Taxon: Barleria lupulina Lindl. **Family:** Acanthaceae

Common Name(s): hophead Philippine violet
hop-headed barleria

Synonym(s): Barleria macrostachya Bojer
Barleria monostachya Bojer ex
Barleria norbertii Benoist

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 20 Nov 2019

WRA Score: 15.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Tropical Shrub, Naturalized, Environmental Weed, Spiny, Dense Stands

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	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic	y=1, n=0	y
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		
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		

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	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	y
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
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**
	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	[No evidence] "Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). 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**
	Sankar, R. V., & Ravikumar, K. (2004). First report of Barleria lupulina Lindl.(Acanthaceae) from southern India. Zoos' Print Journal, 19(5), 1484	"This species is native of Mauritius. In India, it has been recorded in the states of Uttar Pradesh (Rajagopal & Panigrahi, 1965; Sharma & Pandey, 1984), Bihar (Haines, 1922), Orissa (Haines, 1922) and Madhya Pradesh (Khanna et al., 1997) where it is reported to be running wild and occasionally planted also. This species has not been recorded so far from the southern Indian states of Goa, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. In Maharashtra, it is reported to be grown occasionally in gardens (Cooke, 1967) and there is no other further records in the recent floras of the state. In Sri Lanka, it is cultivated as a hedge plant (Cramer, 1998)."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Sankar, R. V., & Ravikumar, K. (2004). First report of Barleria lupulina Lindl.(Acanthaceae) from southern India. Zoos' Print Journal, 19(5), 1484	"This species is native of Mauritius."

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Dave's Garden. (2019). Hophead, Philippine Violet. Barleria lupulina. https://davesgarden.com/guides/pf/go/55520/. [Accessed 18 Nov 2019]	"Hardiness: USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"In Australia, it can be also found growing along roadsides and disturbed areas up to 300 m (1000 ft) elevation."

204	**Native or naturalized in regions with tropical or subtropical climates**	**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	"Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."
	Shendage, S. M., & Yadav, S. R. (2010). Revision of the genus Barleria (Acanthaceae) in India. Rheedea, 20(2), 81-130	"Distribution: Native of Mauritius. India: Bihar, Himachal Pradesh, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh and West Bengal. Cultivated in gardens also found as an escape."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 18 Nov 2019]	"Native Africa WESTERN INDIAN OCEAN: Madagascar Cultivated (also cult. in tropics) Naturalized (widely natzd. in tropics)"
	Sankar, R. V., & Ravikumar, K. (2004). First report of Barleria lupulina Lindl.(Acanthaceae) from southern India. Zoos' Print Journal, 19(5), 1484	"This species is native of Mauritius. In India, it has been recorded in the states of Uttar Pradesh (Rajagopal & Panigrahi, 1965; Sharma & Pandey, 1984), Bihar (Haines, 1922), Orissa (Haines, 1922) and Madhya Pradesh (Khanna et al., 1997) where it is reported to be running wild and occasionally planted also. This species has not been recorded so far from the southern Indian states of Goa, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. In Maharashtra, it is reported to be grown occasionally in gardens (Cooke, 1967) and there is no other further records in the recent floras of the state. In Sri Lanka, it is cultivated as a hedge plant (Cramer, 1998). Recently, it has been collected from Pudukkottai, Sivagangai, Tiruchirappalli and Tiruvannamalai districts of Tamil Nadu. It is observed that this species is wild in Pachchaimalai Hills of Tiruchirappalli District (Charles, pers. comm.). It is planted in the demogardens of Gandeepam MPCP in Sivagangai District and Pichandikulam MPCP, Auroville, Villupuram District, Tamil Nadu, where it has reached a height of about 3m. It is found wild in wastelands and along waysides near Meyyur Village in Tiruvannamalai District and near Kothavalampatty Village in Pudhukkottai District."

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	"Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."

