Taxon: Aechmea bracteata (Sw.) Griseb. **Family:** Bromeliaceae

Common Name(s): cardo hembra, cardón, cuatecomate, gallito, guapiña, pita, tecoloame, vase bromeliad, xchu

Synonym(s): Bromelia bracteata Sw.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 11 Apr 2018

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

Keywords: Epiphyte, Naturalized, Spiny, Apomictic, Bird-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
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)	n
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic		
403	Parasitic	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
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	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)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
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**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	[No evidence of domestication or selection for traits that would reduce weediness] "Aechmea bracteata var bracteata ... Distribution. Epiphyte, 30-1400 m alt, eastern Mexico to Colombia and Venezuela." ... "Aechmea bracteata var pacifica ... Distribution. Epiphytic and sometimes saxicolous, 5-940 m alt, western Mexico, Costa Rica."

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Apr 2018]	"Native Northern America Northern Mexico: Mexico San Luis Potosi, Sinaloa, Tamaulipas Southern Mexico: Mexico Campeche, Chiapas, Colima, Guerrero, Hidalgo, Jalisco, Michoacan, Nayarit, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz, Yucatan Southern America Central America: Belize ; Costa Rica ; Guatemala ; Honduras ; Nicaragua ; Panama Northern South America: Venezuela Western South America: Colombia"

Qsn #	Question	Answer
202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Apr 2018]	"Native Northern America Northern Mexico: Mexico San Luis Potosi, Sinaloa, Tamaulipas Southern Mexico: Mexico Campeche, Chiapas, Colima, Guerrero, Hidalgo, Jalisco, Michoacan, Nayarit, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz, Yucatan Southern America Central America: Belize ; Costa Rica ; Guatemala ; Honduras ; Nicaragua ; Panama Northern South America: Venezuela Western South America: Colombia"

203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	"Aechmea bracteata var bracteata" ... "Distribution. Epiphyte, 30-1400 m alt, eastern Mexico to Colombia and Venezuela." [Elevation range exceeds 1000 m, demonstrating environmental versatility in tropical climates]
	Tropicos.org. 2018. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 6 Apr 2018]	Collected across a latitudinal range of 08°27'36"N to 22°08'00"N and an elevation range of 0-1800 m

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 5 Apr 2018]	"Native Northern America Northern Mexico: Mexico San Luis Potosi, Sinaloa, Tamaulipas Southern Mexico: Mexico Campeche, Chiapas, Colima, Guerrero, Hidalgo, Jalisco, Michoacan, Nayarit, Oaxaca, Puebla, Quintana Roo, Tabasco, Veracruz, Yucatan Southern America Central America: Belize ; Costa Rica ; Guatemala ; Honduras ; Nicaragua ; Panama Northern South America: Venezuela Western South America: Colombia"
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	"This species was found naturalizing about 10 m above the ground in a tree in Waimea Botanical Garden. It was planted by the garden in the notch of a nearby tree and has spread to notches in surrounding trees. Material examined. O'AHU: Waimea Botanical Garden, growing in branches of tree, ca 10 m above ground, 2 m, 25 Jan 2007, D. Frohlich & A. Lau s.n. (BISH 725942, 725943)."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Gann, G.D., Stocking, C.G. and Collaborators. 2007-2018. Floristic Inventory of the Florida Keys Database Online. The Institute for Regional Conservation. Delray Beach, Florida. http://www.regionalconservation.org. [Accessed 10 Apr 2018]	"SOUTH FLORIDA Occurrence: Present SOUTH FLORIDA Native Status: Not Native, Naturalized SOUTH FLORIDA Cultivated Status: Cultivated FLORIDA KEYS Occurrence: Present FLORIDA KEYS Native Status: Not Native, Cultivated Only"
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	"This species was found naturalizing about 10 m above the ground in a tree in Waimea Botanical Garden. It was planted by the garden in the notch of a nearby tree and has spread to notches in surrounding trees. Material examined. O'AHU: Waimea Botanical Garden, growing in branches of tree, ca 10 m above ground, 2 m, 25 Jan 2007, D. Frohlich & A. Lau s.n. (BISH 725942, 725943)."
	Fourdrigniez, M. and Meyer, J.Y. (2008). Liste et caractéristiques des plantes introduites naturalisées et envahissantes en Polynésie française. Contribution à la Biodiversité de Polynésie française N°17. Délégation à la Recherche, Papeete, Tahiti	[Aechmea bracteata = 1: non-invasive: naturalized species for a long time without presenting sign of invasiveness and not cited as invasive elsewhere]
	Global Register of Introduced and Invasive Species. 2018. Aechmea bracteata. http://griis.org/. [Accessed 10 Apr 2018]	Recorded as present in Algeria. No impacts verified

