wet habitats with low fire risk]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	"in lowland wet/mesic secondary forest. Growing in Dimocarpus longan tree, forming dense covering over trunk/branches in more or less dense shade."
	WRA Specialist. (2026). Personal Communication	Werauhia gladioliflora is shade tolerant, with seedlings and mature plants capable of establishing epiphytically on shaded, moss-covered tree trunks and within forest canopies.

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Not applicable. Werauhia gladioliflora is primarily epiphytic, and there is insufficient information to determine whether it tolerates a wide range of soil conditions.

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamante, K. (2024). Werauhia gladioliflora and Werauhia sanguinolenta (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	"A population of thousands, ranging from seedlings to fully mature plants, was observed in the mid- to upper canopy of the secondary forest dominated by 40 m tall albizia trees (Falcateria moluccana), with only seedlings and immature plants accessible from the ground." [Forms dense epiphytic cover]
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	"in lowland wet/mesic secondary forest. Growing in Dimocarpus longan tree, forming dense covering over trunk/branches in more or less dense shade." [Epiphytic species capable for forming dense cover in trees]

412	Forms dense thickets	n
	Source(s)	Notes

Qsn #	Question	Answer
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	"A population of thousands, ranging from seedlings to fully mature plants, was observed in the mid- to upper canopy of the secondary forest dominated by 40 m tall albizia trees (<i>Falcateria moluccana</i>), with only seedlings and immature plants accessible from the ground." [Werauhia gladioliflora can form dense epiphytic populations in tree canopies but does not form terrestrial thickets.]
501	Aquatic	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter."
502	Grass	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	Bromeliaceae
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	Bromeliaceae
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter."
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. Plant Biology, 7(02), 203-209	[No evidence] "In conclusion, <i>Werauhia gladioliflora</i> exhibits reproductive traits that correspond to an early colonizer species. These traits include self-compatibility, autonomous selfing, and high fecundity, but they may be associated with lower performance at colonized sites if there is substantial inbreeding depression. However, additional life history traits related to seed dispersal, seedling establishment and growth may play a major role in determining the presence or absence of this species in successional vegetation patches in the study site."
	IUCN. (2026). The IUCN Red List of Threatened Species. Version 2026-1. https://www.iucnredlist.org/ . [Accessed 3 Sep 2026]	No evidence
602	Produces viable seed	y

Qsn #	Question	Answer
	Source(s)	Notes
	Frohlich, D. & Lau, A. (2012). New plant records for the Hawaiian islands. Bishop Museum Occasional Papers 113: 27-54	"seeds with silky hairs, many per capsule. Spreading adventively by seed about 30 ft away from planted individuals,"
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"The percentage of developed fruits in the three pollination treatments was not statistically different ($c22,0.05 = 3.18$, $p > 0.10$). Self-compatibility at the level of fruit set was high, 97% of the manually self-pollinated flowers produced fruits compared to 94% and 87% in the out-crossed and naturally pollinated flowers, respectively (Table 2). Emasculation during the manipulation of out-crossed flowers had no affect on fruit development. Manipulated flowers that failed to develop fruits were consumed by leaf-cutter ants (<i>Atta</i> sp, Formicidae), which managed to cut the mesh bags during the night after manipulation. The number of developed seeds per fruit was similar among treatments ($F2,61 = 0.54$, $p = 0.58$) (Table 2). The germination capacity after 28 days was higher than 70% for all the treatments and not significantly different ($H2,n = 36 = 3.18$, $p = 0.20$) (Table 2). The germination curves showed similar trends (Fig. 6) and, in all treatments, germinated seeds were evident 10 days after sowing, reaching their maximum number by day 20."

