

Taxon: <i>Matourea azurea</i> (Linden) Colletta & V.C.Souza	Family: Plantaginaceae
Common Name(s): amazon blue Brazilian snapdragon otacanthus	Synonym(s): <i>Achetaria azurea</i> (Linden) V.C.Souza <i>Otacanthus azureus</i> (Linden) Ronse <i>Otacanthus caeruleus</i> Lindl. <i>Stemodia azurea</i> Linden <i>Tetraplacus taubertii</i> Mez

Assessor: Chuck Chimera	Status: Approved	End Date: 19 Jul 2024
WRA Score: 7.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Half-Shrub, Tropical, Naturalized, Ornamental, Self-Fertile

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	n
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		
303	Agricultural/forestry/horticultural weed	y = 2*multiplier (see Appendix 2), n = 0	n
304	Environmental weed	y = 2*multiplier (see Appendix 2), n = 0	n
305	Congeneric weed	y = 1*multiplier (see Appendix 2), n = 0	n
401	Produces spines, thorns or burrs	y = 1, n = 0	n
402	Allelopathic		
403	Parasitic	y = 1, n = 0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y = 1, n = 0	n
406	Host for recognized pests and pathogens	y = 1, n = 0	n
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	n

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y = 1, n = 0	n
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	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y = 1, n = -1	y
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
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	[No evidence] "This species was cultivated as a greenhouse plant in Belgium in the second half of the 19th century, but this culture fell into oblivion. Nowadays it is cultivated as a garden plant or as a pot plant in Brazil, United States, Hawaii, Thailand, Australia, and U.K. Research has shown that this species may become a valuable cut flower as well (Geertsen, 1990). A rapid propagation by in-vitro methods has been developed (Ronse & De Proft, 1992; Ronse et al., 1997b)." [<i>Otacanthus azureus</i> is a synonym of <i>Matourea azurea</i>]

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2024). 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
	KewScience. (2024). Plants of the World Online - <i>Matourea azurea</i> . http://powo.science.kew.org . [Accessed 17 Jul 2024]	"Native to: Brazil Southeast Introduced into: Hawaii, Mauritius, Réunion"
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	" <i>Otacanthus azureus</i> is native to the states of Rio de Janeiro and Espirito Santo, Brazil, and is cultivated in many tropical areas as well as in hothouses in temperate areas."

202	Quality of climate match data	High
	Source(s)	Notes
	KewScience. (2024). Plants of the World Online - <i>Matourea azurea</i> . http://powo.science.kew.org . [Accessed 17 Jul 2024]	"Native to: Brazil Southeast Introduced into: Hawaii, Mauritius, Réunion"

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	Sharma, B. B. (2022). Gardening with Seasonal Flowers. Publications Division, New Delhi, India	"Climate, soil, propagation and culture: Achetaria azurea may thrive well in USDA zones 10 and 11 in locations of Manipur, Nainital, Dalhousie, Shillong, Chandigarh and Delhi. The plant may die to the ground in most winters in zones 8 and 9."
	The National Gardening Association. (2024). Brazilian Snapdragon (<i>Achetaria azurea</i>). https://garden.org/plants/view/493154/Brazilian-Snapdragon-Achetaria-azurea/ . [Accessed 19 Jul 2024]	"Minimum cold hardiness: Zone 9a -6.7 °C (20 °F) to -3.9 °C (25 °F) Maximum recommended zone: Zone 11"
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (<i>Scrophulariaceae</i>). <i>Brittonia</i> , 53, 137-153	" <i>Otacanthus azureus</i> has the southernmost natural distribution, and is only known from near the city of Rio de Janeiro, where it grows in Atlantic forest (mata atlantica), between sea level and 1000 m."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. <i>Bishop Museum Occasional Papers</i> 113: 55-63	" <i>Scrophulariaceae Otacanthus azureus</i> (linden) ronse New naturalized record This attractive groundcover, amazon blue, is popular in the Volcano vicinity, and has become naturalized in the Puna district. With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district. Material examined. HAWAI'I: Puna distr. Eden roc subdivision, 2157595N, 279148E. Bluepurple flower, across road from cultivated specimen, 4 dec 2008, J. Parker & R. Parsons BIED51."
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (<i>Scrophulariaceae</i>). <i>Brittonia</i> , 53, 137-153	"The natural distribution of this species is limited to the states of Rio de Janeiro and Espirito Santo, where it grows on rocks in coastal areas in mata atlantica. It has been reported to be heliophilous. According to Mez (1890), it was very common in the forest of Tijuca, near Rio de Janeiro, in 1876. However, we have found only one other herbarium specimen from Tijuca, made in 1916. It appears to have grown there in the wild, which resolves the question on its natural occurrence at Tijuca raised by Billiet and Heine (1980). There are some other herbarium specimens from localities farther north in the state of Rio de Janeiro, as well as some in Espirito Santo."

