

<b>Taxon:</b> <i>Tillandsia ionantha</i> Planch.	<b>Family:</b> Bromeliaceae
<b>Common Name(s):</b> blushing bride	<b>Synonym(s):</b> Pityrophyllum erubescens Beer Pityrophyllum gracile Beer Tillandsia erubescens H.Wendl. Tillandsia ionantha var. ionantha Tillandsia ionantha var. van-hyningii Tillandsia ionantha var. zebrina Tillandsia rubentifolia Poiss. & Menet Tillandsia scopus Hook. f.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 11 Feb 2022
<b>WRA Score:</b> 1.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Epiphyte, Naturalized (Florida), Ornamental, Outcrossing, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
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	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	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		

Qsn #	Question	Answer Option	Answer
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		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	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	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
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	y
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
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
	Ancona, J. J., Pinzón, J. P., Ortiz Diaz, J. J., Morillo, I. R., Tun-Garrido, J., Palma-Silva, C., & Till, W. (2021). Botanical history and typification in the <i>Tillandsia ionantha</i> complex. <i>Taxon</i> , 70(6), 1317-1326	[No evidence of domestication] " <i>Tillandsia ionantha</i> Planch. is a species of great ornamental interest in horticulture; it is widely represented in private collections and botanical gardens around the world."

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2022). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2022). 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, L. B., & Downs, R. J. (1977). <i>Tillandsioideae</i> (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	" <i>Tillandsia ionantha</i> var <i>ionantha</i> ... Distribution. Terrestrial and epiphytic, 450-1 700 m alt, Mexico to Nicaragua" ... " <i>Tillandsia ionantha</i> var <i>scaposa</i> ... Distribution. Epiphytic, 1500-1950 malt, Guatemala."

202	Quality of climate match data	High
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). <i>Tillandsioideae</i> (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	" <i>Tillandsia ionantha</i> var <i>ionantha</i> ... Distribution. Terrestrial and epiphytic, 450-1 700 m alt, Mexico to Nicaragua" ... " <i>Tillandsia ionantha</i> var <i>scaposa</i> ... Distribution. Epiphytic, 1500-1950 malt, Guatemala."

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 10 Feb 2022]	"Altitude range: 0 to 1,800 metres above sea level." ... "It is drought tolerant, and will thrive within a broad latitude of care conditions." ... "Hardiness: They are sensitive to heavy frost, but can easily tolerate sporadic light frost. However they grow best in a spot with plenty of light, with summertime temperatures of 20-30 C degrees or higher and winter temperatures around 15 ° C. USDA Zones 8–11. Put them inside or outside in summer when the weather is fine. Can live in a wide range of temperature, from 15°C to 45°C."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	" <i>Tillandsia ionantha</i> var <i>ionantha</i> ... Distribution. Terrestrial and epiphytic, 450-1 700 m alt, Mexico to Nicaragua" ... " <i>Tillandsia ionantha</i> var <i>scaposa</i> ... Distribution. Epiphytic, 1500-1950 malt, Guatemala."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence of naturalization in the Hawaiian Islands at time of publication

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	" <i>Tillandsia ionantha</i> is native to Mexico from Sinaloa in the northwest south to Costa Rica (Bailey & Bailey 1976, H. Luther pers. comm.). It is and has been grown on a commercial scale and is one of the more commonly available bromeliads. It is often one of the first bromeliads acquired by novice growers because of its small size, hardiness, and ease of cultivation (Staples & Herbst 2005)."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"Reported here is the naturalization of a Mesoamerican bromeliad, <i>Tillandsia ionantha</i> , in Broward County, southeast Florida. This species is a popular ornamental bromeliad. A total of 63 clusters of plants were found on 31 Australian pine trees adjacent to a mangrove forest at Anne Koeb Nature Center in Dania Beach, Florida. The presence of flowers and germinating seeds indicate that the population is reproducing sexually. No pollination agent(s) is known for this pollinator-dependent species at this location. This is only the second reported case of naturalization of <i>Tillandsia</i> worldwide."
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 10 Feb 2022]	" <i>Tillandsia ionantha</i> is a Mesoamerican Bromeliad, which has a wide geographic distribution. The taxon is found in Mexico, Costa Rica, El Salvador, Guatemala, Honduras and Nicaragua. It is reported to have naturalized in Florida and is possibly found in Panama."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence of naturalization in the Hawaiian Islands at time of publication

