

Taxon: <i>Arthrostemma ciliatum</i> Pav. ex D. Don	Family: Melastomataceae
Common Name(s): Arthrostemma everblooming eavender pink fringe	Synonym(s): <i>Arthrostemma fragile</i> Lindl. <i>Arthrostemma latifolium</i> D. Don

Assessor: No Assessor	Status: Assessor Approved	End Date: 9 Jul 2018
WRA Score: 10.0	Designation: H(Hawai'i)	Rating: High Risk

Keywords: Vinelike Herb, Naturalized, Environmental Weed, Smothering Habit, Persistent Seedbank

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	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
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		
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	y
412	Forms dense thickets	y=1, n=0	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
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	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal		
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m ²)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
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
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	[No evidence of domestication] "Moist thickets or mixed forest, often in pine forest, common in second growth thickets, at 1,500 meters or usually much less; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Suchitepequez ; Retalhuleu; Solola; Quezaltenango; San Marcos; Huehuetenango; Zacapa. Mexico; British Honduras to Panama; Jamaica; South America south to Bolivia." ... "The foliage has a decidedly acid flavor and for this reason men working in cultivated fields or along the roads often chew it and say that they feel much refreshed. This use of the plant is apparently not known elsewhere."

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 9 Jul 2018]	"Native Northern America Mexico Southern America CARIBBEAN: Cuba, Jamaica CENTRAL AMERICA: Nicaragua BRAZIL: Brazil [Acre] WESTERN SOUTH AMERICA: Ecuador, Peru"

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 9 Jul 2018]	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Altitude: Sea level to 1700 m." [Elevation range >1000 m, demonstrating environmental versatility]
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"Moist thickets or mixed forest, often in pine forest, common in second growth thickets, at 1,500 meters or usually much less" [Elevation range >1000 m, demonstrating environmental versatility]

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 Neotropics; in Hawaii occasionally cultivated and locally naturalized at Manoa, Tantalus, southern Opae`ula ridge, and Castle Trail, Oahu, and in the Kona District of Hawaii."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 9 Jul 2018]	"Native Northern America Mexico Southern America CARIBBEAN: Cuba, Jamaica CENTRAL AMERICA: Nicaragua BRAZIL: Brazil [Acre] WESTERN SOUTH AMERICA: Ecuador, Peru"

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. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"cultivated and locally naturalized at Manoa, Tantalus, southern 'Opae'ula ridge, and Castle Trail, O'ahu, and in the Kona District of Hawai'i." [Only mentioned from Hawaii]
	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	"native to tropical America, is sometimes grown in gardens and greenhouses."

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.	"Native to the Neotropics; in Hawaii occasionally cultivated and locally naturalized at Manoa, Tantalus, southern Opae`ula ridge, and Castle Trail, Oahu, and in the Kona District of Hawaii."

302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"It is plentiful in many places in Guatemala and is often weedy in character."

Qsn #	Question	Answer
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[Disturbance-adapted weedy plant with detrimental environmental impacts. See 3.04] "Habitat: Wet to moist forests and open sites, roadsides, ditches."

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	y
	Source(s)	Notes
	United States Army Garrison, Hawai'i. 2007. Status Reports for the Mākuā Implementation Plan and the Draft O'ahu Implementation Plan. Directorate of Public Works Environmental Division, Schofield Barracks, Hawai'i	" <i>Arthrostemma ciliatum</i> is a member of the Melasomataceae family, along with two other well known invasive species <i>Miconia calvenscens</i> and <i>Clidemia hirta</i> . The weed is widely naturalized throughout much of the Ko'olau Mountains, but is uncommon in KLOA. NRS target <i>A. ciliatum</i> in areas where activities like foot traffic or vehicles might lead to the spread of this weed to places where it is not currently found (Figures 1.2.3-4). NRS is currently controlling <i>A. ciliatum</i> at five locations."
	Rubenstein, T. & Berkowitz, P. 2009. Three Mountain Alliance Weed Management Plan. Three Mountain Alliance. http://threemountainalliance.org/ . [Accessed 9 Jul 2018]	"Kīpāhoehoe Natural Area Reserve (NARS)...Mauka of Highway 11 below 1,100m many target invasive tree species (strawberry guava and bingabing (<i>Macaranga mappia</i>)), shrub species (common guava, christmas berry, and <i>clidemia</i>) and herbaceous species (Cape ivy, <i>arthrostemma</i> or everblooming eavender (<i>Arthrostemma ciliatum</i>), bull thistle (<i>Cirsium vulgare</i>), telegraph weed (<i>Heterotheca grandiflora</i>), sweet granadilla (<i>Passiflora ligularis</i>) and passion fruit (<i>Passiflora edulis</i>) are present." [<i>A. ciliatum</i> listed as a target species for eradication/control]
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. 2003. Weeds of Hawai'i's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Sprawling growth smothers smaller plants in pastures and along forest edges."
	US Fish and Wildlife Service. 2003. Endangered and Threatened Wildlife and Plants; Final Designations or Nondesignations of Critical Habitat for 101 Plant Species From the Island of Oahu, HI. Final rule. 50 CFR Part 17. Federal Register Vol. 68, No. 116	[<i>Arthrostemma ciliatum</i> impacts endangered plant species] "The major threats to <i>Cyanea crispera</i> are habitat alteration and predation by feral pigs; competition with the nonnative plant species <i>Arthrostemma ciliatum</i> (NCN), <i>Clidemia hirta</i> , <i>Psidium cattleianum</i> , <i>Psidium guajava</i> , <i>Pterolepis glomerata</i> , <i>Rubus rosifolius</i> (thimbleberry), <i>Schinus terebinthifolius</i> , <i>Setaria palmifolia</i> (palm grass), and <i>Zingiber zerumbet</i> (awapuhi); and extinction due to naturally occurring events and/or reduced reproductive vigor due to the small number of remaining individuals, their limited gene pool, and restricted distribution (Service 1998b; 59 FR 14482)."