Qsn #	Question	Answer
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 18 Nov 2019]	"Cultivated (also cult. in tropics) Naturalized (widely natzd. in tropics)"
	Queensland Government. (2019). Weeds of Australia. Barleria lupulina. http://keyserver.lucidcentral.org. [Accessed 18 Nov 2019]	"Naturalised in some parts of northern Australia (i.e. in the coastal districts of the Northern Territory and in northern and south-eastern Queensland). Also naturalised on Christmas Island and possibly naturalised in the northern parts of Western Australia. Naturalised overseas in south-eastern USA (i.e. Florida), Hawaii, Indonesia and East Timor."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Barleria lupulina Lindl. Acanthaceae Total N° of Refs: 36 Global Risk Score: 2.88 Rating: Low Habit: Shrub Preferred Climate/s: Subtropical, Tropical Origin: Africa, E Asia Major Pathway/s: Herbal, Ornamental Dispersed by: Humans, Escapee References: Guyana-NW-32, Australia-W- 93, Australia-E-155, southeast Asia-W-191, United States of America-CE-617, Africa- W-760, United States of America-N-101, United States of America-W-179, Australia-C-401, Pacific-E-621, Australia- N-310, Australia-N-868, Australia-N-354, Australia-W-1068, Australia, northern-EN- 1183, United States of America-Q-1197, Australia-W-1210, Indo-Pacific-N-1256, La Reunion-N-1321, French Guiana-N- 1346, Global-I-1404, Australia-E-1456, Australia-N-1491, Global-CD-1611, Eastern Caribbean-N-1742, Global-N-85, Australia-W-1977, Brunei Darussalam-W- 1977, Burkina Faso-W-1977, Democratic Republic of the Congo-W-1977, Fiji-W-1977, India-W-1977, Micronesia (Federated States of)-W-1977, Palau-W- 1977, Venezuela-W-1977, Global--1324."
	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	"Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil." … "Cultivated in Hawai'i since at least 1950, it has been collected a few times in settings that suggest that it escapes from cultivation."
	Queensland Government. (2019). Weeds of Australia. Barleria lupulina. http://keyserver.lucidcentral.org. [Accessed 19 Nov 2019]	"Naturalised in some parts of northern Australia (i.e. in the coastal districts of the Northern Territory and in northern and south-eastern Queensland). Also naturalised on Christmas Island and possibly naturalised in the northern parts of Western Australia. Naturalised overseas in south-eastern USA (i.e. Florida), Hawaii, Indonesia and East Timor."
	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.	"Neal (1965) states that another species, Barleria prionitis L., has escaped from cultivation in Hawai'i; however, we have not seen any evidence of this. She probably was referring to B. lupulina Lind!., a spinose shrub with yellow corollas ca. 2-2.5 cm long that is sometimes cultivated in Hawai'i and may sometimes escape. A population opposite Halawa Beach Park, O'ahu, in a kiawe thicket apparently represents an escape."

Qsn #	Question	Answer
	Sankar, R. V., & Ravikumar, K. (2004). First report of Barleria lupulina Lindl.(Acanthaceae) from southern India. Zoos' Print Journal, 19(5), 1484	"This species is native of Mauritius. In India, it has been recorded in the states of Uttar Pradesh (Rajagopal & Panigrahi, 1965; Sharma & Pandey, 1984), Bihar (Haines, 1922), Orissa (Haines, 1922) and Madhya Pradesh (Khanna et al., 1997) where it is reported to be running wild and occasionally planted also. This species has not been recorded so far from the southern Indian states of Goa, Karnataka, Kerala, Tamil Nadu and Andhra Pradesh. In Maharashtra, it is reported to be grown occasionally in gardens (Cooke, 1967) and there is no other further records in the recent floras of the state. In Sri Lanka, it is cultivated as a hedge plant (Cramer, 1998). Recently, it has been collected from Pudukkottai, Sivagangai, Tiruchirappalli and Tiruvannamalai districts of Tamil Nadu. It is observed that this species is wild in Pachchaimalai Hills of Tiruchirappalli District (Charles, pers. comm.). It is planted in the demogardens of Gandeepam MPCP in Sivagangai District and Pichandikulam MPCP, Auroville, Villupuram District, Tamil Nadu, where it has reached a height of about 3m. It is found wild in wastelands and along waysides near Meyyur Village in Tiruvannamalai District and near Kothavalampatty Village in Pudhukkottai District."

