Taxon: Solanum robustum H. L. Wendl. **Family:** Solanaceae

Common Name(s): shrubby nightshade
silverleaf nightshade

Synonym(s): Solanum alatum Seem. & J. C. [illegible]

Assessor: Chuck Chimera **Status:** In Progress **End Date:** 17 Aug 2021

WRA Score: 10.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Naturalized Shrub, Weedy, Prickly, Fleshy-fruited, Zoochorous

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)		
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)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
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		
405	Toxic to animals		
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
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)		
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	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
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)	y=1, n=-1	n
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	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
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	n
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.	[No evidence] "Native to South America, widely grown in botanical gardens, occasionally grown as a novelty because of its handsome leaves and winged petioles and stems"

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**High**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 17 Aug 2021]	"Native: Southern America Brazil: Brazil - Bahia, - Espirito Santo, - Minas Gerais, - Parana, - Rio de Janeiro, - Santa Catarina, - Sao Paulo Southern South America: Argentina - Chaco, - Corrientes, - Formosa, - Misiones; Paraguay"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 17 Aug 2021]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	
	Source(s)	**Notes**
	Dave's Garden. (2021). Shrubby Nightshade 'Green-leaved variety' - Solanum robustum. http://davesgarden.com/guides/pf/go/210284/. [Accessed 17 Aug 2021]	"Hardiness: USDA Zone 9b: to -3.8 °C (25 °F) USDA Zone 10a: to -1.1 °C (30 °F) USDA Zone 10b: to 1.7 °C (35 °F) USDA Zone 11: above 4.5 °C (40 °F)"
	Tropicos.org. (2021). Missouri Botanical Garden. http://www.tropicos.org/. [Accessed 17 Aug 2021]	May have a broad elevation range, but could be dependent on latitude. Collected at an elevation of 1602 m in Tanzania, but at a latitude of 04°46'S. Within its native distribution, collected from 45 m (27°09'S, Paraguay) to 870 m (23°11'S, Brazil).

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to South America, widely grown in botanical gardens, occasionally grown as a novelty because of its handsome leaves and winged petioles and stems; in Hawai'i naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui. First collected in 1977 (Hobdy 288, BISH)."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 17 Aug 2021]	"Native: Southern America Brazil: Brazil - Bahia, - Espirito Santo, - Minas Gerais, - Parana, - Rio de Janeiro, - Santa Catarina, - Sao Paulo Southern South America: Argentina - Chaco, - Corrientes, - Formosa, - Misiones; Paraguay"

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	DAISIE. (2009). Handbook of alien species in Europe Volume 3 of Invading nature. Springer Science + Business Media B.V.	"A Solanum robustum" [A Alien taxon from outside Europe]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans References: Brazil-W-362, Brazil-W-407, Global-XZW-85, United States of America-N-101, New Zealand-UW-280, Canary Islands-N-637, United States of America-N-301, North America-X-790, United States of America-N-839, United States of America-X-229, New Zealand-U-919, Europe-N-819, United States of America-N-1292, La Reunion-AW-1321, Global-W-1324, Global-I-1404, New Zealand-U-2048, Spain-W-1977."
	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 South America, widely grown in botanical gardens, occasionally grown as a novelty because of its handsome leaves and winged petioles and stems;"
	Tassin, J., Riviere, J.-N., Cazanove, M. & Bruzzese, E. (2006). Ranking of invasive woody plant species for management on Reunion Island. Weed Research, 46(5): 388-403	"Table 1 Woody non-indigenous plants to Reunion Island and their invasive status" [Solanum robustum - Invasiveness = known as a coloniser in Reunion Island]