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental Tillandsia, <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	" <i>Tillandsia ionantha</i> 's naturalization appears to be innocuous but it adds to the ever-increasing proportion of aliens in the state's flora." [No evidence of impacts]
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental Tillandsia, <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	" <i>Tillandsia ionantha</i> 's naturalization appears to be innocuous but it adds to the ever-increasing proportion of aliens in the state's flora." [No evidence of impacts]
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental Tillandsia, <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	" <i>Tillandsia ionantha</i> 's naturalization appears to be innocuous but it adds to the ever-increasing proportion of aliens in the state's flora." [No evidence of impacts]
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	y
	Source(s)	Notes
	Johnson, J. D.; Halliwell, R. S. (1973) Compounds for the control of ball moss. <i>Plant Disease Reporter</i> 57(1): 81-83	"In field trials in south-west Texas in 1970-71, good control of <i>Tillandsia recurvata</i> on the evergreen <i>Quercus virginiana</i> was obtained by spray with Cu(OH) <sub>2</sub> (Kocide 101) at 4-8 lb/100 gal water."
	Cardenas, C. H. (1971) Observations on <i>Tillandsia recurvata</i> and its control by means of herbicides. <i>Revista de la Facultad de Agronomia, Universidad Central de Venezuela</i> 6(2): 43-72	"In parts of Venezuela the epiphyte <i>Tillandsia recurvata</i> is sufficiently abundant to kill whole trees or their main branches. Its mode of propagation is described. In the laboratory detached plants were readily killed by submergence in various herbicidal solutions."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental Tillandsia, <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"The plants grow in dense clusters of rosettes, probably by the production of offsets. Individual rosettes are vase-shaped, taller than wide, and 5-10 cm high. Plants have stiff, erect, narrowly triangular leaves with a long-tapering apex. The leaves are green with scattered or dense ash grey scales, except during flowering, when the inner leaves are pink to red. The flowers are tubular, blue with a white base, have exerted stamens and style, arise from the rosette center, and extend just beyond the rosette tips. The pink to red leaves in the center of the grey-green rosettes gives this species a distinctive appearance, which has led to its horticulture common, name "blushing-bride." The dense clusters of small rosettes with red coloration in flowering plants readily separates it from Florida's 12 native <i>Tillandsia</i> species (Wunderlin & Hansen 2003),"

402	Allelopathic	
	Source(s)	Notes
	Valencia-Díaz, S., Flores-Palacios, A., Rodruíguez-López, V., & Jimenez-Aparicio, A. R. (2012). Effects of <i>Tillandsia recurvata</i> extracts on the seed germination of <i>Tillandsia</i> spp. <i>Allelopathy Journal</i> , 29(1): 125-135	[Unknown. No evidence, but allelopathic chemicals documented in other species] "Abstract: Epiphytes associate intraspecifically, but it is unclear whether the dominant species exerts a negative effect on its competitors through allelopathy. <i>Tillandsia recurvata</i> is the dominant epiphyte in the tropical dry forest of central Mexico. It has phytotoxic properties, therefore inhibits the seed germination of other epiphytic bromeliads, which may effect its associations. Nearest neighbor (NN) distance from each bromeliad was measured and the bromeliad associations were characterized as intra or interspecific. Leachates and organic extracts from <i>T. recurvata</i> were used in seed germination trials of <i>Tillandsia</i> . All species have a conspecific as their NN, but interespecific associations indicate that <i>T. recurvata</i> was less frequent NN for all <i>Tillandsia</i> . <i>T. recurvata</i> leachates and organic extracts inhibited the germination of all <i>Tillandsia</i> species. This research demonstrates the inhibitory potential of <i>T. recurvata</i> on its competitors; however its association patterns were not explained. Other ecological factors may account for its dominance and associations."

403	Parasitic	n
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). <i>Tillandsioideae</i> (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	"Terrestrial and epiphytic"

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Smith, J.G. (1896). <i>Fodder and Forage Plants: Exclusive of the Grasses</i> . Government Printing Office, Washington, D.C.	[Unknown. <i>Tillandsia usneoides</i> palatable to cattle] "An epiphyte belonging to the Pineapple family, abundant in Florida and the Gulf States, where it is a characteristic feature of the forests with its long stems hanging in festoons from the tree trunks and branches. Cattle eat it, and it adds considerable value to the woodland pastures."