302	Garden/amenity/disturbance weed	
	Source(s)	**Notes**
	Dave's Garden. (2019). Hophead, Philippine Violet. Barleria lupulina. https://davesgarden.com/guides/pf/go/55520/. [Accessed 19 Nov 2019]	[May be weedy in landscapes. Reported as an environmental weed in Australia] "Self-sows freely; deadhead if you do not want volunteer seedlings next season" … "On May 4, 2007, timrann from Other, Mauritius wrote: Barleria Lupulina is also native to Mauritius, it grows in the wild in the northern part of the island in alkaline and dry places. Tend to be invasive but could be controlled without much difficulty."

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**
	Queensland Government. (2019). Weeds of Australia. Barleria lupulina. http://keyserver.lucidcentral.org. [Accessed 18 Nov 2019]	"This species is regarded as an environmental weed or as a "sleeper weed" in many parts of northern Australia (i.e. Queensland, the Northern Territory and northern Western Australia). For example, it is listed as a high priority pest plant in the Cook Shire in northern Queensland. Hophead barleria (Barleria lupulina) is also invasive in open woodland habitats and along watercourses in the Northern Territory and was also recently reported as being invasive in one location at Brookfield, in suburban Brisbane, in south-eastern Queensland. It has since been targeted for eradication at this location, due to the potential of this species becoming a serious environmental weed in the region."

Qsn #	Question	Answer
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."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Barleria prionitis … Weed of: Pastures"
	CRC Weed Management. (2003). Weed Management Guide. Barleria or porcupine flower (Barleria prionitis). https://www.environment.gov.au. [Accessed 19 Nov 2019]	"Barleria, or porcupine flower, is on the Alert List for Environmental Weeds, a list of 28 non-native plants that threaten biodiversity and cause other environmental damage. Although only in the early stages of establishment, these weeds have the potential to seriously degrade Australia's ecosystems. Barleria has spread into natural ecosystems from gardens and the improper disposal of garden waste. It has the potential to cause economic and environmental damage by forming dense thickets that displace native vegetation and prevent revegetation by native plants. Thickets can impede the movement of stock, restrict access to waterways and reduce the aesthetic values of natural bushland."

401	**Produces spines, thorns or burrs**	**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	"a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."
	Oakman, H.1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Has spikes of small yellow flowers surrounded by needle-thin spines."
	Shendage, S. M., & Yadav, S. R. (2010). Revision of the genus Barleria (Acanthaceae) in India. Rheedea, 20(2), 81-130	"Shrubs, perennial, erect, up to 2 m high, armed. Stems terete, glabrous, dark brown; thorns simple, 2 – 4 in each axil, c. 2 cm long, reflexed, white."

402	**Allelopathic**	**y**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Poonpaiboonpipat, T. (2017). Allelopathic Effect of Barleria lupulina Lindl. on Germination and Seedling Growth of Pigweed and Barnyardgrass. Naresuan University Journal: Science and Technology, 25(4), 44-50	"This study aimed to evaluate on an allelopathic potential and its chemical basis of Barleria lupulina Lindl., a traditional medicinal plant in Thailand. Pigweed (Amaranthus spinosus L.) and barnyard grass (Echinochloa crus-galli (L.) Beauv.) were used as test species. Aqueous extract of different parts at concentrations of 25, 50, 75 and 100 mg/mL was assayed on a seed germination and seedling growth of the test species. The leaf extract significantly showed the highest inhibitory activity of germination and seedling growth of the test species, followed by stems and roots respectively. The leaf selected on partially isolation of active compounds by acid-base partitioning method. Crude 70% aqueous-ethanol extract of leaf was further separated into acidic fraction (AE), neutral fraction (NE) and aqueous fraction (AQ). The fractions were assayed on the test species at the concentrations of 2,500, 5,000, 7,500 and 10,000 ppm. The inhibitory activity was significance depending on fractions and concentrations. NE fraction showed the most inhibition on germination and seedling growth of pigweed and barnyard grass followed by AE and AQ respectively. The inhibitory effect increased with increasing concentration. Pigweed were more susceptible to the fractions than barnyard grass. These results indicated that B. lupilina contained growth inhibitory substances and possess allelopathic activity. Then, partially isolation of active compounds showed NE fraction had the most effect. The results lead for further identification of allelochemicals and development into natural herbicides for sustainable agriculture."