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	West African Plants A Photo Guide. (2021). Solanum robustum. http://www.westafricanplants.senckenberg.de/root/index.php?page_id=14&id=3433. [Accessed 17 Aug 2021]	"cultivated + escaped, native of Brazil, Paraguay, Argentina"
	Healy, A.J. (1982). Identification of weeds and clovers, 3rd edition. NZ Weed and Pest Control Society, Auckland	"Grown as an ornamental overseas, this species was found as a casual at Mt Wellington, Auckland, by the late M. Hodgkins, exact date uncertain, probably in the 1930s. (Brazil.)"
	Vorontsova, M. (2010). NaturePlus - Observing species differences in the West Usambara forest. https://www.nhm.ac.uk/natureplus/blogs/wildspiny/tags/_robustum.html. [Accessed 17 Aug 2021]	"I have been working on many herbarium specimens of Solanum usambarense, but I was not sure whether it was the same species as Solanum anguivi or whether it was really different. Today we searched for Solanum usambarense and I was finally able to solve this problem. Both species were growing together in the forest understorey of a Prunus africana plantation heavily invaded by Solanum robustum. The two species were consistency different from each other even though they grew together, and I could confirm the things I observed in the herbarium: Solanum usambarense has more flowers, its pedicels are always recurved, and it is more hairy."
	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 naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui."
	Ade, M. (2021). Invasive Species Field Coordinator (Plants) Maui Invasive Species Committee. pers. comm. 12 August	"Solanum robustum is moving along Hana Highway from Kailua west and was found at Maliko Gulch along Hana Highway."

Qsn #	Question	Answer
	Conservatoire et Jardin botaniques & South African National Biodiversity Institute. (2012). African Plant Database - Solanum robustum H.L. Wendl. http://www.ville-ge.ch. [Accessed 17 Aug 2021]	"Status for NA : accepted (naturalised-introduced)"
	Tassin, J., Riviere, J.-N., Cazanove, M. & Bruzzese, E. (2006). Ranking of invasive woody plant species for management on Reunion Island. Weed Research, 46(5): 388-403	"Table 1 Woody non-indigenous plants to Reunion Island and their invasive status" [Solanum robustum - Invasiveness = known as a coloniser in Reunion Island]
	Knapp, S., Vorontsova, M. S., & Särkinen, T. (2019). Dichotomous keys to the species of Solanum L. (Solanaceae) in continental Africa, Madagascar (incl. the Indian Ocean islands), Macaronesia and the Cape Verde Islands. PhytoKeys, 127, 39–76	"Young stems and petioles noticeably winged; mature fruit densely pubescent; invasive plant in Tanzanian highlands and South Africa" [Solanum robustum]
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	Solanum robustum - Casual

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Rodrigues, R. R., Martins, S. V., & Matthes, L. H. F. (2005). Post- fire regeneration in a semideciduous mesophytic forest, south- eastern Brazil. New research on forest ecosystems. New York, Nova Science Publishers, 1-19	"Other pioneer species besides R. communis and T. micrantha that also colonized the area quickly, such as S. parahyba, Solanum robustum H.L. Wendl., Croton piptocalyx Müll. Arg., Vernonia polyanthes Less. and Solanum pycnanthemum Mart., did not present regeneration by resprouting after the fire." [Solanum robustum is a pioneer species]

303	Agricultural/forestry/horticultural weed	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 naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui. First collected in 1977 (Hobdy 288, BISH)." [Occurrence in pastures could impact ranching]
	POWO (2021). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. http://plantsoftheworldonline.org/. [Accessed 17 Aug 2021]	"Solanum robustum has been introduced into Africa from S America and is commonly known as the White Potato. Although cultivated as an ornamental this species has become a troublesome weed as an escape from cultivation in T 3 and T 6. Solitary plants of S. robustum have been reported but it often grows in groups which can form impenetrable masses of viciously spiny vegetation."
	Vorontsova, M. (2010). NaturePlus - Observing species differences in the West Usambara forest. https://www.nhm.ac.uk/natureplus/blogs/wildspiny/tags/_robustum.html. [Accessed 17 Aug 2021]	[Invading plantations] "Both species were growing together in the forest understorey of a Prunus africana plantation heavily invaded by Solanum robustum"
	Hawaii Administrative Rules. (2021). Title 4. Department of Agriculture. Subtitle 6. Division of Plant Industry. Chapter 68 Noxious Weed Rules. https://hdoa.hawaii.gov/admin-rules/. [Accessed 17 Aug 2021]	Hawaii State-listed Noxious Weeds include: Solanum carolinense L., Solanum elaeagnifolium Cav., Solanum robustum Wendl. & Solanum torvum Sw. [Presumably impacts agriculture, or the natural environment]

Qsn #	Question	Answer
304	**Environmental weed**	**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.	"in Hawai'i naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	[No evidence] "References: Brazil-W-362, Brazil-W-407, Global-XZW-85, United States of America-N-101, New Zealand-UW-280, Canary Islands-N-637, United States of America-N-301, North America-X-790, United States of America-N-839, United States of America-X-229, New Zealand-U-919, Europe-N-819, United States of America-N-1292, La Reunion-AW-1321, Global-W-1324, Global-I-1404, New Zealand-U-2048, Spain-W-1977."