Qsn #	Question	Answer
305	Congeneric weed	
	Source(s)	Notes
	Garcia, J. G. L., MacBryde, B., Molina, A. T., & Herrera-MacBryde, O. (1975). Prevalent Weeds of Central America. International Plant Protection Centre, El Salvador	Arthrostemma fragile listed as a weed [no description of impacts]

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] "Scandent perennial herbs; stems succulent; 1-4 m long, glabrous or glandular pilose. Leaves ovate to ovate-lanceolate, 2.5-4.3 cm long, 1.4-4.5 cm wide, 5-7-nerved, upper surface sparsely bristly, lower surface glabrous to glandular bristly, margins ciliolate-serrulate, apex acute to long acuminate, base truncate to subcordate, petioles 0.6-3.2 cm long."

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

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.	"Scandent perennial herbs; stems succulent; 1-4 m long, glabrous or glandular pilose." [Melastomataceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Sprawling growth smothers smaller plants in pastures and along forest edges." [Unknown. Weed in pastures. No information on palatability]
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"The foliage has a decidedly acid flavor and for this reason men working in cultivated fields or along the roads often chew it and say that they feel much refreshed." [Chewed by people for medicinal purposes]
	Balick, M. J. & Arvigo, R. 2015. Messages from the Gods: A Guide to the Useful Plants of Belize. Oxford University Press, New York, NY	"The leaves and flowers provide enjoyable fodder for red brocket deer (<i>Mazama americana</i>), locally known as "antelopes"

Qsn #	Question	Answer
405	Toxic to animals	n
	Source(s)	Notes
	Balick, M. J. & Arvigo, R. 2015. Messages from the Gods: A Guide to the Useful Plants of Belize. Oxford University Press, New York, NY	[No evidence] "The leaves and flowers provide enjoyable fodder for red brocket deer (<i>Mazama americana</i>), locally known as "antelopes"

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Hazlett, D. (1986). Ethnobotanical Observations from Cabecar and Guaymí Settlements in Central America. <i>Economic Botany</i> , 40(3), 339-352	" <i>Arthrostemma ciliatum</i> R. et Pav., chaliklik. Herb. Fleshy, square stems are eaten raw to treat pain during urination" [No evidence of toxicity]
	Balick, M. J. & Arvigo, R. 2015. Messages from the Gods: A Guide to the Useful Plants of Belize. Oxford University Press, New York, NY	"If eaten in excess, they can be toxic, causing diarrhea"
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. <i>Fieldiana: Botany</i> . Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"The foliage has a decidedly acid flavor and for this reason men working in cultivated fields or along the roads often chew it and say that they feel much refreshed. This use of the plant is apparently not known elsewhere."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[Medicinal] "Antimalaria. Decongestant vapors, sap and leaves rubbed on the chest for cold. Stems eaten raw to treat pain during urination."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. <i>A Field Guide to Plants of Costa Rica</i> . Oxford University Press US, New York, NY	"Sprawling, vinelike herb, stems 4-sided, 1-4 m long, pale green, rather succulent...Habitat: Wet to moist forests and open sites, roadsides, ditches" [No evidence. Unlikely to be a fire hazard given succulent stems and wet habitat]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. <i>Fieldiana: Botany</i> . Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"Moist thickets or mixed forest, often in pine forest, common in second growth thickets, at 1,500 meters or usually much less; Alta Verapaz; Izabal; Jutiapa; Santa Rosa; Escuintla; Suchitepequez ; Retalhuleu; Solola; Quezaltenango; San Marcos; Huehuetenango; Zacapa. Mexico; British Honduras to Panama; Jamaica; South America south to Bolivia." [Moist thickets and forest suggest species will tolerate shade, although it is more common in higher light areas along roads or trails]

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[Soil types unknown] "Habitat: Wet to moist forests and open sites, roadsides, ditches. Altitude: Sea level to 1700 m."

