Taxon: Rhynchospora caduca Elliott **Family:** Cyperaceae

Common Name(s): anglestem beak sedge
beak rush

Synonym(s): Rhynchospora patula A. Gray

Assessor: No Assessor **Status:** Assessor Approved **End Date:** 25 Jun 2018

WRA Score: 11.0 **Designation:** H(Hawai'i) **Rating:** High Risk

Keywords: Perennial Sedge, Naturalized, Environmental Weed, Rhizomatous, Mat-Forming

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		
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
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	y=1, n=-1	y
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		

Qsn #	Question	Answer Option	Answer
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		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	n
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	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
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**
	Flora of North America Editorial Committee. 2002. Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae. Oxford University Press, Oxford, UK	[No evidence of domestication] "Rhynchospora caduca has its closest relationships with the even more robust R. odorata Grisebach, on the one hand, and the swamp inhabiting, more slender, and rhizomatous R. mixta Britton ex Small, on the other. Intergrades with R. odorata appear in Alabama and northwest Florida; intergrades with R. mixta appear where ranges overlap in both the Atlantic and Gulf coastal plains."

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**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to the southern United States from southern Virginia southwest to Texas and south to Florida; in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m, on Maui and Hawai'i."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 15 Jun 2018]	"Native Northern America NORTH-CENTRAL U.S.A.: United States [Oklahoma] SOUTHEASTERN U.S.A.: United States [Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee] SOUTH-CENTRAL U.S.A.: United States [Texas]"

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 15 Jun 2018]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Wagner, W. L., Herbst, D. R., & Sohmer, S. H. (1989). Contributions to the flora of Hawaii: II. Begoniaceae: Violaceae and the monocotyledons. Bishop Museum Occasional Papers, 29, 88-130	[Elevation range exceeds 1000 m in the Hawaiian Islands, demonstrating environmental versatility] "This species is native to the southern United States. It was first collected on Hawai'i in 1972. It now is naturalized in wet, disturbed areas, sometimes locally common, 320-1,400 m, on Maui and Hawai'i."

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"Native to the southern United States from southern Virginia southwest to Texas and south to Florida; in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m, on Maui and Hawai'i. First collected on Hawai'i in 1972 (Shinbara H110, BISH), and then collected in 1982 and 1983 on Maui.-"

205	**Does the species have a history of repeated introductions outside its natural range?**	**n**
	Source(s)	**Notes**
	Wagner, W. L., Herbst, D. R., & Sohmer, S. H. (1989). Contributions to the flora of Hawaii: II. Begoniaceae: Violaceae and the monocotyledons. Bishop Museum Occasional Papers, 29, 88-130	[No evidence of intentional introduction or cultivation] "This species is native to the southern United States. It was first collected on Hawai'i in 1972. It now is naturalized in wet, disturbed areas, sometimes locally common, 320-1,400 m, on Maui and Hawai'i."
	WRA Specialist. 2018. Personal Communication	No evidence of intentional cultivation or introduction found

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**y**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m, on Maui and Hawai'i. First collected on Hawai'i in 1972 (Shinbara H110, BISH), and then collected in 1982 and 1983 on Maui.-"
	Wysong, M., Hughes, G. & Wood, K.R. (2007). New Hawaiian plant records for the island of Moloka‘i. Bishop Museum Occasional Papers 96: 1-8	"Rhynchospora caduca Elliott New island record Native to the southern United States from southern Virginia southwest to Texas and Florida, R. caduca was first collected on Hawai‘i in 1972 (Shinbara H110, BISH). In Hawai‘i it has previously been reported as sparingly naturalized in wet, disturbed areas from 320 to 1400 m on Kaua‘i, O‘ahu, Maui, and Hawai‘i (Wagner et al. 1999; Wagner et al. 2005). Material examined. MOLOKA‘I: road to Kapuna Spring, 800 m, 4 Feb 2004, K.R. Wood & Hughes 10563 (PTBG)."
	Wagner, W.L. & Herbst, D.R. (1995). Contributions to the flora of Hawaii. IV. New records and name changes. Bishop Museum Occasional Paper 42: 13-27	"Rhynchospora caduca Elliott The following collection represents a new island record from Kauai. Rhynchospora caduca was previously known from Maui and Hawaii. Based on the recent introduction of this species to the archipelago, it appears to be spreading rapidly. Material examined. Kauai: Hanalei District, large bog mauka of Kilauea town, 450 ft, 10 Apr 1988, Hume & Levine 332 (BISH, PTBG)."
	Wagner, W.L., Shannon, R.K. & Herbst, D.R. 1997. Contributions to the Flora of the Hawai‘i. VI. Bishop Museum Occasional Papers 48: 51-65	"Rhyncospora caduca Elliott New island record Previously reported from the islands of Maui and Hawai‘i by Koyama (1990: 1428), this species now occurs on O‘ahu as well. Material examined. O‘AHU: Kahana Valley, 200 ft., Sept. 1992, Takeuchi 8516 (BISH)."