603	Hybridizes naturally	
	Source(s)	Notes
	Núñez-Hidalgo, S., & Cascante-Marín, A. (2024). Selfing in epiphytic bromeliads compensates for the limited pollination services provided by nectarivorous bats in a neotropical montane forest. <i>AoB Plants</i> , 16(2), plae011	"The alternative hypothesis of selfing as a mechanism of reproductive isolation is not supported because of the non-overlapping flowering seasons previously reported for the investigated <i>Werauhia</i> species in the study site (Cascante-Marín et al. 2017), which precludes heterospecific pollen transfer." [Non-overlapping flowering seasons may minimize possibility of hybridization. <i>Werauhia</i> species co-existing in the wild today have developed strong physical barriers (primarily non-overlapping flowering seasons) to prevent ongoing interspecific gene flow]
	Loiseau et al. (2021). Genome skimming reveals widespread hybridization in a Neotropical flowering plant radiation. <i>Frontiers in Ecology and Evolution</i> , 9, 668281	[Phylogenomic analysis identified <i>Werauhia gladioliflora</i> as one of the species carrying a significant genetic signature of hybrid origin . The literature states:]"These 287 combinations contain 17 species identified as potentially of hybrid origin, which included nine species of <i>Vriesea</i> s.str., the species <i>V. dubia</i> that belongs to the <i>Vriesea-Cipuropopsis</i> clade, three species of <i>Tillandsia</i> as well as <i>Goudaea chrysostachys</i> , <i>Guzmania berteroniana</i> , <i>Werauhia gladioliflora</i> , and <i>Zizkaea tuerckheimii</i> (Table 1)."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"The results of our experimental tests showed that <i>W. gladioliflora</i> is fully self-compatible and that selfing does not affect the progeny in terms of quantity (number of fruits and seeds) and quality (seed germination). These are advantageous traits for species that colonize new habitats (Baker 1955; Opler et al. 1980). The ability to produce seeds without pollinator visitation may be an advantage for <i>W. gladioliflora</i> during adverse weather conditions for pollinators, for example on rainy nights, which may reduce visitation rates. At both ends of the blooming season, the reduced availability of potential mates may increase the amount of progeny from selfing."

605	Requires specialist pollinators	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	[Adapted for bat pollination, but bat pollinators are not required to set seed] "Abstract: The floral phenology, fruit and seed production, and self-compatibility of <i>Werauhia gladioliflora</i> , an epiphytic bromeliad with a wide distribution, were studied in a premontane forest in the Monteverde area in Costa Rica. The species presents the pollination syndrome of chiropterophily, and it is visited by the small bats <i>Hylonycteris underwoodi</i> and <i>Glossophaga commissarisi</i> (Glossophaginae). The population flowering period extended from October to early December (end of rainy season) and seed dispersal occurred from February to April (dry season). Most plants opened a single flower per night, either every day or at one-day intervals during the flowering period. In natural conditions, the average fruit set amounted to almost half of the potential output, but individual fecundity (number of seeds) remained high. Seed number per fruit and germination capacity after artificial selfing and out-crossing treatments did not differ from natural pollination conditions. <i>Werauhia gladioliflora</i> exhibited high levels of autonomous self-pollination and self-compatibility at the individual and population level, characters associated with the epiphytic habitat. These reproductive traits are also associated with early colonizer species, yet life history traits, such as seed dispersal, seedling establishment success, and growth, are likely to have a major role in determining the presence of this species in the successional vegetation patches scattered over the studied premontane area."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Growli. (2026). How to propagate Gladiolus-Flowered <i>Werauhia</i> (<i>Werauhia gladioliflora</i>) – step by step. https://www.getgrowli.app/propagate/gladiolus-flowered-werauhia . [Accessed 3 Sep 2026]	"The reliable, beginner-friendly way to propagate gladiolus-flowered <i>werauhia</i> is nodal stem cuttings in water or soil. It suits this species because of how it grows: large tank-type epiphytic rosette with broad, arching strap leaves forming a vase shape around a central water-holding cup; monocarpic – the rosette dies after flowering and is replaced by pups.. Remove offsets (pups) once they are at least one-third the size of the mother plant and pot individually; the mother rosette can be left in place until it fully withers."
	WRA Specialist. (2026). Personal Communication	<i>Werauhia gladioliflora</i> can reproduce vegetatively by producing offsets (pups) around the base of the flowering mother rosette, which develop into independent plants.

