

<b>Taxon:</b> <i>Barleria cristata</i> L.	<b>Family:</b> Acanthaceae
<b>Common Name(s):</b> bluebell bluebell barleria Philippine violet	<b>Synonym(s):</b> B. c. f. albiflora Degener & I. Degener

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 17 Dec 2018
<b>WRA Score:</b> 14.0	<b>Designation:</b> H(HPWRA)	<b>Rating:</b> High Risk

**Keywords:** Naturalized, Weedy Herb, Ornamental, Dehiscent Capsules, Spreads Vegetatively

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	y
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	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
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)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
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	y=1, n=-1	y
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	y=1, n=-1	y
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 <sup>2</sup> )	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	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
	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 India and Burma; in Hawai'i cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i." [Cultivated, but no evidence of domestication]

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 India and Burma"
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	"Native Asia-Temperate CHINA: China [Fujian, Guangdong, Guizhou, Sichuan, Yunnan, Guangxi, Hainan] Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, Bhutan, India (e.), Nepal, Pakistan INDO-CHINA: Cambodia, Laos, Myanmar, Thailand, Vietnam"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Elevation range exceeds 2000 m, demonstrating environmental versatility] "Barleria cristata ... Roadsides, slopes, along streams, in xeric vegetation; below 100–2600 m."

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	"Native Asia-Temperate CHINA: China [Fujian, Guangdong, Guizhou, Sichuan, Yunnan, Guangxi, Hainan] Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, Bhutan, India (e.), Nepal, Pakistan INDO-CHINA: Cambodia, Laos, Myanmar, Thailand, Vietnam Cultivated (also cult.) Naturalized Africa WESTERN INDIAN OCEAN: Mauritius, Reunion Asia-Tropical MALESIA: Christmas Island, Indonesia Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] SOUTH-CENTRAL PACIFIC: French Polynesia SOUTHWESTERN PACIFIC: Fiji"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 17 Dec 2018]	"Naturalized Africa WESTERN INDIAN OCEAN: Mauritius, Reunion Asia-Tropical MALESIA: Christmas Island, Indonesia Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] SOUTH-CENTRAL PACIFIC: French Polynesia SOUTHWESTERN PACIFIC: Fiji"

301	Naturalized beyond native range	y
	Source(s)	Notes

Qsn #	Question	Answer
	Oppenheimer, H. L. & Bartlett, R. T. 2002. New plant records from the main Hawaiian Islands. Bishop Museum Occasional Papers. 69: 1-14	"According to Wagner et al. (1999: 170) <i>Barleria cristata</i> is known from the islands of Kaua'i, O'ahu, and Hawai'i. On West Maui, <i>B. cristata</i> was first observed by Pu'u Kukui Watershed field staff in 1996 in Kahana Valley, but no specimens were collected. Recently, several populations have been located in gulches further south. Material examined. MAUI: West Maui, Lahaina Distr., M'omoku, in gully, 280 m, 9 Mar 2000, Oppenheimer H30003; Kahana Iki Gulch, along dirt road on S side, 226 m, 10 Mar 2000, Oppenheimer H30005; Mähinahina, 207 m, forming dense stands under <i>Leucaena leucocephala</i> , 7 Apr 2000, Oppenheimer & J. Kunna H40009."
	Starr, F., Starr, K. & Loope, L.L. 2006. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 87: 31-43	" <i>Barleria cristata</i> (Philippine violet) was previously reported from Kaua'i, O'ahu, Maui, and Hawai'i (Wagner et al., 1999; Oppenheimer & Bartlett, 2002). This sprawling shrub is now also known from Moloka'i, where large patches can be found in the understory of kiawe ( <i>Prosopis pallida</i> ) along the road to the East end of Moloka'i. Material examined. MOLOKA'I: East Moloka'i, Kalua'aha, filling understory in many spots along Kamehameha Hwy., in association with <i>Prosopis pallida</i> , 10 ft [3 m], 17 May 2005, Starr & Starr 050517-5."
	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 cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	"Naturalized Africa WESTERN INDIAN OCEAN: Mauritius, Reunion Asia-Tropical MALESIA: Christmas Island, Indonesia Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] SOUTH-CENTRAL PACIFIC: French Polynesia SOUTHWESTERN PACIFIC: Fiji"
	Queensland Government. (2018). Weeds of Australia. <i>Barleria cristata</i> . <a href="http://keyserver.lucidcentral.org">http://keyserver.lucidcentral.org</a> . [Accessed 17 Dec 2018]	Naturalised Distribution Occasionally naturalised in northern and south-eastern Queensland. Also naturalised on Christmas Island, in south-eastern USA (i.e. Florida) and on several Pacific islands (i.e. Fiji, New Caledonia and Hawaii). Notes A commonly cultivated garden plant (i.e. ornamental) that has recently become naturalised in the sub-tropical and tropical regions of eastern Australia. It is regarded as a potential environmental weed or "sleepers weed" in Queensland, and like many other members of the Acanthaceae family it is seen as a threat to riparian areas."