403	Parasitic	n
	Source(s)	**Notes**
	Biswal, A., Mohapatra, A., & Reddy, C. S. (2008). 19. Barleria Lupulina Lindl. (Acanthaceae) - An Addition To the Flora of Orissa, India. J. Bombay Nat. Hist. Soc, 105(2): 231-232	"Undershrubs up to 1 m; young branches tetragonous." [Acanthaceae. No evidence]

404	Unpalatable to grazing animals	
	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	[Palatability unknown, but spines may deter browsing] "This species bears sharp spines at its leaf bases which may cause mechanical injury."

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] "Roots for jaundice, abdominal pain, insect poisoning, toothache, antisnake venom. Leaves and roots chewed against toothache. Crushed leaves applied to cure fresh cuts, wounds, ulcers and to stop bleeding; a poultice of the leaves put on bites of insects, snakes or dogs, as an antiinflammatory."
	NIH U.S. National Library of Medicine. (2019). TOXNET Toxicology Data Network. https://toxnet.nlm.nih.gov/. [Accessed 20 Nov 2019]	No evidence

406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	The Garden Geeks. (2019). Barleria lupulina. http://thegardengeeks.net/plant-guide/8222-barleria-lupulina. [Accessed 20 Nov 2019]	"Pests and Diseases: Susceptible to aphids, spider mites, whiteflies, bacterial leaf spot, fungal spots and stem galls."
	Aguilar, N.O. (2001). Barleria 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. prota4u.org/prosea	[Possibly] "Barleria is attacked by several leaf-spot fungi, including Alternaria tenuis, and also the leaf-spot bacterium Pseudomonas cichorri. It is also a host for the mycoplasma-like disease of Santalum album L. in India, which causes little-leaf disease. Many Barleria pests are known in India, especially the larvae of the lepidopterous insects Syngamia latimarginalis and Spilosoma obliqua (synonym Diacrisia obliqua) and the Barleria lacebug (Habrochila laeta), but also the nematode Aphelenchoides fragariae, and leaf galls induced by Ferrisia virgata (Coccidae), causing abnormal rolling and twisting."

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] "Roots for jaundice, abdominal pain, insect poisoning, toothache, antisnake venom. Leaves and roots chewed against toothache. Crushed leaves applied to cure fresh cuts, wounds, ulcers and to stop bleeding; a poultice of the leaves put on bites of insects, snakes or dogs, as an antiinflammatory."
	NIH U.S. National Library of Medicine. (2019). TOXNET Toxicology Data Network. https://toxnet.nlm.nih.gov/. [Accessed 20 Nov 2019]	No evidence

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Queensland Government. (2019). Weeds of Australia. Barleria lupulina. http://keyserver.lucidcentral.org. [Accessed 20 Nov 2019]	[Unknown, but fire not listed among potential impacts] "This species is regarded as an environmental weed or as a "sleeper weed" in many parts of northern Australia (i.e. Queensland, the Northern Territory and northern Western Australia). For example, it is listed as a high priority pest plant in the Cook Shire in northern Queensland. Hophead barleria (Barleria lupulina) is also invasive in open woodland habitats and along watercourses in the Northern Territory and was also recently reported as being invasive in one location at Brookfield, in suburban Brisbane, in south-eastern Queensland. It has since been targeted for eradication at this location, due to the potential of this species becoming a serious environmental weed in the region."
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	Unknown. Not listed among impacts