607	Minimum generative time (years)	
	Source(s)	Notes
	Far North Coast Bromeliad Study Group N.S.W. (2016). Newsletter. http://www.bromeliad.org.au/news/FNCBSG-16_08.pdf . [Accessed 3 Sep 2026]	"John brought in two examples of upper pupping Bromeliads, these are the group of plants that pup in the upper leaf axils nearer to the base of the inflorescence. One being <i>Werauhia gladioliflora</i> , this species is mostly grown from seed as they don't often give more than one pup. The other a hybrid yet to be registered as <i>Vriesea</i> 'Ladd's Elation', originally these seedlings were tagged as <i>Vr. elata</i> , however as they matured it was realised they were a hybrid not the species. Both plants are about 5 years old, they have been very slow growing, and have recently flowered, and are now sending out pups, upper pups. (photos p.9" [<i>Werauhia gladioliflora</i> may begin flowering at approximately five years of age under cultivation, although age at first flowering under natural conditions is unknown.]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"Fruits are dry capsules with wind- dispersed plumed seeds"
	WRA Specialist. (2026). Personal Communication	Although it can be cultivated as a terrestrial plant, in the wild it occurs as an epiphyte and it's wind-dispersed seeds are unlikely to be accidentally dispersed by human activity. Intentional cultivation and seed dispersal by wind appear to be the primary vectors

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	<i>W. gladioliflora</i> is cultivated as an ornamental bromeliad and can be intentionally propagated and moved by people. It is propagated vegetatively through offsets/pups and is distributed through horticultural cultivation and the ornamental plant trade.

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	No evidence and unlikely. Although it can be cultivated as a terrestrial plant, in the wild it occurs as an epiphyte and it's wind-dispersed seeds are unlikely to become a contaminant of other plants.

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"Fruits are dry capsules with wind- dispersed plumed seeds"

705	Propagules water dispersed	
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. (2008). <i>A Field Guide to Plants of Costa Rica</i> . Oxford University Press US, New York, NY	"Terrestrial or epiphytic stemless herb, a "tank"-type bromeliad about 70 cm diameter." ... "Fruit dry, 3-4 cm long, brown and black, splitting open to release plumed seeds. Habitat: Wet and very wet forests." [Possibly. It may be possible that the wind dispersed seeds or vegetative propagules could be dispersed by water in wet habitats, although this would probably be a rare event]

706	Propagules bird dispersed	
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"Fruits are dry capsules with wind- dispersed plumed seeds." [Comose seeds are an adaptation for wind dispersal, but they could possibly be dispersed into trees attached to the legs or feathers of birds]

707	Propagules dispersed by other animals (externally)	
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Qsn #	Question	Answer
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"Fruits are dry capsules with wind- dispersed plumed seeds." [Comose seeds are an adaptation for wind dispersal, but they could possibly be dispersed into trees attached to the legs or feathers of birds]

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"Fruits are dry capsules with wind- dispersed plumed seeds." [Not fleshy-fruited, and seeds are adapted for wind dispersal]

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes
	Cascante-Marín, A., Oostermeijer, J. G. B., Wolf, J. H., & Den Nijs, J. C. M. (2005). Reproductive biology of the epiphytic bromeliad <i>Werauhia gladioliflora</i> in a premontane tropical forest. <i>Plant Biology</i> , 7(02), 203-209	"In spite of the relatively low number of flowers per plant (mean = 26), individual reproductive output (number of seeds) of <i>W. gladioliflora</i> is high. The number of seeds per fruit (Table 2) greatly exceeds that of other bromeliad species in the area (pers. obs., ACM) or in previous reports in the literature (see references in Benzing, 2000). An average plant develops half of the flowers into fruits, producing nearly 23 000 seeds. This amount of seeds, when extrapolated to the sampled population (n = 40), represents an estimated output of nearly one million seeds released in a given reproductive season."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Zotz, G. (2013). A Longer Story Than Expected: Seeds Of Several Species (Tillandsioideae) Remain Viable For Up To Two Years. <i>Journal of the Bromeliad Society</i> , 63(1), 83-87	[Seeds may remain viable for >1 year under ambient conditions] "The majority of the seven species showed no reduction in germination response after one year of storage (Fig. 1). Even in <i>V. sanguinolenta</i> , the species showing the greatest decline in germination rate after storage, an estimated 50% of all seeds successfully germinated after one year. After 26 months few seeds remained viable, although in <i>V. viridifolia</i> and <i>T. fasciculata</i> germination success was still, respectively, 25 ± 7% and 14 ± 12%. In contrast, seeds that had been kept at -20 °C had lost hardly any viability. Their average germination success after 26 months was 93% (range: from 74% in <i>V. gladioliflora</i> to 100% in <i>V. viridifolia</i>). We estimated the time it took seeds from each species to lose 50% viability by noting where the curve drawn through the observed mean germination rates over time for that species crossed the dashed horizontal line in Fig 1 representing 50%, yielding values between 12 and 22 months (Table 1). Lack of seed material did not allow us to study germination success of <i>T. flexuosa</i> after 26 months, but after 20 months it was still 89 ± 6%."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Unknown. No information was found demonstrating effective herbicide control of <i>W. gladioliflora</i> .