305	**Congeneric weed**	**y**
	Source(s)	**Notes**
	USDA-APHIS. (2010). Federal Noxious Weed List. https://www.aphis.usda.gov. [Accessed 17 Aug 2021]	Federal noxious weeds include: Solanum tampicense, Solanum torvum & Solanum viarum
	Hawaii Administrative Rules. (2021). Title 4. Department of Agriculture. Subtitle 6. Division of Plant Industry. Chapter 68 Noxious Weed Rules. https://hdoa.hawaii.gov/admin-rules/. [Accessed 17 Aug 2021]	Hawaii State-listed Noxious Weeds include: Solanum carolinense L., Solanum elaeagnifolium Cav., Solanum robustum Wendl. & Solanum torvum Sw.
	Weber, E. (2003). Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	Solanum laxum. Solanum linnaeanum, Solanum mauritianum, Solanum nigrum, Solanum tampicense, Solanum viarum listed as weeds of natural areas

401	**Produces spines, thorns or burrs**	**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.	"Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long, base up to 6 mm wide, densely pubescent with stellate hairs on stems and upper and lower leaf surface along veins, ferruginous on younger shoots; stems strongly winged from the decurrent bases of the leaves, wings leafy, 2-15 mm wide. Leaves with lower surface paler than upper surface, simple, alternate, ovate in outline but with 2-4 triangular lobes on each margin, sinuses cut 1/3 to midvein, juvenile leaves up to 30 cm long and 28 cm wide, later leaves ovate in outline, ca. 15 cm long and 10 cm wide, lobes 2-4 cm long, sinuses rounded, apex acute, base truncate to subcordate, oblique and continued down the petiole as a leafy wing, petioles 2-8 cm long."

402	**Allelopathic**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown

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.	"Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long, base up to 6 mm wide..." [Solanaceae. No evidence]

404	**Unpalatable to grazing animals**	
	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 prickles may deter browsing] "Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long ... in Hawai'i naturalized in guava-infested cattle pastures"

405	**Toxic to animals**	
	Source(s)	**Notes**
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence, but several other Solanum species are reported to be toxic

406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown

407	**Causes allergies or is otherwise toxic to humans**	
	Source(s)	**Notes**
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence, but several other Solanum species are reported to be toxic

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**
	Rodrigues, R. R., Martins, S. V., & Matthes, L. H. F. (2005). Post- fire regeneration in a semideciduous mesophytic forest, south- eastern Brazil. New research on forest ecosystems. New York, Nova Science Publishers, 1-19	[Unknown] "Other pioneer species besides R. communis and T. micrantha that also colonized the area quickly, such as S. parahyba, Solanum robustum H.L. Wendl., Croton piptocalyx Müll. Arg., Vernonia polyanthes Less. and Solanum pycnanthemum Mart., did not present regeneration by resprouting after the fire. This indicates that these species used as regeneration strategy the germination of seeds that were already in the soil and resisted the fire action or that arrived in the area after the fire event, from other areas of the fragment less affected by the fire, or nearby fragments."

409	**Is a shade tolerant plant at some stage of its life cycle**	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Dave's Garden. (2021). Shrubby Nightshade 'Green-leaved variety' - Solanum robustum. http://davesgarden.com/guides/pf/go/210284/. [Accessed 17 Aug 2021]	"Sun Exposure: Full Sun Sun to Partial Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	**Notes**
	Dave's Garden. (2016). Shrub Nightshade - Solanum robustum. http://davesgarden.com/guides/pf/go/31888/. [Accessed 17 Aug 2021]	"Soil pH requirements: 5.6 to 6.0 (acidic) 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)"

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.	"Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long, base up to 6 mm wide, densely pubescent with stellate hairs on stems and upper and lower leaf surface along veins, ferruginous on younger shoots; stems strongly winged from the decurrent bases of the leaves, wings leafy, 2-15 mm wide. Leaves with lower surface paler than upper surface, simple, alternate, ovate in outline but with 2-4 triangular lobes on each margin, sinuses cut 1/3 to midvein, juvenile leaves up to 30 cm long and 28 cm wide, later leaves ovate in outline, ca. 15 cm long and 10 cm wide, lobes 2-4 cm long, sinuses rounded, apex acute, base truncate to subcordate, oblique and continued down the petiole as a leafy wing, petioles 2-8 cm long."