Qsn #	Question	Answer
405	<b>Toxic to animals</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Air Plant Design Studio. (2022). Air Plants + Pets: Are Air Plants Toxic? <a href="https://www.air-plants.com/blogs/air-plant-encyclopedia/air-plants-pets-are-air-plants-toxic">https://www.air-plants.com/blogs/air-plant-encyclopedia/air-plants-pets-are-air-plants-toxic</a> . [Accessed 11 Feb 2022]	"Tillandsia, aka air plants, are non toxic to dogs and cats."
	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	
	<b>Source(s)</b>	<b>Notes</b>
	Plant Care Today. (2022). Tillandsia Ionantha: Growing and Care Of The Tillandsia Flower. <a href="https://plantcaretoday.com/tillandsia-ionantha.html">https://plantcaretoday.com/tillandsia-ionantha.html</a> . [Accessed 11 Feb 2022]	"Pests rarely bother the ionantha air plant. As it doesn't grow in soil, it absorbs fewer minerals that tend to attract insects and spider mites. This doesn't mean that pests won't attack the plant. If mites or other critters infest the plant, rinse the plant and then hang it upside down to dry."
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental Tillandsia, <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"The introduced Mexican bromeliad weevil, <i>Metamasius callizana</i> (Chevrolat), was first collected in Florida on <i>T. ionantha</i> plants in a Ft. Lauderdale nursery ( <a href="http://www.Creatures.ifas.edu">www. Creatures.ifas.edu</a> ). This weevil, which threatens some of Florida's native <i>Tillandsia</i> species is not likely to be a population regulatory agent of <i>T. ionantha</i> . The adults feed on <i>T. ionantha</i> , but because they do not lay eggs on the plant; it will escape damage from the larvae that feed within rosettes." [Sustains, but does not serve as a host, of the Mexican bromeliad weevil]

407	Causes allergies or is otherwise toxic to humans	n
	<b>Source(s)</b>	<b>Notes</b>
	Plant Care Today. (2022). Tillandsia Ionantha: Growing and Care Of The Tillandsia Flower. <a href="https://plantcaretoday.com/tillandsia-ionantha.html">https://plantcaretoday.com/tillandsia-ionantha.html</a> . [Accessed 11 Feb 2022]	"These plants are not toxic to animals or people. In fact, cats tend to like munching on the leaves, so it's a good idea to place it out of their reach."
	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
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. (2022). Personal Communication	An epiphyte with no evidence of flammability or increased fire risk

409	Is a shade tolerant plant at some stage of its life cycle	

Qsn #	Question	Answer
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 11 Feb 2022]	[Partial shade. Dense shade causes plants to weaken and wither] "It grows best in full sun to partial sun. In the hottest climates, it is best given some afternoon shade. In a dark location the plant will gradually weaken and wither. In winter, find a luminous place. Its colour is generally more intense when budding and when getting lots of light."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	"Terrestrial and epiphytic"
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 10 Feb 2022]	[NA] "Soil: It is exclusively epiphyte, which means it naturally grows on trees and needs no soil or transplanting. Atmospheric tillandsias cling to just about anything from trees to cacti to telephone poles and can be affixed on a branch or piece of bark, or slabs of tree-fern."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	[Epiphytic, not climbing] "Plant stemless or rarely caulescent, usually in dense masses. Leaves rarely over 6 cm long, covered with coarse cinereous spreading scales"

412	Forms dense thickets	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	[An epiphyte that may form dense clusters in trees] "The plants grow in dense clusters of rosettes, probably by the production of offsets."