Qsn #	Question	Answer
205	Does the species have a history of repeated introductions outside its natural range?	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	"Otacanthus has an interesting history in cultivation. Popular in Europe during the nineteenth century, it disappeared from cultivation around the turn of the century. "Rediscovered" in the 1970s, it was again introduced to cultivation, gaining rapidly in esteem, and is now extremely popular, at least in Hawai'i. The cultivar name Amazon Blue' is often used here as the common name."
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"The many records in northern Brazil involve cultivated plants, except for one from Manaus (state of Amazonas), where it is probably naturalized, as well as a record from the state of Santa Catarina in the south (along a road). <i>Otacanthus azureus</i> has also been found naturalized on several islands in the Mascarenes. The oldest record comes from the Seychelles in 1908, and from 1924 on it was also collected on Mauritius (about 10 specimens in the Mauritius herbarium MAU from the region of Montagne Laselle: J. Dequaire, pers. comm.). From 1957 on it was recorded at La Reunion, and later in Madagascar. In Hawaii I have seen it growing in the wild, in the vicinity of some houses."

301	Naturalized beyond native range	y
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"One species, <i>Otacanthus azureus</i> , is cultivated as an ornamental in Brazil and outside; it has been found naturalized in different parts of Brazil, in the Mascarenes and in the Seychelles."
	Bostock, P.D. and Holland, A.E. (eds) (2014). Introduction to the Census of the Queensland Flora 2014. Queensland Department of Science, Information Technology, Innovation and the Arts: Brisbane	"Plantaginaceae * <i>Otacanthus caeruleus</i> Lindl., new naturalisation for Queensland"
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. <i>Bishop Museum Occasional Papers</i> 113: 55-63	[Hawaii island] "Scrophulariaceae <i>Otacanthus azureus</i> (linden) ronse New naturalized record This attractive groundcover, amazon blue, is popular in the Volcano vicinity, and has become naturalized in the Puna district. With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district. Material examined. HAWAI'I: Puna distr. Eden roc subdivision, 2157595N, 279148E. Bluepurple flower, across road from cultivated specimen, 4 dec 2008, J. Parker & R. Parsons BIED51."
	Murphy, M., Yogi, D. & Faccenda, K. (2024). BIISC Plant Pono Specialist - Invasive Plant Prevention & UH Botany. personal communication. 12 July	[Hawaii Island] "We observed 6 to 10 fruiting individuals growing on bare rock near Kaumana Caves. Some stems were rooted where they touched the ground. It is unknown how the original plant arrived there, but it seemed out of place. After that, we did a driving survey about a mile from the caves and found another patch. This one is much larger, like 50 individuals. They were growing on an unmowed roadside among grasses, sedges, sensitive plant."