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes

Qsn #	Question	Answer
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"B. cristata is sometimes weedy and has the potential to outcompete native plants for common resources such as water, space, and light (Aguilar, 2001). In Australia, B. cristata is seen as a threat to riparian areas and is also regarded as an environmental weed (Weeds of Australia, 2015)." [Actually listed as a potential environmental weed in Australia. Regarded as a weed of unspecified impacts elsewhere]
	Aguilar, N. O. (2001). <i>Barleria cristata</i> L.. In: van Valkenburg, J.L.C.H. and Bunyapraphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	" <i>Barleria cristata</i> occurs in waste places and along roadsides, and is sometimes weedy."
	Dave's Garden. (2018). <i>Barleria</i> Species, Bluebell <i>Barleria</i> , Crested Philippine Violet, Enana, Philippine Violet - <i>Barleria cristata</i> . <a href="https://davesgarden.com/guides/pf/go/2401/">https://davesgarden.com/guides/pf/go/2401/</a> . [Accessed 17 Dec 2018]	[Negative review from grower in Oregon. Regarded as a landscaping weed] "On Nov 7, 2004, IslandJim from Keizer, OR (Zone 8b) wrote: I hate to label any plant as invasive but this one self-seeds with abandon and is one of two or three plants that have made me a regular customer for RoundUp. It is pretty, however."

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Moody, K. 1989. Weeds Reported in Rice in South and Southeast Asia. International Rice Research Institute, Manila, Philippines	Possibly. Reported as a weed of rice crops in India. Impacts unspecified

304	Environmental weed	
	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 India and Burma; in Hawai'i cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i." [Unknown. Description does not imply negative environmental impacts]
	Queensland Government. (2018). Weeds of Australia. <i>Barleria cristata</i> . <a href="http://keyserver.lucidcentral.org">http://keyserver.lucidcentral.org</a> . [Accessed 17 Dec 2018]	[Potentially] "A commonly cultivated garden plant (i.e. ornamental) that has recently become naturalised in the sub-tropical and tropical regions of eastern Australia. It is regarded as a potential environmental weed or "sleeper weed" in Queensland, and like many other members of the Acanthaceae family it is seen as a threat to riparian areas."

305	Congeneric weed	Y
	Source(s)	Notes
	Csurhes, S. & Edwards, R. 1998. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	"B. prionitis is a thorny shrub which has naturalised at several locations in the Northern Territory and Queensland. It has a history as a weed in Mauritius and could invade native vegetation throughout tropical and sub-tropical, coastal areas of Australia. Although the plant is a popular garden ornamental, there appears to be an opportunity to eradicate naturalised specimens and prevent further sale by the nursery trade."