501	Aquatic	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"Terrestrial and epiphytic"

502	Grass	n
	Source(s)	Notes
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663–1492	Bromeliaceae

503	Nitrogen fixing woody plant	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). Flora Neotropica, 14(2), 663–1492	Bromeliaceae

<b>504</b>	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Smith, L. B., & Downs, R. J. (1977). Tillandsioideae (Bromeliaceae). Flora Neotropica, 14(2), 663–1492	"Plant stemless or rarely caulescent, usually in dense masses. Leaves rarely over 6 cm long, covered with coarse cinereous spreading scales"

<b>601</b>	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	WFO (2022). World Flora Online. Published on the Internet; <a href="http://www.worldfloraonline.org">http://www.worldfloraonline.org</a> . [Accessed 10 Feb 2022]	IUCN Red List Status - Least Concern

<b>602</b>	<b>Produces viable seed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 10 Feb 2022]	"Propagation: Division or seed. <i>Tillandsia ionantha</i> is easily propagated by removal of offsets at any time of the year. The plantlets must be hung on bark slabs. In the greenhouse you can attach the offsets to slabs of oak wood with small staples holding the roots on the wood until they attach themselves. This can also be done with a small patch of hot glue (just not too hot) to hold the plants in place. Around the base you can use some reindeer moss to cover the roots and to hold moisture. Pups are produced after blooming, as is usual with most <i>Tillandsia</i> species. Seeds are germinated on peat moss. Seeds need light to germinate. One easy way to tell apart plant raised from seeds or division is to look at the plant. While not always the case, generally it is true that if the leaves are relatively straight and short and there are no roots the plant is an offset taken from a mother plant. If the converse is true, that is, the leaves are long and curving and there is a root system present, then this plant will be a number of years old and grown from a seed."
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"Seedlings of <i>Tillandsia ionantha</i> enmeshed in the seed filaments attached to the rosette which bore the fruit generating the seed. This seed production indicates that sexual reproduction in this obligate, outcrossing species is occurring in the naturalized population."

<b>603</b>	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Gardner, C. S. (1984). Natural Hybridization in <i>Tillandsia</i> Subgenus <i>Tillandsia</i> . <i>Selbyana</i> , 7(2/4), 380-393	"Ample opportunity exists for hybridization among species of subgen. <i>Tillandsia</i> as several species often occupy the same host and flower simultaneously. For example in the thorn forest of coastal Tamaulipas in northern Mexico, <i>T. polystachia</i> L., <i>T. paucifolia</i> J. G. Baker, <i>T. balbisiana</i> Schultes, <i>T. fasciculata</i> Swartz, <i>T. ionantha</i> Planchon, <i>T. schiedeana</i> Steudel, <i>T. baileyi</i> Rose, and <i>T. utriculata</i> L. grow in a dense, mixed community. Flowering seasons overlap and putative hybrids were collected." ... "Tillandsia hybrids listed in the International Checklist of Bromeliad Hybrids involving members of the subgenus <i>Tillandsia</i> ." [ <i>Tillandsia brachycaulos</i> X <i>T. ionantha</i> ; <i>Tillandsia ionantha</i> X <i>T. schiedeana</i> ]
	Smith, L. B., & Downs, R. J. (1977). <i>Tillandsioideae</i> (Bromeliaceae). <i>Flora Neotropica</i> , 14(2), 663-1492	[No <i>Tillandsia ionantha</i> hybrids documented] "In <i>Tillandsia</i> interspecific hybrids are rare except in the advanced subgenus <i>Diaphoranthema</i> . Most of these hybrids are natural and thus without vouchers except as the supposed parents are found in the vicinity."

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	"Electrophoretic data suggest that <i>Tillandsia ionantha</i> and <i>T. recurvata</i> differ in breeding system, in agreement with predictions based on their strikingly different floral morphologies (Fig. 1, 2). Electrophoretic data indicate that <i>Tillandsia ionantha</i> is an outcrossing species or species with a mixed mating system, whereas extremely high levels of inbreeding are evident in <i>T. recurvata</i> ."
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	"Genetic studies have shown <i>T. ionantha</i> to be an outcrossing species (Soltis et al. 1987), and plants kept in a greenhouse isolated from pollinators do not produce fruit (D. Benzing pers. comm.)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	[Hummingbirds, and possibly bees and lepidoptera suspected of pollinating this plant] "No pollination agent(s) is known for this pollinator-dependent species at this location." ... "The agent(s) responsible for <i>T. ionantha</i> 's pollination and subsequent fruit production in southern Florida have yet to be determined. Most <i>Tillandsia</i> subg. <i>Tillandsia</i> , to which <i>T. ionantha</i> belongs, are thought to be pollinated mostly by hummingbirds, and to lesser extent by bees and Lepidoptera (Benzing et al. 2000), but the pollination ecology of most species is unknown (H. Luther pers. comm.). <i>Tillandsia ionantha</i> 's red inner leaves, which appear at flowering, and its exerted flower parts suggest hummingbird pollination (Benzing et al. 2000). Although hummingbirds occur in southern Florida, they are not reliable pollinators. This has led to autogamy in the red-flowered terrestrial orchid <i>Sacoila lanceolata</i> (Aublet) Garay, which is hummingbird-pollinated in tropical America (Catling 1987). Pollination success is probably among the most important factors for <i>T. ionantha</i> 's expansion."