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[Cited as a weed. Impacts unknown] "Otacanthus caeruleus Lindl. Scrophulariaceae Total N° of Refs: 2 Major Pathway/s: Ornamental Dispersed by: Humans References: La Reunion-W-1321, Madagascar-N-1000."
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
	Ngugi, M. R., & Neldner, V. J. (2016). Assessing the invasion threat of non-native plant species in protected areas using Herbarium specimen and ecological survey data. A case study in two rangeland bioregions in Queensland. <i>The Rangeland Journal</i> , 39(1), 85-95	"Table S2. List of non-native species observed in Cape York Peninsula bioregion," [Otacanthus caeruleus Lindl. - N= not regarded as environmental weed]
	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
	WRA Specialist. (2024). Personal Communication	No evidence found
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence. The species listed in the GCW (<i>Otacanthus azureus</i> (Linden) Ronse and <i>Otacanthus caeruleus</i> Lindl.) are synonyms for <i>Matourea azurea</i> (Linden) Colletta & V.C.Souza
401	Produces spines, thorns or burrs	n
	Source(s)	Notes

Qsn #	Question	Answer
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	[No evidence] "Half-shrub to 1-2 m high, branched at the base. Stems and leaves sticky, covered only with glandular hairs. Stems terete, the present year's stems indistinctively and obtusely quadrangular, especially distally, sometimes reddish, pale brown when biennial. Leaves with broadly elliptic blade, somewhat triangular to acute apically, with winged petioles, to 120 X 44 mm, the margins slightly crenate to serrate, dark brown to black when dried, the petioles of opposite leaves connate or touching at the base. Inflorescence 6-17 cm long at maturity; pedicels to 2 mm long. Calyx glabrous but covered with minute glands except on the margins, the lower segments narrowly triangular to subulate, 15 X 1 mm, the upper segment broadly ovate, almost circular at the apex, 11-20 mm long and to 10 mm wide. Corolla violet-blue to sky blue with a white spot on the lower lip at the throat, the tube 25-40 mm long, nearly cylindrical, slightly curved downward at the apex, glabrous to 3/4 of the length, further up minutely villous, the upper lip reniform, 15-20 X 16-25 mm, the lower lip slightly 3-lobed and somewhat smaller. Anthers with globose pollen. Style 30 mm, slightly shorter or longer than the stamens. Ovary conical, 3 X 2 mm, loosely pilose, bilocular. Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"Perennial herb to 2' tall, pleasantly aromatic when handled." [No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"pleasantly aromatic when handled" [Unknown. Fragrance could possibly deter browsing]
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	[Unknown. resinous smell may deter browsing] "All taxa of <i>Otacanthus</i> that have been analyzed contain essential oils, consisting of a mixture of 32-102 mono- and sesquiterpenes (Ronse, 1993; Ronse et al., 1997a). The highest content (0.2-0.3% on fresh weight) is found in <i>O. azureus</i> , which possesses sticky leaves releasing a resinous smell."

Qsn #	Question	Answer
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
	ASPCA. (2024). Toxic and Non-Toxic Plants List. https://www.asPCA.org/pet-care/animal-poison-control/toxic-and-non-toxic-plants . [Accessed 19 Jul 2024]	No evidence

406	Host for recognized pests and pathogens	n
	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	"Few pests or diseases trouble it."
	Sharma, B. B. (2022). Gardening with Seasonal Flowers. Publications Division, New Delhi, India	"The species plants are tough, self-sufficient and virtually problem free."

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
	U.S. Food and Drug Administration. (2024). FDA Poisonous Plant Database. https://www.fda.gov/food/science-research-food/fda-poisonous-plant-database . [Accessed 19 Jul 2024]	No evidence

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Whistler, W.A. (2000). Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Moist but well-drained soils in sunny places are preferred." [No evidence. Moist areas unlikely to be fire prone]

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"it grows on rocks in coastal areas in mata atlantica. It has been reported to be heliophilous." [heliophilous = needs, or tolerates, a high level of direct sunlight]
	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	" <i>Otacanthus</i> requires full sun and ample water with good soil drainage and is somewhat tolerant of wind and salt spray."
	Sharma, B. B. (2022). Gardening with Seasonal Flowers. Publications Division, New Delhi, India	"Select a location with sun or light shade and grows best when grown in a rich loamy soil that is watered regularly during dry seasons."
	The National Gardening Association. (2024). Brazilian Snapdragon (<i>Achetaria azurea</i>). https://garden.org/plants/view/493154/Brazilian-Snapdragon-Achetaria-azurea/ . [Accessed 19 Jul 2024]	"Sun Requirements: Full Sun to Partial Shade"