302	**Garden/amenity/disturbance weed**	
	Source(s)	**Notes**
	Wagner, W. L., Herbst, D. R., & Sohmer, S. H. (1989). Contributions to the flora of Hawaii: II. Begoniaceae: Violaceae and the monocotyledons. Bishop Museum Occasional Papers, 29, 88-130	[Disturbance adapted weed with negative environmental impacts. See 3.04] "It now is naturalized in wet, disturbed areas, sometimes locally common, 320-1,400 m, on Maui and Hawai'i."

303	**Agricultural/forestry/horticultural weed**	
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	[Potentially. Impacts on pasture productivity unknown] "Rhynchospora caduca Elliott, of little value as forage for livestock, is sometimes a weed in poorly maintained pastures in the southeastern U.S.A. where it is native (Bryson, pers. obs.) and is recently introduced and spreading rapidly in Hawaii (Wagner et al., 1990; Wagner & Herbst, 1995)."

304	**Environmental weed**	**y**
	Source(s)	**Notes**
	Medeiros, A. C., Loope, L. L., & Hobdy, R. W. (1995). Conservation of cloud forests in Maui County (Maui, Moloka ‘i, and Lana ‘i), Hawaiian Islands. In Tropical montane cloud forests (pp. 223-233). Springer, New York, NY	"Paspalum conjugatum (Poaceae) and Rhynchospora caduca (Cyperaceae) are mat-forming graminoids that quickly colonize and are persistent in sites of pig disturbance."

Qsn #	Question	Answer
	Medeiros, A.C., Loope, L.L. & Chimera, C.G. 1998. Flowering Plants and Gymnosperms of Haleakala National Park. Technical Report 120. Pacific Cooperative Studies Unit, Honolulu, HI	[Listed among worst rain forest weeds] "Within Haleakala National Park, the worst rain forest weeds (as of 1998) appear to be Clidemia hirta (Koster's curse), Hedychium gardnerianum (kahili ginger), Paspalum conjugatum (Hilo grass), and Psidium cattleianum (strawberry guava). Other serious invasive and modifying rain forest weeds are Andropogon virginicus (broomsedge), Cyathea cooperi (Australian tree fern), Paspalum urvillei (vasey grass), Rhynchospora caduca, Rubus argutus (prickly Florida blackberry), Spathodea campanulata (African tulip tree), Tibouchina herbacea, and at lower elevations Syzgium jambos (rose apple) and Phyllostachys nigra (black bamboo)." … "Rhynchospora caduca … Kaumakani; lower to middle Kipahulu Valley ... Common, invasive, tall (to 1 m) sedge in grassy openings, disturbed understory, and along trails of koa forests, often growing with Paspalum conjugatum. This species has spread considerably in the last decade. At lower elevations (below ca. 1000 ft), uncommon in lower riparian zone and pastures."