Qsn #	Question	Answer
	Meyer, J. Y., & Lavergne, C. 2004. Beautés fatales: Acanthaceae species as invasive alien plants on tropical Indo-Pacific Islands. <i>Diversity and Distributions</i> , 10(5-6): 333-347	[Possibly] "Most, if not all Acanthaceae species were intentionally introduced to tropical islands as ornamentals. Many of them which have escaped gardens (e.g. <i>Asystasia gangetica</i> , <i>Barleria cristata</i> , <i>Blechnum pyramidatum</i> , <i>Justicia betonica</i> , <i>Thunbergia alata</i> among the most common tropical species, Whistler, 1994; Swarbrick, 1997), well known as 'agricultural weeds' (i.e. unwanted plant species in agroecosystems), 'ruderals' (i.e. growing under disturbed conditions) or 'adventives' (i.e. growing in a place for a while only, that can be called transient, casual, or occasional escapes). They are naturalized in human-disturbed areas such as urban areas, waysides (along trails and roads), wastelands, old garden sites, fallow or abandoned fields, pastures, forestry plantations, croplands and other cultivated areas (taro marshes, banana plantations, etc.). They are usually restricted to open habitats, sometimes found in riverbanks and forest margins and clearings, and rarely found in the understorey of closed canopy forests." ... "The garden ornamental <i>Barleria lupulina</i> was found as a ruderal in dry zones of La Réunion (Lavergne, 1982)."
	Glanzign, A., McLachlan, K, and Kessal, O. 2004. Garden Plants that are Invasive Plants of National Importance: an overview of their legal status and commercial availability. WWF Australia, Sydney	[Prohibited from trade, import & targeted for eradication] "Table5: Naturalised Garden Plants on the Alert List of Environmental Weeds" [Barleria prionitis - State/Terr. Control Status = WA-II NT-I, II, III ... I. Prohibited for Sale and/or trade by State / Territory II. Prohibited Import by State / Territory III. Eradication required by State / Territory]

401	Produces spines, thorns or burrs	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. <i>Flora of China</i> . Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Inflorescences axillary short and dense cymes, shortly pedunculate; bracts absent; bracteoles variable, linear to linear-lanceolate, 2.4–6.5 × 0.5–1.5 cm, 3–7-veined, base cuneate, margin usually spiny but sometimes bristly pilose and becoming spinescent with age, apex acuminate. Outer calyx lobes ovate to narrowly elliptic to lanceolate, 1.2–2.5 × 0.5–1.3 cm, pilose, reticulately veined, margin spiny, apex mucronate"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Spinose bracts] "Flowers subtended by 2 greenish white to white, linear, spinose bracts with conspicuous veins, 8-15 mm long, pedicels 0-1 mm long; outer 2 calyx lobes enlarged, ovate, becoming chartaceous with age, the veins green and conspicuous, ca. 10 mm long at anthesis, enlarging to 15-25 mm long in fruit, spiny-margined, the inner 2 lobes linear, ca. 7 mm long, margins entire"

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

Qsn #	Question	Answer
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.	"Erect branching shrubs 6-10 dm tall; stems pubescent with both long and short appressed hairs." [No evidence. Acanthaceae]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Kunwar, A., Gaire, R., Pokharel, K. P., Baral, S., & Thapa, T. B. (2016). Diet of the Four-horned Antelope <i>Tetracerus quadricornis</i> (De Blainville, 1816) in the Churia Hills of Nepal. <i>Journal of Threatened Taxa</i> , 8(5), 8745-8755	"Abstract: The food composition of the Four-horned Antelope <i>Tetracerus quadricornis</i> was studied in the Churia Hills of Nepal during summer, monsoon and the winter seasons of 201–2013. Microhistological technique was used to determine the diet. The Four-horned Antelope was found to be a mixed feeder feeding on trees, shrubs, forbs, grasses and climbers. Trees and shrubs contribute the major percentage of diet in all the three seasons. The Gramineae family is consumed in highest proportion. <i>Mitragyna parvifolia</i> , <i>Bridelia retusa</i> , <i>Bambusa vulgaris</i> , <i>Hymenodictyon</i> sp. and <i>Ziziphus mauritiana</i> are major tree species while <i>Barleria cristata</i> , <i>Pogostemon benghalensis</i> , <i>Achyranthes</i> sp., <i>Clerodendrum viscosum</i> are among shrubs. <i>Ageratum conyzoides</i> and <i>Blumea virens</i> are the main forbs <i>Eulaliopsis binata</i> and <i>Imperata cylindrica</i> are the principal grass species."
	Singh, V., Gaur, R. D., & Bohra, B. (2008). A survey of fodder plants in mid-altitude Himalayan rangelands of Uttarakhand, India. <i>Journal of Mountain Science</i> , 5(3): 265-278	"Table 1 Fodder species in the rangeland ecosystems of Uttarakhand Himalaya" [Includes <i>Barleria cristata</i> ]
	Shaheen, H., Qureshi, R., Iqbal, S., & Qasem, M. F. 2014. Seasonal availability and palatability of native flora of Santh Saroola Kotli Sattian, Rawalpindi, Pakistan. <i>African Journal of Plant Science</i> , 8(2): 92-102	[ <i>Barleria acanthoides</i> and <i>Barleria cristata</i> , are labeled MP - Moderately palatable] "Table 1. Inventory of native flora along with local names, family, part used, palatability, availability and animal preference."