Qsn #	Question	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	n
	Source(s)	Notes
	Whistler, W.A. (2000). Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Moist but well-drained soils in sunny places are preferred."
	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	"Otacanthus requires full sun and ample water with good soil drainage and is somewhat tolerant of wind and salt spray."
	Sharma, B. B. (2022). Gardening with Seasonal Flowers. Publications Division, New Delhi, India	"Select a location with sun or light shade and grows best when grown in a rich loamy soil that is watered regularly during dry seasons. It prefers acid soil."
411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of Otacanthus Lindl. (Scrophulariaceae). Brittonia, 53, 137-153	"Half-shrub to 1-2 m high, branched at the base. Stems and leaves sticky, covered only with glandular hairs."
412	Forms dense thickets	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of Otacanthus Lindl. (Scrophulariaceae). Brittonia, 53, 137-153	"The natural distribution of this species is limited to the states of Rio de Janeiro and Espirito Santo, where it grows on rocks in coastal areas in mata atlantica." [No evidence]
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. Bishop Museum Occasional Papers 113: 55-63	[No evidence] "This attractive groundcover, amazon blue, is popular in the Volcano vicinity, and has become naturalized in the Puna district. With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district. Material examined. HAWAII: Puna distr. Eden roc subdivision, 2157595N, 279148E. Bluepurple flower, across road from cultivated specimen, 4 dec 2008, J. Parker & R. Parsons BIED51"
501	Aquatic	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of Otacanthus Lindl. (Scrophulariaceae). Brittonia, 53, 137-153	[Terrestrial] "The natural distribution of this species is limited to the states of Rio de Janeiro and Espirito Santo, where it grows on rocks in coastal areas in mata atlantica."
502	Grass	n
	Source(s)	Notes
	KewScience. (2024). Plants of the World Online - <i>Matourea azurea</i> . http://powo.science.kew.org . [Accessed 19 Jul 2024]	"Family Plantaginaceae Genus <i>Matourea</i> Species <i>Matourea azurea</i> "
503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	KewScience. (2024). Plants of the World Online - <i>Matourea azurea</i> . http://powo.science.kew.org . [Accessed 19 Jul 2024]	"Family Plantaginaceae Genus <i>Matourea</i> Species <i>Matourea azurea</i> "

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"Half-shrub to 1-2 m high, branched at the base. Stems and leaves sticky, covered only with glandular hairs."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	[No evidence] "The natural distribution of this species is limited to the states of Rio de Janeiro and Espirito Santo, where it grows on rocks in coastal areas in mata atlantica. It has been reported to be heliophilous. According to Mez (1890), it was very common in the forest of Tijuca, near Rio de Janeiro, in 1876. However, we have found only one other herbarium specimen from Tijuca, made in 1916. It appears to have grown there in the wild, which resolves the question on its natural occurrence at Tijuca raised by Billiet and Heine (1980). There are some other herbarium specimens from localities farther north in the state of Rio de Janeiro, as well as some in Espirito Santo."

602	Produces viable seed	y
	Source(s)	Notes
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. <i>Bishop Museum Occasional Papers</i> 113: 55-63	" <i>Otacanthus azureus</i> (Linden) Ronse New naturalized record This attractive groundcover, amazon blue, is popular in the Volcano vicinity, and has become naturalized in the Puna district. With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district."
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	"The tiny seeds may be sown in flats on a fine substrate for later transplanting."