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Oakman, H.1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Seeds profusely; hardy in most soils, in sun or shade"
	Dave's Garden. (2019). Hophead, Philippine Violet. Barleria lupulina. https://davesgarden.com/guides/pf/go/55520/. [Accessed 19 Nov 2019]	"Sun Exposure: Full Sun Sun to Partial Shade"
	The Garden Geeks. (2019). Barleria lupulina. http://thegardengeeks.net/plant-guide/8222-barleria-lupulina. [Accessed 19 Nov 2019]	"Under glass, grow in soil based potting mix with additional well rotted compost, in full light, but shaded from hottest sunlight."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Dave's Garden. (2019). Hophead, Philippine Violet. Barleria lupulina. https://davesgarden.com/guides/pf/go/55520/. [Accessed 20 Nov 2019]	"Soil pH requirements: 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral) 7.6 to 7.8 (mildly alkaline) 7.9 to 8.5 (alkaline)"
	The Garden Geeks. (2019). Barleria lupulina. http://thegardengeeks.net/plant-guide/8222-barleria-lupulina. [Accessed 20 Nov 2019]	"Soil Type: Prefers fertile, moist, but well drained soil"

411	Climbing or smothering growth habit	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	"a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."

Qsn #	Question	Answer
412	**Forms dense thickets**	**y**
	Source(s)	**Notes**
	March, N. & Wharton, P. (2015). Priority weeds of the Southern Gulf region of Queensland ~ a field guide. Southern Gulf NRM, Mount Isa, Australia	"Barleria lupulina & Barleria prionitis … Forms dense thickets which out-compete pastures and reduce the biodiversity of native ground cover vegetation."

501	Aquatic	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	[Terrestrial] "Mauritius. Shrub, many-branched, axillary spines, flowers in small terminal spikes, corolla lobes orange-yellow, capsule ovoid, in secondary bushland and thickets, moist soil"

502	Grass	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 19 Nov 2019]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Barlerieae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2019). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 19 Nov 2019]	Family: Acanthaceae Subfamily: Acanthoideae Tribe: Barlerieae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	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	"a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."

601	Evidence of substantial reproductive failure in native habitat	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	[No evidence] "Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil."

602	Produces viable seed	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Biswal, A., Mohapatra, A., & Reddy, C. S. (2008). 19. Barleria Lupulina Lindl. (Acanthaceae) - An Addition To the Flora of Orissa, India. J. Bombay Nat. Hist. Soc, 105(2): 231-232	"Capsule c. 1.5 cm long, ovoid, compressed, beak rigid. Seeds appressed hairy."
	Oakman, H.1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Seeds profusely"
	Dave's Garden. (2019). Hophead, Philippine Violet. Barleria lupulina. https://davesgarden.com/guides/pf/go/55520/. [Accessed 19 Nov 2019]	"Self-sows freely; deadhead if you do not want volunteer seedlings next season"

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Krishnaswami, S., & Menon, P. M. (1974). Cytomorphological study on some species and an interspecific hybrid of Barleria L. Cytologia, 39(3), 397-402	[Unknown for Barleria lupulina. Barriers to hybridization exist, but interspecific hybridization is possible for other species in some circumstances] "The species B. mysorensis and B. noctiflora are sympatric in distribution, but rarely or never form hybrids in nature. Similarly, the other two species B. cristata and B. prionitis favoured under cultivation also exhibit isolation barriers between them. Cross pollination between these two species resulted in the non development of capsules." … "On the contrary, B. cristata and B. mysorensis yield a few capsules but the seeds are ill developed and do not germinate. In the crosses of B. cristata and B. noctiflora, however, the seeds obtained germinate well but the seedlings does not survive. Thus the crossability barrier appears to have been more developed between B. cristata and B. prionitis than between B. cristata and other two species, B. mysorensis and B. noctiflora." … "The interspecific hybrid secured between B. prionitis and B. noctiflora was vigorous with profuse branches and it had a greater number and large sized flowers with a long blooming period. The hybrid had the same chromosome number (2n= 40) as that of the parents and the meiosis was normal. The gross homology of the genomes of the two species is evident from the chromosome association in the hybrid. The female fertility of this hybrid was, however, considerably reduced and the causes of female sterility appeared to be complex. The barrier to isolation in different species studied were mainly in the nature of cross-incompatibility mechanism. This mechanism appeared to be incompletely developed and reinforced by hybrid inviability. The possibility of producing interspecific hybrids offers scope for artificial introgression. The interspecific hybrid reported herein has greater ornamental attributes than the existing forms."