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Fourdrigniez, M. and Meyer, J.Y. (2008). Liste et caractéristiques des plantes introduites naturalisées et envahissantes en Polynésie française. Contribution à la Biodiversité de Polynésie française N°17. Délégation à la Recherche, Papeete, Tahiti	"Classe 1. non envahissant : espèce naturalisée depuis une longue période sans présenter de signe d'envahissement et non citée comme envahissant ailleurs" [Aechmea bracteata = 1: non-invasive: naturalized species for a long time without presenting sign of invasiveness and not cited as invasive elsewhere]
	Gann, G.D., Stocking, C.G. and Collaborators. 2007-2018. Floristic Inventory of the Florida Keys Database Online. The Institute for Regional Conservation. Delray Beach, Florida. http://www.regionalconservation.org. [Accessed 10 Apr 2018]	"SOUTH FLORIDA Native Status: Not Native, Naturalized"
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	"This species was found naturalizing about 10 m above the ground in a tree in Waimea Botanical Garden. It was planted by the garden in the notch of a nearby tree and has spread to notches in surrounding trees. Material examined. O'AHU: Waimea Botanical Garden, growing in branches of tree, ca 10 m above ground, 2 m, 25 Jan 2007, D. Frohlich & A. Lau s.n. (BISH 725942, 725943)."

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Fourdrigniez, M. and Meyer, J.Y. (2008). Liste et caractéristiques des plantes introduites naturalisées et envahissantes en Polynésie française. Contribution à la Biodiversité de Polynésie française N°17. Délégation à la Recherche, Papeete, Tahiti	"Classe 1. non envahissant : espèce naturalisée depuis une longue période sans présenter de signe d'envahissement et non citée comme envahissant ailleurs" [Aechmea bracteata = 1: non invasive: naturalized species for a long time without presenting sign of invasiveness and not cited as invasive elsewhere]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
	Global Register of Introduced and Invasive Species. 2018. Aechmea bracteata. http://griis.org/. [Accessed 10 Apr 2018]	Recorded as present in Algeria. No impacts verified

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

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

305	Congeneric weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Aechmea comata, Aechmea drakeana, Aechmea fasciata, Aechmea gamosepala, Aechmea lindenii, Aechmea miniata, & Aechmea weilbachii listed as naturalized & potential weeds, but impacts have not been verified or documented in the literature.

401	Produces spines, thorns or burrs	y
	Source(s)	**Notes**
	Holst, B. K., Amaya, D., Baron, E., Paredes, M. & Kay, E. 2017. Spiny Bromeliaceae of Belize. Guide #: 969. The Field Museum, Chicago, IL. http://fieldguides.fieldmuseum.org/guides/guide/969. [Accessed]	"Aechmea bracteata ... A common and attractive bromeliad in Belize, distinguished by the urnshaped rosette, strong and erect marginal teeth, and bright red bracts that are pendent." ... "Level 1 spines. They are significant and dangerous, but are not curved and do not hook flesh"
	Dave's Garden. 2018. Aechmea Bromeliad, Urn Plant - Aechmea bracteata var. rubra. https://davesgarden.com/guides/pf/go/197514/. [Accessed 11 Apr 2018]	"Danger: Plant has spines or sharp edges; use extreme caution when handling"

402	Allelopathic	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found.

Qsn #	Question	Answer
403	**Parasitic**	**n**
	Source(s)	**Notes**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	"Plant 5-17 dm or higher. Leaves about 20, 3 to over 10 dm long" ... "Aechmea bracteata var bracteata ... Epiphyte" ... "Aechmea bracteata var pacifica ... Epiphytic and sometimes saxicolous" [Bromeliaceae. No evidence]

404	**Unpalatable to grazing animals**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown

405	**Toxic to animals**	**n**
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	Frank, J. (1999). Bromeliad-Eating Weevils. Selbyana, 20 (1), 40-48	"Table 1. Weevils known to eat bromeliads, or that are suspected of doing so, with their distribution and hostplants in their native areas" [Weevil - Cactophagus sanguinolentus feeds on Aechmea bracteata]

407	**Causes allergies or is otherwise toxic to humans**	**n**
	Source(s)	**Notes**
	Mazza, G. 2018. Aechmea bracteata. http://www.photomazza.com/Aechmea-bracteata. [Accessed 10 Apr 2018]	[No evidence] "Furthermore, they get from the leaves robust fibres utilized for fabricating ropes and handicrafts, whilst from the fruits, crushed and soaked in water to ferment, they get a drink with the taste of pineapple."
	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