412	Forms dense thickets	y
	Source(s)	**Notes**
	POWO (2021). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. http://plantsoftheworldonline.org/. [Accessed 17 Aug 2021]	"Solitary plants of S. robustum have been reported but it often grows in groups which can form impenetrable masses of viciously spiny vegetation. These spines and the dense ferrugineous pubescence composed of varied and complex hairs characterise this species."

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 shrub] "Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long" ... "in Hawai'i naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui."

Qsn #	Question	Answer
502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 17 Aug 2021]	Genus: Solanum Subgenus: Leptostemonum Section: Erythrotrichum Family: Solanaceae Subfamily: Solanoideae Tribe: Solaneae

Qsn #	Question	Answer
503	**Nitrogen fixing woody plant**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 17 Aug 2021]	Genus: Solanum Subgenus: Leptostemonum Section: Erythrotrichum Family: Solanaceae Subfamily: Solanoideae Tribe: Solaneae

Qsn #	Question	Answer
504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Shrubs up to 2 m tall, armed with strong, straight or slightly recurved, flattened prickles up to 12 mm long, base up to 6 mm wide"

Qsn #	Question	Answer
601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Native to South America, widely grown in botanical gardens,"

Qsn #	Question	Answer
602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Berries yellowish, globose, 1.2-2 cm in diameter, persistently pubescent, pedicels 1-2 cm long, calyx not much enlarged, reflexed. Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate"

Qsn #	Question	Answer
603	**Hybridizes naturally**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown. Interspecific hybridization documented in genus

604	**Self-compatible or apomictic**	**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.	"Self-compatible"

605	**Requires specialist pollinators**	**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.	"Flowers perfect, actinomorphic, in unarmed, racemose cymes up to 10 cm long, extra-axillary, peduncle to first flower 1.5-2.5 cm long, pedicels ca. 1 cm long; calyx tube 2-3 mm long, the lobes ovate-lanceolate, 7-10 mm long; corolla stellate, deeply divided, the lobes lanceolate, 10 15 mm long, 5-8 mm wide, densely pubescent externally; stamens equal, inserted near base of corolla tube; filaments 1-3 mm long; anthers lanceolate, 5-7 mm long, opening by apical pores; ovary globose, densely pubescent; style I, erect, 9-11 mm long, exceeding anthers, pubescent in lower part; stigma terminal." ... "Self-compatible"

606	**Reproduction by vegetative fragmentation**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown

607	**Minimum generative time (years)**	**1**
	Source(s)	**Notes**
	Dave's Garden. (2021). Shrubby Nightshade 'Green-leaved variety' - Solanum robustum. http://davesgarden.com/guides/pf/go/210284/. [Accessed 17 Aug 2021]	"On Sep 21, 2014, scirpidiella from Pińczów, Poland (Zone 6b) wrote: ... Very ornamental variety native to Brazil, can be grown outside in zone 6 (as annual) and warmer (first ripe fruits fall down after 9 months from germination of seeds). "

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence. No means of external attachment] "Berries yellowish, globose, 1.2-2 cm in diameter, persistently pubescent, pedicels 1-2 cm long, calyx not much enlarged, reflexed. Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate."