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Colletta, G. D., Scatigna, A. V., & Souza, V. C. (2020). Assessment of <i>Matourea pratensis</i> (Plantaginaceae: Gratioleae) reveals an older name for <i>Achetaria</i> . <i>Taxon</i> , 69 (6), 1354-1360	[Unknown] "Abstract <i>Matourea pratensis</i> is a name published by Aublet in 1775 that has never been typified and whose identity has long been obscure. It was historically associated with <i>Stemodia foliosa</i> , as <i>S. pratensis</i> , a species with reported medical importance and wide distribution in the Neotropics. However, its morphology has also been interpreted as more similar to <i>Achetaria</i> , a genus widely distributed throughout the Neotropics and also with medicinal, ecological and economic value. After an extensive bibliographical survey, along with morphological study of type specimens of <i>M. pratensis</i> , <i>S. foliosa</i> , and <i>Achetaria</i> spp., we conclude that (1) <i>S. foliosa</i> and <i>M. pratensis</i> represent distinct taxa; and (2) <i>M. pratensis</i> is congeneric with <i>Achetaria</i> . As a result, we transfer the currently accepted species of <i>Achetaria</i> to <i>Matourea</i> , proposing eight new combinations (<i>M. azurea</i> , <i>M. caparaoensis</i> , <i>M. crenata</i> , <i>M. erecta</i> , <i>M. latifolia</i> , <i>M. ocymoides</i> , <i>M. platychila</i> , <i>M. scutellarioides</i>). Additionally, we designate lectotypes for <i>M. pratensis</i> , <i>Tetraplacus platychilus</i> f. <i>longifolius</i> , <i>Otacanthus caparaoensis</i> , <i>O. fluminensis</i> , and <i>O. villosus</i> , and a second-step lectotype for <i>Beyrichia scutellarioides</i> ."
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	Unknown. No hybrids documented
604	Self-compatible or apomictic	y
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	" <i>O. azureus</i> from a single plant, thus showing it to be facultatively autogamous."
605	Requires specialist pollinators	n
	Source(s)	Notes
	Sharma, B. B. (2022). <i>Gardening with Seasonal Flowers</i> . Publications Division, New Delhi, India	"Brazilian snapdragon flowers attract a variety of pollinators like butterflies and bees."
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"No information was found in the literature on the pollination of <i>Otacanthus</i> , but the dimensions and colors of the flowers make it probable that they are bee pollinated. We observed <i>O. villosus</i> being visited in the field by large black bees, possibly <i>Xylocopa</i> sp. In the greenhouse it was possible to pollinate <i>O. azureus</i> from a single plant, thus showing it to be facultatively autogamous."
606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	" <i>Otacanthus</i> is easily propagated by stem cuttings, which root readily when treated with a rooting hormone."
	Murphy, M., Yogi, D. & Faccenda, K. (2024). BIISC Plant Pono Specialist - Invasive Plant Prevention & UH Botany. personal communication. 12 July	"We observed 6 to 10 fruiting individuals growing on bare rock near Kaumana Caves. Some stems were rooted where they touched the ground."
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. <i>Bishop Museum Occasional Papers</i> 113: 55-63	"With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district."
607	Minimum generative time (years)	1

Qsn #	Question	Answer
	Source(s)	Notes
	Sharma, B. B. (2022). Gardening with Seasonal Flowers. Publications Division, New Delhi, India	"This tropical or subtropical perennial can be grown indoors as a house plant or outdoors as an annual in areas outside tropical zones. As a perennial, it blooms almost all year and it has great cut flowers for arrangements. When grown as an annual, it will bloom midsummer to autumn."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Murphy, M., Yogi, D. & Faccenda, K. (2024). BIISC Plant Pono Specialist - Invasive Plant Prevention & UH Botany. personal communication. 12 July	[Growing along roadside. Could be moved by vehicles] "We observed 6 to 10 fruiting individuals growing on bare rock near Kaumana Caves. Some stems were rooted where they touched the ground. It is unknown how the original plant arrived there, but it seemed out of place. After that, we did a driving survey about a mile from the caves and found another patch. This one is much larger, like 50 individuals. They were growing on an unmowed roadside among grasses, sedges, sensitive plant."
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	[Seeds small. Could possibly adhere to footwear, vehicles or equipment in soil] "Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Whistler, W.A. (2000). <i>Tropical Ornamentals: A Guide</i> . Timber Press, Portland, OR	" <i>Otacanthus caeruleus</i> , Amazon blue, native to Brazil, is cultivated elsewhere in the tropics for its mauve flowers, an uncommon color in tropical gardens. Though more commonly grown during the last century, it has come back into popularity more recently and hence is found in few books on ornamental flowers." [<i>Otacanthus caeruleus</i> is a synonym of <i>Matourea azurea</i>]
	Staples, G.W. & Herbst, D.R. (2005). <i>A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places</i> . Bishop Museum Press, Honolulu, HI	" <i>Otacanthus</i> has an interesting history in cultivation. Popular in Europe during the nineteenth century, it disappeared from cultivation around the turn of the century. "Rediscovered" in the 1970s, it was again introduced to cultivation, gaining rapidly in esteem, and is now extremely popular, at least in Hawai'i. The cultivar name Amazon Blue' is often used here as the common name."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown. No evidence found