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Martín-Bravo, S., & Daniel, T. F. (2016). Molecular evidence supports ancient long-distance dispersal for the amphi-Atlantic disjunction in the giant yellow shrimp plant (Barleria oenotheroides). American Journal of Botany, 103(6), 1103-1116	[Unknown. Self-compatibility documented in other Barleria species] "Like most other species of Acanthaceae tested to date, B. oenotheroides is self-compatible and highly autogamous (Daniel, 1998 , unpublished data). Th us, single seeds or plants are potentially capable of establishing new populations."
	Makholela, T. M., Van der Bank, F. H., & Balkwill, K. 2004. Allozyme variation in Barleria saxatilis (Acanthaceae) is lower than in two congeneric endemics. South African Journal of Botany, 7 (4): 515-520	[Unknown. Self-compatibility documented in other Barleria species] "The type of breeding system obtained from P:O was facultative autogamy in all the three Barleria species. Cruden's (1977) outcrossing index indicated B. greenii to be partially self-compatible, outcrossing and with a demand for pollinators. The same was also observed in B. argillicola and B. saxatilis, but it was also observed that B. argillicola can be self-compatible with some demand for pollinators whereas B. saxatilis can also be cleistogamous."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Kumar, D., Sharma, V., & Bharti, U. (2015). Mapping of medicinal flora as honey bee forage. Journal of Entomology and Zoology Studies, 3(6), 235-238	"Table 1: Diversity of Nectariferous Medicinal Bee flora of Chandigarh" [Includes Barleria lupulina]
	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. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"B. lupulina spread by seeds and vegetatively by stem segments. Seeds are spread short distances from the mother-plant when the “explosive” capsules rupture. They are also dispersed by water and by humans as ornamental plantings and in discarded garden refuse (Smith, 2002). "
	Aguilar, N.O. (2001). Barleria 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. prota4u.org/prosea	"Barleria is propagated by seed and stem cuttings. Seeds germinate readily within 7 days after sowing."

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Shendage, S. M., & Yadav, S. R. (2010). Revision of the genus Barleria (Acanthaceae) in India. Rheedea, 20(2), 81-130	"Shrubs, perennial, erect, up to 2 m high, armed." [Time to maturity unknown]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"

Qsn #	Question	Answer
	March, N. & Wharton, P. (2015). Priority weeds of the Southern Gulf region of Queensland ~ a field guide. Southern Gulf NRM, Mount Isa, Australia	"The seeds may be spread short distances when capsules burst open. Seeds are also dispersed by water movement and as a contaminant in mud on vehicles."

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	"At least two other species of Barleria are likely to be encountered in gardens from time to time. Barleria lupulina Lindley, native to Madagascar and India and widely naturalized elsewhere, is a purplish-stemmed shrub several feet call with slender, paired spines at each leaf axil. The oblong to narrowly elliptic leaves reach 6" in length but are usually less than 1" wide, glossy darker green on the upper side and paler below; the inflorescence bracts are green with reddish apexes, the flowers yellow to creamy orange. Cultivated in Hawai'i since at least 1950, it has been collected a few times in settings that suggest that it escapes from cultivation."
	Csurhes, S. & Edwards, R. 1998. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	"B. lupulina has small thorns and produces erect, yellow flower heads. It is widely sold by nurseries and has escaped from gardens."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Escapee"
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"
	March, N. & Wharton, P. (2015). Priority weeds of the Southern Gulf region of Queensland ~ a field guide. Southern Gulf NRM, Mount Isa, Australia	"The seeds may be spread short distances when capsules burst open. Seeds are also dispersed by water movement and as a contaminant in mud on vehicles."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"
	March, N. & Wharton, P. (2015). Priority weeds of the Southern Gulf region of Queensland ~ a field guide. Southern Gulf NRM, Mount Isa, Australia	"The seeds may be spread short distances when capsules burst open. Seeds are also dispersed by water movement and as a contaminant in mud on 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	[No adaptation for wind dispersal.] "Acanthaceae have explosive capsules, armed with hook like structures that propel the seeds out of the capsule. Seeds of the genus Barleria have unusual hairs that swell when wetted, becoming slimy, mucilaginous, and sticky."