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Sprawling growth smothers smaller plants in pastures and along forest edges."
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Sprawling, vinelike herb, stems 4-sided, 1–4 m long, pale green, rather succulent, about 0.3 cm wide, angles sharp, reddish hairy."

412	Forms dense thickets	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Sprawling, vinelike herb, stems 4-sided, 1-4 m long, pale green, rather succulent...Habitat: Wet to moist forests and open sites, roadsides, ditches" [No evidence that it forms thickets, but can smother other plants. See 4.11]

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 Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Terrestrial] "Scandent perennial herbs... in Hawai'i occasionally cultivated and locally naturalized at Manoa, Tantalus, southern 'Opae'ula ridge, and Castle Trail, O'ahu, and in the Kona District of Hawai'i."

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 9 Jul 2018]	Family: Melastomataceae

Qsn #	Question	Answer
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 9 Jul 2018]	Family: Melastomataceae

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 Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Scandent perennial herbs; stems succulent; 1-4 m long, glabrous or glandular pilose. Leaves ovate to ovate-lanceolate, 2.5-4.3 cm long, 1.4-4.5 cm wide, 5-7-nerved, upper surface sparsely bristly, lower surface glabrous to glandular bristly, margins ciliolate-serrulate, apex acute to long acuminate, base truncate to subcordate, petioles 0.6-3.2 cm long."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[No evidence] "Habitat: Wet to moist forests and open sites, roadsides, ditches. Altitude: Sea level to 1700 m."
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	[No evidence] "It is plentiful in many places in Guatemala and is often weedy in character."

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.	"Fruiting hypanthium oblong-ellipsoid, 15-20 mm long, 8-9 mm wide. Seeds ca. 1 mm long"

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

604	Self-compatible or apomictic	
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[Breeding biology unknown] "Flowers lavender pink, radially symmetrical, about 4 cm wide, petals 4, 2-3 cm long, about 1 cm wide, easily deciduous, anthers yellow, with lavender filaments, flower buds red, solitary in axils; blooms all year."

Qsn #	Question	Answer
605	Requires specialist pollinators	n
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Flowers lavender pink, radially symmetrical, about 4 cm wide, petals 4, 2-3 cm long, about 1 cm wide, easily deciduous, anthers yellow, with lavender filaments, flower buds red, solitary in axils; blooms all year" [unspecialized flowers]
	Zomlefer, W.B. 1994. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London	"The showy flowers generally do not produce nectar, and insects (often bumblebees) visit to collect pollen by vibrating or otherwise manipulating the terminally pored anthers." [Family description]

606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	"Sprawling, vinelike herb, stems 4-sided, 1-4 m long, pale green, rather succulent...Habitat: Wet to moist forests and open sites, roadsides, ditches" [Sprawling habit suggests that plant might be able to spread vegetatively]
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	[Brittle stems might root & establish new plants] "A much branched herb with very brittle stems, these erect and less than a meter high or occasionally scandent and frequently 2-3 meters long or longer"

607	Minimum generative time (years)	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	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.	"Seeds ca. 1 mm long." [Small seeds in mud could easily adhere to footwear, clothing, tools or vehicles, as do many other invasive Melastomataceae]
	United States Army Garrison, Hawai'i. 2007. Status Reports for the Mākuā Implementation Plan and the Draft O'ahu Implementation Plan. Directorate of Public Works Environmental Division, Schofield Barracks, Hawai'i	"The <i>A. ciliatum</i> at this site has the potential to be spread by military personnel, via foot and/or vehicle traffic within the East Range land navigation area. This area was roped off at the beginning of the year to restrict vehicle and personnel access. NRS visited this site four times this year (Table 1.2.8). Forty-three plants (mature 1, immature 16, seedling 26) were controlled during site visits by hand pulling and/or spraying. NRS will continue to deplete the seed bank during quarterly site visits."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. 2005. A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"native to tropical America, is sometimes grown in gardens and greenhouses." [Grown as an ornamental]