Qsn #	Question	Answer
408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[No evidence. Does not occur in naturally fire prone habitats] "The epiphytic bromeliad, Aechmea bracteata (SW.) Griseb has a distribution that ranges from Central Mexico south throughout Central America and including Caribbean islands (Missouri Botanical Garden, http://www. mobot.org/). Throughout its range, A. bracteata is found in low densities in both lowland inundated forests and upland semideciduous forests. However, it is more than twice as common in seasonally inundated forest types (Dejean and Olmstead 1997)."

409	**Is a shade tolerant plant at some stage of its life cycle**	**y**
	Source(s)	**Notes**
	Mazza, G. 2018. Aechmea bracteata. http://www.photomazza.com/Aechmea-bracteata. [Accessed 10 Apr 2018]	"...it is cultivated in the tropical and humid subtropical climates as epiphyte on the trees, but also as terrestrial, to form edges and flower beds, in full sun or half shade."
	Dave's Garden. 2018. Aechmea Bromeliad, Urn Plant - Aechmea bracteata var. rubra. https://davesgarden.com/guides/pf/go/197514/. [Accessed 11 Apr 2018]	"Sun Exposure: Light Shade Partial to Full Shade"

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	
	Source(s)	**Notes**
	Dave's Garden. 2018. Aechmea Bromeliad, Urn Plant - Aechmea bracteata var. rubra. https://davesgarden.com/guides/pf/go/197514/. [Accessed 11 Apr 2018]	"Soil pH requirements: Unknown - Tell us"
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[Epiphytic. Soil tolerances unknown] "Aechmea bracteata is a common epiphytic bromeliad found in symbiosis with many other species throughout tropical forests of Mexico and south through Panama."

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	"Aechmea ... Perennial, almost always acaulescent herbs or medium stature, frequently propagating by basal rhizomes." [Generic description. Epiphytic]
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	[Limited climbing via rhizomes, but not truly climbing or smothering] "The groups, through regeneration on the one hand and desiccation of the old ramets on the other, have a tendency to climb up the trees to a point where their weight (due to water accumulation) and exposure to the wind become limiting."

412	**Forms dense thickets**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Pool-Chalé, M., Ramírez-Morillo, I., Carnevali Fernández-Concha, G., & Hornung-Leoni, C. T. (2018). Reproductive biology of Aechmea bracteata (Sw.) Griseb. (Bromelioideae: Bromeliaceae). Plant Biology, 20(1), 113-120	[No evidence. Epiphytic] "In the Yucatan Peninsula, A. bracteata grows in large populations in various ecosystems; it is also associated with bodies of water (e.g. cenotes – sinkholes), forming populations of only a few individuals (Ram□ırez-Morillo et al. 2004a). However, it is far more common to find this species growing in inundated low forests (Dejean & Olmsted 1997). The presence of basal rhizomes facilitates the formation of small groups of ramets; each ramet produces only one inflorescence during its lifetime (monocarpic)."

501	Aquatic	n
	Source(s)	**Notes**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	"Aechmea ... Perennial, almost always acaulescent herbs or medium stature, frequently propagating by basal rhizomes." [Generic description. Epiphytic]

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 6 Apr 2018]	Family: Bromeliaceae Subfamily: Bromelioideae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 6 Apr 2018]	Family: Bromeliaceae Subfamily: Bromelioideae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Smith, L., & Downs, R. (1979). Bromelioideae (Bromeliaceae). Flora Neotropica, 14(3), 1493-2142	"Aechmea ... Perennial , almost always acaulescent herbs or medium stature, frequently propagating by basal rhizomes ." [Epiphytic]

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Tropicos.org. 2018. Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 6 Apr 2018]	"Aechmea bracteata ... Conservation Status: LC - Least Concern - National"

602	Produces viable seed	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"Due to its flat smooth, ovoid seeds disseminated by birds, this epiphyte generally develops on rough-barked trees at the point where a large branch forks out."
	Mazza, G. 2018. Aechmea bracteata. http://www.photomazza.com/Aechmea-bracteata. [Accessed 10 Apr 2018]	"It reproduces, besides by seed, by vegetative way through the new plants coming out at the base of the plant and which can be detached when they have reached a size equal to at least one third of the mother plant."
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	"More than half of all 1-year-old seeds in this study germinated under growth chamber conditions, whereas none of the 2-year-old seeds germinated. In the field, seeds must land in a site suitable for germination, where they will not be subject to predation."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Zhang, F. et al. (2012). Genetic relatedness among Aechmea species and hybrids inferred from AFLP markers and pedigree data. Scientia Horticulturae, 139, 39-45	[Unknown. Artificial hybrids documented in genus] "A total of 27 accessions of Aechmea cultivars and hybrids were involved in this study"