305	Congeneric weed	y
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	"Rhynchospora caduca is not extraordinary among the beak-rushes in the southeastern U.S.A., which suggests that any number of apparently harmless species could pose similar problems in an alien environment. Insular systems, such as the Hawaiian Islands, have great potential as natural laboratories for the study of invasion."
	Taha, S. A. A. H., Naqqiuddin, M. A., & Omar, H. (2015). Biology of Rhynchospora corymbosa in Outdoor Conditions. Acta Biologica Malaysiana, 4(3), 72-83	"This genus has a little economic importance, even though most the species of Rhynchospora are considered weed only secondarily or occasionally. Thus species like Rhynchospora corymbose (L.) Britton, Rhynchospora holoschoenoides (Rich) Herter, Rhynchospora submarginata Kük, and Rhynchospora wightiana (Nees) Steud were cited as rice agriculture weeds in Eastern Hemisphere (Kern 1974; Simpson and Inglis 2001)." … "As this plant is considered as weeds in many part of the world, using this plant as bioremediation agent for leachate is of no issue in Malaysia."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	A number of species are listed as naturalized and/or weeds of agriculture and the natural environment

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Perennials with short-creeping rhizomes; culms loosely to moderately densely tufted, 60-120 cm tall, 1.8-3 mm in diameter near base, 3-4-nodose below the inflorescence, trigonous, smooth."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	[Unknown. No evidence reported for Rhynchospora, but documented in other genera] "Certain plants, including weeds, achieve a competitive advantage through allelopathy, the production of chemical compounds that suppresses seed germination and growth in competing plants. Allelopathy is well known in Cyperus rotundus and C. esculentus and has been cited as a factor in its competition with cotton and other crops (Friedman & Horowitz, 1971; Mallik & Tesfai, 1988; Martinez-Diaz, 1997). Although it has not been investigated, the nearly monotypic nature of invasive populations of C. entrerianus, observed in southern Louisiana and eastern Texas, U.S.A. (Carter, 1990; Carter & Bryson, 1996), suggests an allelopathic effect."

403	Parasitic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with short-creeping rhizomes; culms loosely to moderately densely tufted, 60-120 cm tall, 1.8-3 mm in diameter near base, 3-4-nodose below the inflorescence, trigonous, smooth." [Cyperaceae. No evidence]

404	Unpalatable to grazing animals	y
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	"Rhynchospora caduca Elliott, of little value as forage for livestock, is sometimes a weed in poorly maintained pastures in the southeastern U.S.A. where it is native (Bryson, pers. obs.) and is recently introduced and spreading rapidly in Hawaii (Wagner et al., 1990; Wagner & Herbst, 1995)."

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**
	WRA Specialist. 2018. Personal Communication	Unknown

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	**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

408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Wagner, W. L., Herbst, D. R., & Sohmer, S. H. (1989). Contributions to the flora of Hawaii: II. Begoniaceae: Violaceae and the monocotyledons. Bishop Museum Occasional Papers, 29, 88-130	"It now is naturalized in wet, disturbed areas" [No evidence. Occurs in low fire risk areas]

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	[Light requirements unknown. Disturbed habitats tend to be high light environments] "in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m"

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	
	Source(s)	**Notes**
	USGS. 2018. Guide to the Plants of Louisiana. https://warcapps.usgs.gov/PlantID/. [Accessed 25 Jun 2018]	"Habitat - Moist sand, marshes, wet soil, ditches, savannahs, and low woods."
	Flora of North America Editorial Committee. 2002. Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae. Oxford University Press, Oxford, UK	[Genus description] "Species over 250 (68 in the flora): worldwide, mostly in sunny places with wet, acidic soils."

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with short-creeping rhizomes; culms loosely to moderately densely tufted, 60-120 cm tall, 1.8-3 mm in diameter near base, 3-4-nodose below the inflorescence, trigonous, smooth."

Qsn #	Question	Answer
412	**Forms dense thickets**	
	Source(s)	**Notes**
	Medeiros, A. C., Loope, L. L., & Hobdy, R. W. (1995). Conservation of cloud forests in Maui County (Maui, Moloka ʻi, and Lana ʻi), Hawaiian Islands. In Tropical montane cloud forests (pp. 223-233). Springer, New York, NY	[May exclude other vegetation] "Paspalum conjugatum (Poaceae) and Rhynchospora caduca (Cyperaceae) are mat-forming graminoids that quickly colonize and are persistent in sites of pig disturbance."