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
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Qsn #	Question	Answer
	Source(s)	Notes
	WRA Specialist. (2026). Personal Communication	Unknown. <i>W. gladioliflora</i> is a robust, easily cultivated bromeliad capable of establishing outside cultivation, but there is no evidence that it benefits from fire or that mutilation specifically stimulates regeneration.

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	n
	Source(s)	Notes
	Jablonski, J., Williams, A. M., Oppenheimer, H., & Bustamente, K. (2024). <i>Werauhia gladioliflora</i> and <i>Werauhia sanguinolenta</i> (Bromeliaceae) newly naturalized in Hawai'i. Bishop Museum Occasional Papers, 156, 191-197	"Although naturalized populations of <i>W. gladioliflora</i> in Hawai'i are lacking bat pollinators, they are likely also missing parasites or predators that could potentially check their population growth."
	Cascante-Marín, A., Wolf, J. H., & Oostermeijer, J. G. B. (2009). Wasp florivory decreases reproductive success in an epiphytic bromeliad. <i>Plant Ecology</i> , 203(1), 149-153	[Not present in the Hawaiian Islands] "Abstract Flower predation or florivory may alter the sexual expression, floral display, and reduce the reproductive success in plants. In this article, we estimated the effect of florivory on the reproductive success of the epiphytic bromeliad <i>Werauhia gladioliflora</i> during 2001-2003 in a premontane area in Costa Rica. Floral buds of <i>W. gladioliflora</i> are attacked by the wasp <i>Eurytoma werauhia</i> (Eurytomidae), which inhibits flower anthesis. Nearly, a quarter of the sampled population flowers were lost due to wasp infection and it accounted for nearly 70% of the reduction in fruit set. Flowers located on the inflorescence upper segment had a higher attack incidence. In the studied population, florivory has a major role in the reproductive success of <i>W. gladioliflora</i> . Florivory on epiphytic plants is scarcely reported in the literature, but evidence suggests that this phenomenon is more spread in the epiphytic community. Whether florivory in <i>W. gladioliflora</i> is a selective pressure influencing the reproductive success or a localized factor operating at the studied population is a subject requiring additional data."
	WRA Specialist. (2026). Personal Communication	No effective natural enemies of <i>Werauhia gladioliflora</i> are known to be present in Hawai'i; its naturalized populations may be released from some of the herbivores and other natural enemies that limit reproduction in its native range.

Summary of Risk Traits:

High-Risk Traits

Naturalized: Already established on O'ahu, Kaua'i, and Hawai'i Island.
Potential Environmental Weed: Threatens native forests and ecosystems.
Broad Climate Suitability: Grows from sea level to 1,300 m; no major elevational barrier.
Shade Tolerant: Can invade forest understories and canopies.
Self-Compatible: Fully self-fertile; no pollinator required.
Prolific Seeder: Produces up to ~1 million seeds per season.
Persistent Seed Bank: Seeds remain viable for 12-22 months.
Wind-Dispersed: Plumed seeds spread efficiently by wind.
Vegetative Reproduction: Spreads via offsets (pups).
Lacks Natural Enemies: Missing predators/parasites that limit spread in native range.
Provides Pest Habitat: Water tanks breed disease-vectoring mosquitoes.

Low-Risk Traits

No Spines/Thorns: Lacks physical defenses.
Non-Toxic: Safe for humans, cats, and dogs.
Low Fire Risk: Fleshy, water-storing form does not increase fuel loads.
Slow to Mature: Takes ~5 years to reach flowering.