604	Self-compatible or apomictic	y
	Source(s)	**Notes**
	Bullock, S. H. 1985. Breeding systems in the flora of a tropical deciduous forest in Mexico. Biotropica, 17(4): 287-301	"APPENDIX 1 Floristic list with life form, floral sexuality, family, and species" [Aechmea bracteata - h, monostylous hermaphrodite]
	Pool-Chalé, M., Ramírez-Morillo, I., Carnevali Fernández-Concha, G., & Hornung-Leoni, C. T. (2018). Reproductive biology of Aechmea bracteata (Sw.) Griseb. (Bromelioideae: Bromeliaceae). Plant Biology, 20(1), 113-120	"Several species of Aechmea are reportedly self-compatible and autogamous, as suggested by results of selfing and non-assisted selfing crosses, but these results are negated by the presence of apomixis, indicating that the species is apomictic. This is the first report of this breeding system for subgenus Aechmea and the sixth for Bromeliaceae. Polyembryony is here suggested for the first time in this genus and family based on the fact that more seeds were recorded that expected based on ovule numbers. Finally, when performing experimental crosses, estimating reproductive success based on number of seeds is a better approach than number of fruits, due to the effect of pseudogamy."

Qsn #	Question	Answer
605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Pool-Chalé, M., Ramírez-Morillo, I., Carnevali Fernández-Concha, G., & Hornung-Leoni, C. T. (2018). Reproductive biology of Aechmea bracteata (Sw.) Griseb. (Bromelioideae: Bromeliaceae). Plant Biology, 20(1), 113-120	[Adapted for hummingbird dispersal, but apomictic. Cross-pollination not required] "Several species of Aechmea are reportedly self-compatible and autogamous, as suggested by results of selfing and non-assisted selfing crosses, but these results are negated by the presence of apomixis, indicating that the species is apomictic. This is the first report of this breeding system for subgenus Aechmea and the sixth for Bromeliaceae." ... "A. bracteata also presents most of the floral characteristics that typify ornithophyly, as suggested by Faegri & van der Pijl (1980), which includes flowers with a tubular but open corolla, yellow petals and red primary bracts, absence of fragrance and secretion of nectar at the base of the corolla."

606	**Reproduction by vegetative fragmentation**	**y**
	Source(s)	**Notes**
	Mazza, G. 2018. Aechmea bracteata. http://www.photomazza.com/Aechmea-bracteata. [Accessed 10 Apr 2018]	"It reproduces, besides by seed, by vegetative way through the new plants coming out at the base of the plant and which can be detached when they have reached a size equal to at least one third of the mother plant."
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"This epiphyte is formed by large groups of ramets at different stages of maturity that develop from a rhizome (Benzing, 1990)." ... "Owing to the presence of the rhizome which connects different ramets, the younger ramets benefit from the vitality of well-developed green ones. Therefore, the expansion of the group proceeds rapidly and it extends itself particularly through the ramification of the rhizome. The limitation of the size of the groups is given by the diameter, the shape and the inclination of the supporting branches. The groups, through regeneration on the one hand and desiccation of the old ramets on the other, have a tendency to climb up the trees to a point where their weight (due to water accumulation) and exposure to the wind become limiting."

607	**Minimum generative time (years)**	**3**
	Source(s)	**Notes**
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[Possibly longer in natural environment] "A. bracteata grown in our greenhouses began to flower 3 years after germination, only when supplied with fertilized water. Under field conditions, where precipitation and nutrients are supplied in pulses rather than continuously, growth is extremely slow."