704	Propagules adapted to wind dispersal	
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown." [No adaptations for wind dispersal, but small size may allow for seeds to be moved by wind]

705	Propagules water dispersed	
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Qsn #	Question	Answer
	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	"Windward gardens and sheltered valleys with ample rainfall are ideal sites for it." [Grows in wet habitats; seeds could be moved with water]
706	Propagules bird dispersed	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown." [No evidence. Not fleshy-fruited]
707	Propagules dispersed by other animals (externally)	
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown." [Small seeds could adhere to animals in mud]
708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Ronse, A. (2001). A revision of <i>Otacanthus</i> Lindl. (Scrophulariaceae). <i>Brittonia</i> , 53, 137-153	"Capsule 8 X 4 mm, minutely pubescent, opening by 2 valves bent inward. Seeds almost ovoid, strongly angled by caruncles disposed in longitudinal lines, 0.6 X 0.4 mm, dark brown." [Unlikely. No evidence that capsules or seed are consumed]
801	Prolific seed production (>1000/m2)	
	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	"Frt a conical capsule, opening by 2 valves. Seeds 100-300, minute." [Seed densities unknown]
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. Bishop Museum Occasional Papers 113: 55-63	"With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district."
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2024). Personal Communication	Unknown
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y

Qsn #	Question	Answer
	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	"Plants grow rapidly in the Hawaiian climate and must be pruned to encourage branching and a compact habit. Few pests or diseases trouble it. Otacanthus is easily propagated by stem cuttings, which root readily when treated with a rooting hormone."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Parker, J.L. & Parsons, B. (2012). New plant records from the Big Island for 2009. Bishop Museum Occasional Papers 113: 55-63	[Unknown. Spread not predicted to be inhibited by natural enemies] "This attractive groundcover, amazon blue, is popular in the Volcano vicinity, and has become naturalized in the Puna district. With its rapid growth, tiny seeds, and ease of vegetative propagation, we expect this species to successfully colonize the ample suitable habitat in the district. Material examined. HAWAII: Puna distr. Eden roc subdivision, 2157595N, 279148E. Bluepurple flower, across road from cultivated specimen, 4 dec 2008, J. Parker & R. Parsons BIED51."

Summary of Risk Traits:

Matourea azurea (Amazon blue, Brazilian snapdragon, otacanthus), is a perennial herb or half-shrub native to southeast Brazil. It has been cultivated as an ornamental for its mauve flowers, and has become naturalized in parts of Brazil, in the Mascarenes, in the Seychelles, as well as on Hawaii island. With an ability to spread both vegetatively and from seeds, it is likely that it will continue to escape from cultivation into suitable habitat.

High Risk / Undesirable Traits

- Thrives and spreads in regions with tropical climates
- Naturalized in parts of Brazil, in the Mascarenes, in the Seychelles, as well as on Hawaii island
- Reproduces by seeds and vegetatively by rooting stems and stem fragments
- Facultatively autogamous (capable of self-fertilization)
- Able to reach maturity in one growing season
- Small seeds lack specialized adaptations for dispersal, but can probably be moved by water, short distances by wind, and possibly in soil on footwear, vehicles, and equipment
- Also dispersed through intentional cultivation
- Tolerates pruning

Low Risk Traits

- No negative impacts have been documented where the species has naturalized
- Unarmed (no spines, thorns, or burrs)
- Reported to be non-toxic
- Grows best in high light environments (dense shade may inhibit spread)