705	Propagules water dispersed	y

Qsn #	Question	Answer
	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. lupulina 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."
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"

707	Propagules dispersed by other animals (externally)	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	"Acanthaceae have explosive capsules, armed with hook like structures that propel the seeds out of the capsule. Seeds of the genus Barleria have unusual hairs that swell when wetted, becoming slimy, mucilaginous, and sticky."
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	"Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Smith, N.M. (2002). Weeds of the Wet/Dry Tropics of Australia -a Field Guide. Environment Centre NT, Inc., Darwin, N.T.	[No evidence of consumption] "Seed is spread short distances when capsules rupture and by water. Spread by humans as ornamental plantings and in discarded garden refuse"

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Oakman, H.1995. Harry Oakman's what flowers when: the complete guide to flowering times in tropical and subtropical gardens. Univ. of Queensland Press, St. Lucia, Australia	"Seeds profusely." [Densities unknown]

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Royal Botanic Gardens Kew. (2019) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed]	Unknown. No storage information for Barleria lupulina. Other species have orthodox seeds, which may indicate that species in this genera could form persistent soil seed banks.

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	CRC Weed Management. (2003). Weed Management Guide. Barleria or porcupine flower (Barleria prionitis). https://www.environment.gov.au. [Accessed 20 Nov 2019]	[Other species successfully controlled with herbicides] "Physical and chemical control have been successfully used to control barleria. In the Katherine region, where several small infestations were present, herbicides were applied to the areas most infested with barleria by spraying whole plants from a pneumatic 7-litre backpack handsprayer. Isolated plants were removed by hand."
	Northern Territory Government. (2018). Northern Territory Weed Management Handbook. Department of Environment and Natural Resources, Palmerston NT	The following herbicides, rates, and applications are recommended to control Barleria prionitis and Barleria lupulina: Chemical and concentration = 2, 4-D amine 625 g/L Various trade names - Rate = 320 mL / 100 L; Weed growth stage, method and comments = Seedling or adult (individuals or infestation): Foliar spray – apply when actively growing; Chemical and concentration = Fluroxypyr 200 g/L Various trade names; Rate = 500 mL / 100 L; Chemical and concentration = Seedling or adult (individuals or infestation): Foliar spray – apply when actively growing For boom rate contact WMB

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	CABI. (2019). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Tolerates, or benefits from, cultivation, browsing pressure, mutilation, fire etc"

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	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	[Unknown] "Cultivated in Hawai'i since at least 1950, it has been collected a few times in settings that suggest that it escapes from cultivation."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Escaped, and possible naturalized on Oahu (Hawaiian Islands); widely naturalized elsewhere
• An environmental weed in Australia, competing with native vegetation
• Other Barleria species are invasive
• Armed with spines at leaf axils
• Allelopathic
• Tolerates many soil types
• Forms dense thickets that exclude other vegetation
• Reproduces by seeds and vegetatively by stem fragments
• Seeds dispersed short distances when capsules rupture, by water, and intentionally planted by people
• Also dispersed by dumped garden waste
• Tolerates cutting and fire

Low Risk Traits
• Cultivated in Hawaiian Islands since 1950, but only reported to be escaped on Oahu
• Non-toxic
• Valued as an ornamental
• Herbicides may provide effective control