405	Toxic to animals	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2018). <i>Barleria cristata</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Barleria+cristata">http://tropical.theferns.info/viewtropical.php?id=Barleria+cristata</a> . [Accessed 17 Dec 2018]	"Known Hazards - None known"
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"No serious insect or disease problems. Susceptible to bacterial leaf spot, fungal spots and stem galls. Aphids, whiteflies, and spider mites may appear."



Qsn #	Question	Answer
	Gilman, E. F. & Landrum, L. 2014. <i>Baleria cristata</i> . Philippine Violet. FPS60. Revised. University of Florida, IFAS, Gainesville, FL. <a href="http://edis.ifas.ufl.edu">http://edis.ifas.ufl.edu</a> . [Accessed 17 Dec 2018]	"Pests and Diseases - None of major concern."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Tropical Plants Database, Ken Fern. (2018). <i>Barleria cristata</i> . <a href="http://tropical.theferns.info/viewtropical.php?id=Barleria+cristata">http://tropical.theferns.info/viewtropical.php?id=Barleria+cristata</a> . [Accessed 17 Dec 2018]	"Known Hazards - None known"
	Aguilar, N. O. (2001). <i>Barleria cristata</i> L.. In: van Valkenburg, J.L.C.H. and Bunyaphatsara, N. (Editors): Plant Resources of South-East Asia No 12(2): Medicinal and Poisonous Plants 2. PROSEA Foundation, Bogor, Indonesia. <a href="http://prota4u.org/prosea">prota4u.org/prosea</a>	"The bitter juice of the leaves or roots is used as a diaphoretic and expectorant for serious catarrhal infections. An infusion of the roots and leaves is applied to boils and sores to reduce swellings."
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Medicinal] "Used in Ayurveda and Sidha. Whole plant antiinflammatory, bechic, hypoglycemic, spasmolytic, oxytocic, used in snakebite; a paste or a decoction given in tuberculosis. Leaves for inflammations. Roots and leaves infusion applied to boils and sores to reduce swellings; the bitter juice of the leaves or roots diaphoretic and expectorant; root paste for toothache; roots for anemia and cough, a decoction of the root with <i>Barleria strigosa</i> and dry fish is given in anemia; a decoction of the root of <i>Barleria strigosa</i> with <i>Barleria cristata</i> and <i>Tinospora cordifolia</i> is given in fevers with honey and long pepper."

408	Creates a fire hazard in natural ecosystems	
	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.	"now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i." [Flammability unknown. Occurs in dry, and potentially fire prone areas. Could contribute to fuel load]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Peter, K.V. (ed.). 2007. Underutilized and underexploited horticultural crops, Volume 1. New India Publishing, New Delhi, India	"Plants are usually found growing in hedges but very often planted near temples and gardens. It prefers shady places."
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"Sun: Full sun to part shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes

Qsn #	Question	Answer
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Soil drainage free Soil reaction acid neutral Soil texture light medium"
	Gilman, E. F. & Landrum, L. 2014. <i>Baleria cristata</i> . Philippine Violet. FPS60. Revised. University of Florida, IFAS, Gainesville, FL. <a href="http://edis.ifas.ufl.edu">http://edis.ifas.ufl.edu</a> . [Accessed 17 Dec 2018]	"Soil tolerances: acidic; slightly alkaline; sand; loam; clay"

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.	"Erect branching shrubs 6-10 dm tall; stems pubescent with both long and short appressed hairs."

412	Forms dense thickets	y
	Source(s)	Notes
	Oppenheimer, H. L. & Bartlett, R. T. 2002. New plant records from the main Hawaiian Islands. Bishop Museum Occasional Papers. 69: 1-14	"Material examined. MAUI: West Maui, Lahaina Distr., Mōmoku, in gully, 280 m, 9 Mar 2000, Oppenheimer H30003; Kahana Iki Gulch, along dirt road on S side, 226 m, 10 Mar 2000, Oppenheimer H30005; Māhinahina, 207 m, forming dense stands under <i>Leucaena leucocephala</i> , 7 Apr 2000, Oppenheimer & J. Kunna H40009."