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"The seeds, smooth, ovoid and flat (3 x 2 x 1 mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

Qsn #	Question	Answer
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[With sticky seeds, but as an epiphyte, unlikely to come into contact with people] "Aechmea bracteata is a common epiphytic bromeliad found in symbiosis with many other species throughout tropical forests of Mexico and south through Panama." ... "A. bracteata seeds are approximately 4.3 mg, 3.9 mm long, and 1.4 mm wide. The seeds are sticky and stuck to the trees on their own."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Mazza, G. 2018. Aechmea bracteata. http://www.photomazza.com/Aechmea-bracteata. [Accessed 10 Apr 2018]	"Since long time, it is cultivated in the tropical and humid subtropical climates as epiphyte on the trees, but also as terrestrial, to form edges and flower beds, in full sun or half shade."
	Frohlich, D. & Lau, A. 2008. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers 100: 3-12	"This species was found naturalizing about 10 m above the ground in a tree in Waimea Botanical Garden. It was planted by the garden in the notch of a nearby tree and has spread to notches in surrounding trees."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	[No evidence] "The seeds, smooth, ovoid and flat (3 x 2 x 1 mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"The seeds, smooth, ovoid and flat (3 x 2 x 1 mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"The seeds, smooth, ovoid and flat (3 x 2 x 1 mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

Qsn #	Question	Answer
706	**Propagules bird dispersed**	**y**
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"Due to its flat smooth, ovoid seeds disseminated by birds, this epiphyte generally develops on rough-barked trees at the point where a large branch forks out." ... "The seeds, smooth, ovoid and flat (3 x 2 x I mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	
	Source(s)	**Notes**
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[With sticky seeds. Possible that seeds could be transported externally, but as an epiphyte, contact with non-avian animals may be limited] "Aechmea bracteata is a common epiphytic bromeliad found in symbiosis with many other species throughout tropical forests of Mexico and south through Panama." ... "A. bracteata seeds are approximately 4.3 mg, 3.9 mm long, and 1.4 mm wide. The seeds are sticky and stuck to the trees on their own."

Qsn #	Question	Answer
708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	"Due to its flat smooth, ovoid seeds disseminated by birds, this epiphyte generally develops on rough-barked trees at the point where a large branch forks out." ... "The seeds, smooth, ovoid and flat (3 x 2 x I mm), are disseminated by birds (Benzing, 1990). They fall onto the ground during dissemination if they are not caught by the horizontal or inclined branches of rough-barked tree species."

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Pool-Chalé, M., Ramírez-Morillo, I., Carnevali Fernández-Concha, G., & Hornung-Leoni, C. T. (2018). Reproductive biology of Aechmea bracteata (Sw.) Griseb. (Bromelioideae: Bromeliaceae). Plant Biology, 20(1), 113-120	[Unknown. Plants can potentially produce large numbers of seeds] "The ovary is oblong, green, densely white-lepidote, eventually producing berries, which are green when immature and purple to black upon maturity, globular to sub-globular in shape, with the remnants of the sepals forming an apical cone (Fig. 1C). Seeds are smooth, red to grey, long ovoid, curved and regulate" ... "Table 2. Pollination test; (A) number of fruits/manipulated flowers; (B) number of seeds per fruit (mean and SD), % fructification; (C) number of seeds/fruit; (D) % germinated seeds; and (E) reproductive success (sensu Dafni 1992"

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Goode, L. K., & Allen, M. F. (2009). Seed germination conditions and implications for establishment of an epiphyte, Aechmea bracteata (Bromeliaceae). Plant Ecology, 204(2), 179-188	[1-year old seeds are viable. 2-year old seeds did not germinate] "More than half of all 1-year-old seeds in this study germinated under growth chamber conditions, whereas none of the 2-year-old seeds germinated. In the field, seeds must land in a site suitable for germination, where they will not be subject to predation."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	**Notes**
	Dejean, A., & Olmsted, I. (1997). Ecological studies on Aechmea bracteata (Swartz)(bromeliaceae). Journal of Natural History, 31(9), 1313-1334	[Unknown, but ability of ramets to establish from parent plants suggests possibility that fragmented sections may persist after damage or mutilation] "Owing to the presence of the rhizome which connects different ramets, the younger ramets benefit from the vitality of well-developed green ones. Therefore, the expansion of the group proceeds rapidly and it extends itself particularly through the ramification of the rhizome. The limitation of the size of the groups is given by the diameter, the shape and the inclination of the supporting branches. The groups, through regeneration on the one hand and desiccation of the old ramets on the other, have a tendency to climb up the trees to a point where their weight (due to water accumulation) and exposure to the wind become limiting."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Thrives in tropical climates
• Naturalized on Oahu, Hawaiian Islands
• Sharp marginal teeth (spines) on leaves
• Shade tolerant
• Reproduces by seeds & vegetatively by rhizomes
• Apomictic
• Seeds dispersed by birds & intentionally by people

Low Risk Traits
• Despite naturalization, no reports of negative impacts to date
• Ornamental value
• Reaches maturity in 3 years under greenhouse conditions; growth & reproduction in natural environment may take much longer