Qsn #	Question	Answer
606	<b>Reproduction by vegetative fragmentation</b>	
	<b>Source(s)</b>	<b>Notes</b>
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 11 Feb 2022]	[Possibly if offsets naturally break off] " <i>Tillandsia ionantha</i> is easily propagated by removal of offsets at any time of the year. The plantlets must be hung on bark slabs. In the greenhouse you can attach the offsets to slabs of oak wood with small staples holding the roots on the wood until they attach themselves. This can also be done with a small patch of hot glue (just not too hot) to hold the plants in place. Around the base you can use some reindeer moss to cover the roots and to hold moisture. Pups are produced after blooming, as is usual with most <i>Tillandsia</i> species."
	Plant Care Today. (2022). <i>Tillandsia Ionantha: Growing and Care Of The Tillandsia Flower</i> . <a href="https://plantcaretoday.com/tillandsia-ionantha.html">https://plantcaretoday.com/tillandsia-ionantha.html</a> . [Accessed 11 Feb 2022]	[Possibly, if offshoots break off naturally] "The easiest way to propagate <i>tillandsia ionantha</i> is with offshoots. The pups grow around the base of the mother plant. These offshoots should appear once the air plant matures. When they reach about half the size of the mother plant, separate the offshoots to grow new plants. To collect the pups, use a sharp knife and carefully divide the plant. These young plants may not be ready for mounting. For now, place them on top of peat mix and place in indirect sunlight."

607	Minimum generative time (years)	2
	Source(s)	Notes
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 11 Feb 2022]	[2-3 years] "It grows slowly, often needing two or three growing seasons to reach maturity. It produces a substantial root system and responds to good cultivation. If one has patience, a large clump can be produced in a few years."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Gardner, C. S. (1984). Natural Hybridization in <i>Tillandsia</i> Subgenus <i>Tillandsia</i> . <i>Selbyana</i> , 7(2/4), 380-393	"An efficient means of seed dispersal, by wind, has allowed <i>Tillandsia</i> to reach many new places."
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

Qsn #	Question	Answer
702	<b>Propagules dispersed intentionally by people</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	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	"This is the most popular species of <i>Tillandsia</i> and often the first species acquired by novice growers because of its small size, hardiness, and ease of culture."
	Pemberton, R., & Liu, H. (2007). Rare Naturalization of an Ornamental <i>Tillandsia</i> , <i>Tillandsia ionantha</i> in Southern Florida. <i>Selbyana</i> , 28(2): 150-153	" <i>Tillandsia ionantha</i> is native to Mexico from Sinaloa in the northwest south to Costa Rica (Bailey & Bailey 1976, H. Luther pers. comm.). It is and has been grown on a commercial scale and is one of the more commonly available bromeliads. It is often one of the first bromeliads acquired by novice growers because of its small size, hardiness, and ease of cultivation (Staples & Herbst 2005)."

703	Propagules likely to disperse as a produce contaminant	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

704	Propagules adapted to wind dispersal	y
	<b>Source(s)</b>	<b>Notes</b>
	Gardner, C. S. (1984). Natural Hybridization in <i>Tillandsia</i> Subgenus <i>Tillandsia</i> . <i>Selbyana</i> , 7(2/4), 380-393	"An efficient means of seed dispersal, by wind, has allowed <i>Tillandsia</i> to reach many new places."
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

705	Propagules water dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[Plumose, wind-dispersed seeds. Primarily epiphytic, so secondary dispersal by water would presumably not disperse seeds into a suitable substrate] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[No evidence. Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

Qsn #	Question	Answer
707	<b>Propagules dispersed by other animals (externally)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[No evidence. Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

708	<b>Propagules survive passage through the gut</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	[No evidence. Plumose, wind-dispersed seeds] "Both species grow in clumps of several to many individuals, have few flowers (1- 3) per plant, and possess small plumose seeds."