501	**Aquatic**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawaiʻi Press and Bishop Museum Press, Honolulu, HI.	[Terrestrial] "Perennials with short-creeping rhizomes… in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m"

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 12 Jun 2018]	Family: Cyperaceae Subfamily: Cyperoideae Tribe: Rhynchosporeae

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 12 Jun 2018]	Family: Cyperaceae Subfamily: Cyperoideae Tribe: Rhynchosporeae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawaiʻi Press and Bishop Museum Press, Honolulu, HI.	"Perennials with short-creeping rhizomes; culms loosely to moderately densely tufted, 60-120 cm tall, 1.8-3 mm in diameter near base, 3-4-nodose below the inflorescence, trigonous, smooth."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Flora of North America Editorial Committee. 2002. Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae. Oxford University Press, Oxford, UK	[No evidence] "Fruiting summer–fall. Low meadows, clearings, marshes, marsh borders, seeps, bog moats, savannas, ditches, pine flatwoods, swamps; 0–400 m; Ala., Ark., Fla., Ga., La., Miss., N.C., Okla., S.C., Tenn., Tex., Va. Rhynchospora caduca has its closest relationships with the even more robust R. odorata Grisebach, on the one hand, and the swamp inhabiting, more slender, and rhizomatous R. mixta Britton ex Small, on the other. Intergrades with R. odorata appear in Alabama and northwest Florida; intergrades with R. mixta appear where ranges overlap in both the Atlantic and Gulf coastal plains."

602	Produces viable seed	y
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes broadly obovate, lenticular, 1-1.6 mm long, 1-1.4 mm wide, transversely undulate-rugose and cancellate with longitudinally oblong cells."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. Hybridization reported from genus

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"Most, if not all, Cyperaceae are proterogynous. Due to the fact that the spikelets are often many-flowered or, if few-flowered, then often crowded, female (receptive stigmas) and male phases (pollen-shedding anthers) of flowering are present in a single spikelet or inflorescence. In spikelets, flowering is usually acropetal, as expected." [Unknown. Family description. The pistil comes to maturity before the stamens, which may prevent selfing, whether or not plants are self-compatible]
	Costa, A. C., Thomas, W. W., & Machado, I. C. (2017). Comparative floral biology of Rhynchospora ciliata (Vahl) Kukenth and R. pubera (Vahl) Boeckeler (Cyperaceae): the role of white involucral bracts in attracting pollinating insects. Plant Species Biology, 32(4), 403-411	[Self-compatibility documented in genus] "The exclusion experiments verified that Rhynchospora pubera is self-compatible and autogamous."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Kubitzki, K. (ed.). 1998. The Families and genera of vascular plants. Volume IV. Flowering plants, Monocotyledons: Alismatanae and Commelinanae (except Gramineae). Springer-Verlag, Berlin, Heidelberg, New York	"The Cyperaceae are clearly adapted to anemophily, as is evidenced by their small, inconspicuous flowers and hidden or reduced perianth, the long stigmatic branches, the filaments elongating considerably during anthesis, and anthers shedding abundant pollen."

606	Reproduction by vegetative fragmentation	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with short-creeping rhizomes" [Uncertain. May be able to spread vegetatively by rhizomes]

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with short-creeping rhizomes" [Unknown. Probably between 1-2 years]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Medeiros, A.C., Loope, L.L. & Chimera, C.G. 1998. Flowering Plants and Gymnosperms of Haleakala National Park. Technical Report 120. Pacific Cooperative Studies Unit, Honolulu, HI	[Spread along trails, likely be adhering to boots or clothing in mud] "Common, invasive, tall (to 1 m) sedge in grassy openings, disturbed understory, and along trails of koa forests, often growing with Paspalum conjugatum. This species has spread considerably in the last decade. At lower elevations (below ca. 1000 ft), uncommon in lower riparian zone and pastures."