Qsn #	Question	Answer
703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Sprawling growth smothers smaller plants in pastures and along forest edges." [Unknown. Could potentially be dispersed with pasture feed or contaminated forest products]
704	Propagules adapted to wind dispersal	
	Source(s)	Notes
	Liogier, H.A. 1995. Descriptive flora of Puerto Rico and adjacent islands: Spermatophyta, Volume IV. Melastomataceae to Lentibulariaceae. La Editorial, UPR, San Juan, Puerto Rico	"fruit a 4-valved capsule, enclosed in the accrescent hypanthium; seed cochleate, with about 8 rows of tubercles."
	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.	"Fruiting hypanthium oblong-ellipsoid, 15-20 mm long, 8-9 mm wide. Seeds ca. 1 mm long" [Capsule with small seeds may be wind-dispersed, but evidence inconclusive]
705	Propagules water dispersed	
	Source(s)	Notes
	Gargiullo, M.B., Magnuson, B.L & Kimball, L.D. 2008. A Field Guide to Plants of Costa Rica. Oxford University Press US, New York, NY	[Occurrence in ditches suggests seeds may be moved by water] "Habitat: Wet to moist forests and open sites, roadsides, ditches."
706	Propagules bird dispersed	n
	Source(s)	Notes
	Liogier, H.A. 1995. Descriptive flora of Puerto Rico and adjacent islands: Spermatophyta, Volume IV. Melastomataceae to Lentibulariaceae. La Editorial, UPR, San Juan, Puerto Rico	"fruit a 4-valved capsule, enclosed in the accrescent hypanthium; seed cochleate, with about 8 rows of tubercles." [not fleshy fruited]
707	Propagules dispersed by other animals (externally)	
	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.	"Seeds ca. 1 mm long." [Small seeds in mud could potentially adhere to animal feet or fur, as have other small-seeded Melastomataceae]
708	Propagules survive passage through the gut	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.	"Fruiting hypanthium oblong-ellipsoid, 15-20 mm long, 8-9 mm wide. Seeds ca. 1 mm long." [Not fleshy-fruited. Unlikely to be internally dispersed]
801	Prolific seed production (>1000/m2)	

Qsn #	Question	Answer
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"seeds numerous, semi-ovoid, with about 8 rows of tubercles." [Possibly, as seeds are very small, but numbers per capsule unknown]

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/ . [Accessed]	"Storage Behaviour: Orthodox Storage Conditions: 100 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 46 weeks at -20°C at RBG Kew, WP" [Longevity in soil unknown]
	Higashi, M., Beachy, J., Lee, J. & Weisenberger, L. 2015. Buried Alive: Assessing Soil Seed Bank Persistence to Assist in Invasive Species Eradication. Poster 56. 23rd Annual Hawaii Conservation Conference, August 3-6, University of Hawaii at Hilo	[Seeds of <i>Arthrostemma ciliatum</i> sown on agar in Petri dishes continued to germinate after 7 years of storage following exposure to light. Seeds kept in dark, wet conditions in the laboratory germinated for a little over 4 years. Classified as possessing a "Persistent, Long Term" seed bank]

803	Well controlled by herbicides	y
	Source(s)	Notes
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching, L. 2003. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	"Management: Sensitive to foliar applied triclopyr at 1 lb/acre; dicamba less effective; 2,4-D poor."
	United States Army Garrison, Hawai'i. 2007. Status Reports for the Mākua Implementation Plan and the Draft O'ahu Implementation Plan. Directorate of Public Works Environmental Division, Schofield Barracks, Hawai'i	"The <i>A. ciliatum</i> at this site does not have the potential to be spread by military personnel or vehicles. This patch of <i>A. ciliatum</i> is located about mid-slope on a steep bank of a gulch. This site was visited two times this year, in which 11 immature plants were hand pulled (Table 1.2.8). This site is on a steep slope making both hand pulling and spraying difficult. NRS will continue to spray immature and seedlings in this area during quarterly site visits."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Standley, P.C. & Williams, L.O. 1963. Flora of Guatemala. Fieldiana: Botany. Volume 24 - Part VII - Number 4. Chicago Natural History Museum	"A much branched herb with very brittle stems" [Possibly yes. Many invasive Melastomataceae resprout after cutting or damage to stems]

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 occasionally cultivated and locally naturalized at Manoa, Tantalus, southern 'Opae'ula ridge, and Castle Trail, O'ahu, and in the Kona District of Hawai'i. First collected on O'ahu in 1939"

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Naturalized on Oahu & Hawaii (Hawaiian Islands)
- Weedy habit in native range
- Environmental weed in Hawaiian Islands, threatening endangered plants
- Medicinal, but may cause diarrhea if eaten in excess
- Shade tolerant
- Sprawling growth smothers smaller plants in pastures & along forest edges
- Reproduces by seeds
- Small seeds likely dispersed along trails, & possibly by water or wind
- Forms a persistent seed bank
- Gaps in biological & ecological information limit accuracy or risk prediction

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Provides fodder to deer in native range
- Ornamental
- Herbicides provide effective control (e.g. foliar applied triclopyr at 1 lb/acre)