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] "Erect branching shrubs 6-10 dm tall; stems pubescent with both long and short appressed hairs." ... "in Hawai'i cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Barlerieae

Qsn #	Question	Answer
503	<b>Nitrogen fixing woody plant</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 13 Dec 2018]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Barlerieae
504	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	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.	"Erect branching shrubs 6-10 dm tall; stems pubescent with both long and short appressed hairs."
601	<b>Evidence of substantial reproductive failure in native habitat</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence. Widely distributed] "Fujian, Guangdong, Guangxi, Guizhou, Hainan, Sichuan, Taiwan, ?Xizang, Yunnan [Bhutan, Cambodia, India, Indonesia, Laos, Myanmar, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam]."
602	<b>Produces viable seed</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	Peter, K.V. (ed.). 2007. Underutilized and underexploited horticultural crops, Volume 1. New India Publishing, New Delhi, India	"Capsule long ellipsoid, acute at both ends, 4- seeded. Seeds compressed, silky hairy."
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"Propagate by seed or stem/tip cuttings. Shrubs self sow in the landscape."
603	<b>Hybridizes naturally</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2018. Personal Communication	Unknown. Hybridization documented in genus

Qsn #	Question	Answer
604	Self-compatible or apomictic	
	Source(s)	Notes
	Makholela, T. M., Van der Bank, F. H., & Balkwill, K. 2004. Allozyme variation in <i>Barleria saxatilis</i> (Acanthaceae) is lower than in two congeneric endemics. South African Journal of Botany, 7 (4): 515-520	[Unknown. Self-compatibility documented in other <i>Barleria</i> species] "The type of breeding system obtained from P:O was facultative autogamy in all the three <i>Barleria</i> species. Cruden's (1977) outcrossing index indicated <i>B. greenii</i> to be partially self-compatible, outcrossing and with a demand for pollinators. The same was also observed in <i>B. argillicola</i> and <i>B. saxatilis</i> , but it was also observed that <i>B. argillicola</i> can be self-compatible with some demand for pollinators whereas <i>B. saxatilis</i> can also be cleistogamous."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Gaur, R. D., Tiwari, P., Tiwari, J. K., Rawat, D. S., & Ballabha, R. (2014). Bee forage potential of Garhwal Himalaya, India. Indian Journal of Fundamental and Applied Life Sciences, 4, 196-204	"Table 1: Checklist of the bee forage plants from Garhwal Himalaya, India" [Includes <i>Barleria cristata</i> . Attracts bees]
	Bhalchandra, W., Baviskar, R. K., & Nikam, T. B. (2014). Diversity of nectariferous and polleniferous bee flora at Anjaneri and Dugarwadi hills of Western Ghats of Nasik district (MS) India. Journal of Entomology and Zoology Studies, 2(4), 244-249	[ <i>Barleria cristata</i> visited for nectar and pollen] "The present investigation was conducted to study the diversity of nectariferous and polleniferous bee flora and to develop a floral calendar for Anjaneri and Dugarwadi hills. The flowering plants were visited and observed for the presence and foraging activities of honeybees. Plants were scored as bee foraging species when at least three honeybees had visited to the flowers within the period of 10 minutes. The results revealed that 52 plant species were useful to honeybees, out of which 29 were agricultural crops and 23 wild plants. The identified flora was further grouped into pollen, nectar and both pollen and nectar yielding plants. Mid-December to February and mid-July to September were identified as honey flow periods and mid-April to mid-June were the critical dearth periods during the year. Based on the availability, utility status and flowering duration of flora, floral calendar was developed for the study area."
	Steentoft, M. 1988. Flowering Plants in West Africa. Cambridge University Press, Cambridge, UK	[Family Description] "Pollination is by long-tongued insects, whether the corolla is gullet-shaped or tubular."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	<i>B. cristata</i> spreads mostly by stolons (Swarbrick, 1997). This species is dispersed long distances mostly by people who use the plant as an ornamental (Flora of China Editorial Committee, 2015). Stem fragments and stolons can be spread in dumped garden waste, and by water, soil movements, and vehicles."