801	<b>Prolific seed production (&gt;1000/m2)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Soltis, D. E., Gilmartin, A. J., Rieseberg, L., & Gardner, S. (1987). Genetic variation in the epiphytes <i>Tillandsia ionantha</i> and <i>T. recurvata</i> (Bromeliaceae). <i>American Journal of Botany</i> , 74(4), 531-537	"Greenhouse grown plants of <i>T. ionantha</i> rarely set seed, whereas plants of <i>T. recurvata</i> regularly set seed." [Limited seed set would also presumably occur outside native range where pollinator limitation would be a factor]

802	<b>Evidence that a persistent propagule bank is formed (&gt;1 yr)</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Flores-Palacios, A., Bustamante-Molina, A. B., Corona-López, A. M., & Valencia-Díaz, S. (2015). Seed number, germination and longevity in wild dry forest <i>Tillandsia</i> species of horticultural value. <i>Scientia Horticulturae</i> , 187, 72-79	[Unknown, but seeds of some species are capable of being stored for at least 478 days] "The seeds of all <i>Tillandsia</i> species were capable to germinate in light and dark conditions. Seed longevity in all species was at least 478 days after collection and improved under cool temperatures(7–11°C)."

803	<b>Well controlled by herbicides</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Arny, N.P. (1996). Spanish Moss and Ball Moss. FOR52. University of Florida IFAS Extension, Gainesville, FL <a href="http://edis.ifas.ufl.edu">http://edis.ifas.ufl.edu</a> . [Accessed 11 Feb 2022]	[Unknown. Chemical control of <i>Tillandsia usneoides</i> is effective] "Chemical control of <i>Tillandsia</i> is possible. As of 1996, the following materials are licensed for control of Spanish moss and/or ball moss: TC Tribasic Copper Sulphate, Blue Shield, Basic Copper 53, Micro Flo Basic Copper 53, Micro Flo Copper 3 FL. It should be noted that there is evidence that copper-based herbicides and fungicides may cause damage to tender growth on oak trees. As with all herbicides, when using these materials read and follow label directions carefully."

804	<b>Tolerates, or benefits from, mutilation, cultivation, or fire</b>	
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	LLIFLE - Encyclopedia of living forms. (2022). <i>Tillandsia ionantha</i> . <a href="http://www.llifle.com/">http://www.llifle.com/</a> . [Accessed 11 Feb 2022]	[Unknown. Possibly may resprout after damage to offsets] " <i>Tillandsia ionantha</i> is easily propagated by removal of offsets at any time of the year. The plantlets must be hung on bark slabs. In the greenhouse you can attach the offsets to slabs of oak wood with small staples holding the roots on the wood until they attach themselves. This can also be done with a small patch of hot glue (just not too hot) to hold the plants in place. Around the base you can use some reindeer moss to cover the roots and to hold moisture. Pups are produced after blooming, as is usual with most <i>Tillandsia</i> species."

805	<b>Effective natural enemies present locally (e.g. introduced biocontrol agents)</b>	
	<b>Source(s)</b> 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	<b>Notes</b> [Unknown] "This is the most popular species of <i>Tillandsia</i> and often the first species acquired by novice growers because of its small size, hardiness, and ease of culture."

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Broad climate suitability and elevation range
- Thrives and spreads in regions with tropical climates
- Naturalized in Florida
- Other *Tillandsia* species have become invasive
- Tolerates many soil types
- Reproduces by wind-dispersed seeds, and intentionally cultivated by people
- May hybridize with other species
- Propagated by offsets; may be able to spread vegetatively

## Low Risk Traits

- Widely cultivated with no evidence of negative impacts where introduced
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Grows best in high light environments (dense shade may inhibit spread)
- An outcrossing species
- Presumably pollinated by hummingbirds and possibly insects, but pollinator limitation suspected of limiting seed set outside native range

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

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

Outcome = Accept (Low Risk)