702	Propagules dispersed intentionally by people	n
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	No evidence of intentional cultivation or introduction found

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unlikely. Not cultivated with produce or commercial plants] "Native to the southern United States from southern Virginia southwest to Texas and south to Florida; in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m, on Maui and Hawai'i."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes broadly obovate, lenticular, 1-1.6 mm long, 1-1.4 mm wide, transversely undulate-rugose and cancellate with longitudinally oblong cells. … in Hawai'i sparingly naturalized in wet, disturbed areas," [No evidence]

705	Propagules water dispersed	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m" [Occurs in wet areas]
	Medeiros, A.C., Loope, L.L. & Chimera, C.G. 1998. Flowering Plants and Gymnosperms of Haleakala National Park. Technical Report 120. Pacific Cooperative Studies Unit, Honolulu, HI	[Likely moved by water in riparian areas] "At lower elevations (below ca. 1000 ft), uncommon in lower riparian zone and pastures."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes broadly obovate, lenticular, 1-1.6 mm long, 1-1.4 mm wide" [No evidence. Not fleshy fruited]

707	Propagules dispersed by other animals (externally)	y
	Source(s)	**Notes**
	van der Pijl, L. 2013. Principles of Dispersal in Higher Plants. Springer-Verlag, Berlin Heidelberg	"Pricking into and hooking in on fur are mixed with sticking on. The sharp beaks and spiny awns on diaspores of some grasses and Cyperaceae (Rhynchospora) stand apart as a more boring type, penetrating into the fur of mammals."
	Medeiros, A.C., Loope, L.L. & Chimera, C.G. 1998. Flowering Plants and Gymnosperms of Haleakala National Park. Technical Report 120. Pacific Cooperative Studies Unit, Honolulu, HI	[Feral pigs likely dispersing this sedge along trails] "Common, invasive, tall (to 1 m) sedge in grassy openings, disturbed understory, and along trails of koa forests, often growing with Paspalum conjugatum."

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	"Rhynchospora caduca Elliott, of little value as forage for livestock, is sometimes a weed in poorly maintained pastures in the southeastern U.S.A. where it is native (Bryson, pers. obs.)" [Unknown, but unlikely to be consumed & internally dispersed]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes broadly obovate, lenticular, 1-1.6 mm long, 1-1.4 mm wide" [Seed densities unknown]

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. 2008. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/. [Accessed]	Unknown. Several species have orthodox seeds

803	Well controlled by herbicides	
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	[Possibly. Efficacy on Rhynchospora caduca unknown] "Effective methods of herbicide application include pre-emergence broadcast and incorporated (with tillage) applications to control unwanted sedges that germinate from seed, rhizomes, and tubers. Acceptable post-emergence treatments are dependent on the herbicide selectivity. Nonselective herbicides are applied in areas where nontarget species are of little concern, while selective herbicides are applied to control target sedges without harming crops or other desirable plants. Application technologies have been developed to spray or wipe nonselective herbicides on target weeds with special equipment (e.g., directed sprayers, hooded sprayers, recirculating sprayers, foam applicators, shielded sprayers, chemigation, control droplet applicators, air-assist systems, pneumonic applicators, sensing devices, electrically charged sprayers, and rope-wick applicators) to reduce or eliminate damage to crops (Burr & Warren, 1971, 1972; Wiese, 1986; Bryson & Wills, 1991; Wills et al., 1991; Barrentine et al., 1992; Bryson et al., 1992b, 1994a; Bryson & Hanks, 1993; Bryson, 1994, 1997)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	**Notes**
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	[Unknown if Rhynchospora caduca tolerates mechanical damage or fire] "Mechanical tillage, flame cultivation, mowing, chemical treatments (herbicides and fumigants), cover crops (e.g., sweet potato [Ipomoea batatas (L.) Lam.]), and shading with a crop or black plastic have proven to be effective in controlling many sedge weeds of turf, pasture, and vegetable and row crops (Patterson, 1982; Glaze, 1987; Bryson & Keeley, 1992; Buchanan, 1992; Peterson & Harrison, 1995)."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown] "in Hawai'i sparingly naturalized in wet, disturbed areas, 320-1,400 m,"

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Thrives in tropical climates
• Naturalized on Kauai, Oahu, Molokai, Maui, & Hawaii (Hawaiian Islands)
• Disturbance-adapted weed with negative environmental impacts in native forest
• Other Rhynchospora species have become invasive
• Unpalatable to grazing animals
• Reproduces by seeds & possibly by rhizomes
• Seeds dispersed externally & by water
• Limited ecological information may limit accuracy or risk assessment

Low Risk Traits
• Unarmed (no spines, thorns, or burrs)
• Non-toxic