Qsn #	Question	Answer
607	Minimum generative time (years)	
	Source(s)	Notes
	Gilman, E. F. & Landrum, L. 2014. <i>Baleria cristata</i> . Philippine Violet. FPS60. Revised. University of Florida, IFAS, Gainesville, FL. <a href="http://edis.ifas.ufl.edu">http://edis.ifas.ufl.edu</a> . [Accessed 17 Dec 2018]	"Growth rate: fast"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>B. cristata</i> spreads mostly by stolons (Swarbrick, 1997). This species is dispersed long distances mostly by people who use the plant as an ornamental (Flora of China Editorial Committee, 2015). Stem fragments and stolons can be spread in dumped garden waste, and by water, soil movements, and vehicles."
	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	"The seeds have unusual hairs that swell when wetted, becoming slimy, mucilaginous, and sticky." [Presumably aids in external attachment]
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"Winter hardy to USDA Zones 9-11 where this small shrub (or subshrub) is typically found growing along roadsides, slopes, and streambanks, but also in some xeric sites." [Occurs in heavily trafficked areas]

702	Propagules dispersed intentionally by people	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 cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i."
	Csurhes, S. & Edwards, R. 1998. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	"The <i>Barleria</i> genus is comprised of shrubby and herbaceous species native to tropical and mild temperate areas (Ellison 1995). They reproduce by seeds or soft wood cuttings. At least three species are currently sold as garden ornamentals. <i>B. cristata</i> ('Philippine violet') and <i>B. lupulina</i> are small, bushy shrubs growing to c. 1 m tall. <i>B. cristata</i> is native to India (Bodkin 1986). <i>B. lupulina</i> has small thorns and produces erect, yellow flower heads. It is widely sold by nurseries and has escaped from gardens. The plants appears to favour riparian vegetation."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"The species spreads by seeds and rhizomes and thus it has the capability to escape and colonize new habitats. Stem segments and stolons can also be dispersed as a contaminant of soil and as a garden-waste." [Possibly Yes]

704	Propagules adapted to wind dispersal	
-----	--------------------------------------	--

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Dave's Garden. (2018). <i>Barleria</i> Species, Bluebell <i>Barleria</i> , Crested Philippine Violet, Enana, Philippine Violet - <i>Barleria cristata</i> . <a href="https://davesgarden.com/guides/pf/go/2401/">https://davesgarden.com/guides/pf/go/2401/</a> . [Accessed 17 Dec 2018]	[Not specifically adapted for wind dispersal, but wind may aid in dispersal of explosively dehiscent seeds] "The seedpods (seed pods) are found hidden amongst the dried bracts. They are black (or dark, dark brown), 5/8 of an inch long by 1/8 of an inch wide, and quite hard. Inside the seedpods are 2 roundish lighter colored seeds. They have a spring action mechanism that disperses the seeds from the seedpods after the seedpods dry and crack open"

705	Propagules water dispersed	y
	<b>Source(s)</b>	<b>Notes</b>
	CABI. 2018. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>B. cristata</i> spreads mostly by stolons (Swarbrick, 1997). This species is dispersed long distances mostly by people who use the plant as an ornamental (Flora of China Editorial Committee, 2015). Stem fragments and stolons can be spread in dumped garden waste, and by water, soil movements, and vehicles."
	Csurhes, S. & Edwards, R. 1998. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	"The plants appears to favour riparian vegetation."
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"Winter hardy to USDA Zones 9-11 where this small shrub (or subshrub) is typically found growing along roadsides, slopes, and streambanks, but also in some xeric sites." [Occurs in riparian areas]

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. <i>Flora of China</i> . Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Capsule 1.2–1.8 cm, glabrous, 4-seeded. Seeds subglobose to ovoid, 4–5 × ca. 4 mm." [No evidence. Not fleshy-fruited]

707	Propagules dispersed by other animals (externally)	
	<b>Source(s)</b>	<b>Notes</b>
	CABI. 2018. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>B. cristata</i> spreads mostly by stolons (Swarbrick, 1997). This species is dispersed long distances mostly by people who use the plant as an ornamental (Flora of China Editorial Committee, 2015). Stem fragments and stolons can be spread in dumped garden waste, and by water, soil movements, and vehicles." [Seeds could possibly adhere to animals]
	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 seeds have unusual hairs that swell when wetted, becoming slimy, mucilaginous, and sticky." [Presumably aids in external attachment]

708	Propagules survive passage through the gut	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Capsule 1.2–1.8 cm, glabrous, 4-seeded. Seeds subglobose to ovoid, 4–5 × ca. 4 mm." [No evidence of consumption, and no adaptations to attract frugivores. Unlikely to be internally dispersed]

801	Prolific seed production (>1000/m2)	n
	Source(s)	Notes
	Whistler, W.A. 2000. Tropical Ornamentals: A Guide. Timber Press, Portland, OR	"Fruit a flattened ovoid capsule, infrequently formed in cultivation" [Suggests seed production is limited]
	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	"Philippine-violet is usually propagated by stem or tip cuttings." [Seed production may be limited in cultivation]

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2018) Seed Information Database (SID). Version 7.1. Available from: <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 17 Dec 2018]	Unknown. No storage information for <i>Barleria cristata</i> . Other species have orthodox seeds, which may indicate that species in this genera could form persistent soil seed banks.

803	Well controlled by herbicides	
	Source(s)	Notes
	Technigro. 2010. The Vegetation Manager - March. <a href="http://www.technigro.com.au/documents/MarchTVM.pdf">www.technigro.com.au/documents/MarchTVM.pdf</a>	[Herbicides used on related species. Effectiveness unknown] "For this particular species, documentation on the use of herbicides for control has proven difficult to find however treatment using Starane has proven to be successful on the infestation found in Kuraby. There is also information available for similar species belonging to the same genus. Research suggests that control of coral creeper is also likely to be achieved using a range of other herbicides including Glyphosate, 2,4-D or Fluroxypyr. Application methods may include cut & swab, stem scraping and leaf wiping or foliar spray. For the latter, the use of a suitable non-ionic surfactant is recommended due to the glossy nature of the leaves. Within Queensland, the APVMA's Environmental Weeds Permit PER11463 ( <a href="http://permits.apvma.gov.au/PER11463.PDF">http://permits.apvma.gov.au/PER11463.PDF</a> ) covers the use of these herbicides in an appropriate, non-crop situation. Before applying these methods of control within other state boundaries, it is recommended that you consult any relevant permits and government legislation."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	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	"An adaptable subject for the garden, this ever-blooming plant requires regular trimming to maintain a compact, bushy habit and prevent legginess."

Qsn #	Question	Answer
	Missouri Botanical Garden. (2018). <i>Barleria cristata</i> . <a href="https://www.missouribotanicalgarden.org">https://www.missouribotanicalgarden.org</a> . [Accessed 17 Dec 2018]	"Prune to desired shape. Cut back stems in spring (sometimes to the ground) to promote a bushy rounded growth. Shrubs may survive winter in Zone 8, but to facilitate this climate, stems should be cut back to the ground when winter frosts kill the tops, with application of mulch to the root zone for winter (mound of sand covered with a layer of pine straw)."
	Konsam, B., Phartyal, S. S., Kumar, M., & Todaria, N. P. (2017). Life after Fire for Understory Plant Community in Subtropical Chir Pine Forest of Garhwal Himalaya. <i>Indian Forester</i> , 143(8), 759-766	"Table 3: Post-fire regeneration pattern (R= re-sprouted and S= seed origin) represented by emerged seedlings in burned sites. Symbol "*" represents re-sprouted individuals after a forest fire." [ <i>Barleria cristata</i> - re-sprouted]

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, but apparently not limiting ability to spread in Hawaiian Islands] "in Hawai'i cultivated for hedges and borders (Neal, 1965), now naturalized in dry habitats on Kaua'i, O'ahu and Hawai'i."



**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Naturalized on Kauai, Oahu, Maui, Molokai and Hawaii (Hawaiian Islands) and elsewhere
- A disturbance weed with possible impacts to agriculture and the natural environment
- Other *Barleria* species have become invasive
- Spinose bracts
- Shade tolerant
- Tolerates many soil types
- Can form dense stands (Hawaiian Islands)
- Seeds dispersed by explosive dehiscence of capsules, as well as secondarily by water, and possibly by attachment to people, animals or machinery
- Able to spread vegetatively by branches that root when touching the ground
- Can be spread by discarded garden clippings
- Able to resprout after cutting, pruning or fire

## Low Risk Traits

- Non-toxic
- Valued for ornamental and medicinal uses