702	**Propagules dispersed intentionally by people**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"widely grown in botanical gardens, occasionally grown as a novelty because of its handsome leaves and winged petioles and stems"

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	No evidence, but small seeds could possibly become a produce contaminant if cultivated with other fruits & vegetables

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Berries yellowish, globose, 1.2-2 cm in diameter, persistently pubescent, pedicels 1-2 cm long, calyx not much enlarged, reflexed. Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate"

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Mikich, S. B., & Silva, S. M. (2001). Composição florística e fenologia das espécies zoocóricas de remanescentes de Floresta Estacional Semidecidual no centro-oeste do Paraná, Brasil. Acta Botanica Brasilica 15(1): 89-113	[No evidence. Fleshy-fruited & adapted for zoochory] "Table 1. Zoochorous species of four semi-deciduous forest remnants of the midwestern region of Parana and their characteristics and phenology"

706	Propagules bird dispersed	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.	"Berries yellowish, globose, 1.2-2 cm in diameter, persistently pubescent, pedicels 1-2 cm long, calyx not much enlarged, reflexed. Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate"
	Chiarini, F. E., & Barboza, G. E. (2007). Patrones de placentación y número de semillas en frutos de especies sudamericanas de Solanum subgen. Leptostemonum (Solanaceae). Darwiniana, nueva serie, 45(2), 163-174	"It is interesting to at least speculate about the means of dispersal of the species here studied, since number and type of seeds, color and especially, size, are important factors in determining the dispersal agents (Van der Pijl, 1982). On one hand, species with big, fleshy fruits (i.e. S. alternatopinnatum, S. robustum, S. lycocarpum, S. quitoense) would be adapted to be dispersed by large vertebrates, such as mammals or parrots."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	**n**
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence, and no means of external attachment] "Berries yellowish, globose, 1.2-2 cm in diameter, persistently pubescent, pedicels 1-2 cm long, calyx not much enlarged, reflexed. Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate"

708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Mikich, S. B., & Silva, S. M. (2001). Composição florística e fenologia das espécies zoocóricas de remanescentes de Floresta Estacional Semidecidual no centro-oeste do Paraná, Brasil. Acta Botanica Brasilica 15(1): 89-113	[Presumably yes. Fleshy-fruited & adapted for zoochory] "Table 1. Zoochorous species of four semi-deciduous forest remnants of the midwestern region of Parana and their characteristics and phenology"

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Densities unknown] "Seeds numerous, brown, compressed, subreniform, ca. 1.4 mm long, foveolate"

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Rodrigues, R. R., Martins, S. V., & Matthes, L. H. F. (2005). Post- fire regeneration in a semideciduous mesophytic forest, south- eastern Brazil. New research on forest ecosystems. New York, Nova Science Publishers, 1-19	[Seed longevity unknown. May regenerate after fires from seed bank] "Other pioneer species besides R. communis and T. micrantha that also colonized the area quickly, such as S. parahyba, Solanum robustum H.L. Wendl., Croton piptocalyx Müll. Arg., Vernonia polyanthes Less. and Solanum pycnanthemum Mart., did not present regeneration by resprouting after the fire. This indicates that these species used as regeneration strategy the germination of seeds that were already in the soil and resisted the fire action or that arrived in the area after the fire event, from other areas of the fragment less affected by the fire, or nearby fragments."
	Royal Botanic Gardens Kew. (2021) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 17 Aug 2021]	Unknown. Many species of Solanum have orthodox seeds

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	Loh, R. K., Tunison, T., Zimmer, C., Mattos, R., & Benitez, D (2014). A review of invasive plant management in Special Ecological Areas, Hawai 'i Volcanoes National Park, 1984-2007. Technical Report 187. Pacific Cooperative Studies Unit, University of Hawaii, Honolulu, HI	[Herbicides to control Solanum pseudocapsicum would likely be effective on S. robustum] "Table 2. Herbicide Control Methods for Target Invasive Weeds" [Solanum pseudocapsicum - Herbicide Control Method = 1% Garlon 4 Foliar]

Qsn #	Question	Answer
	Motooka, P., Castro, L., Nelson, D., Nagai, G. & Ching,L. (2003). Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI	[Herbicides to control Solanum torvum would likely be effective on S. robustum] "Sensitive to foliar-applied triclopyr and soil-applied tebuthiuron"
	Swarbrick, J.T. 1997. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	[Herbicides to control Solanum torvum would likely be effective on S. robustum] "Susceptible to translocated herbicides, including glyphosate, 2,4-D, picloram and triclopyr applied to the foliage for freshly-cut stumps at standard rates"

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**n**
	Source(s)	**Notes**
	Rodrigues, R. R., Martins, S. V., & Matthes, L. H. F. (2005). Post- fire regeneration in a semideciduous mesophytic forest, south- eastern Brazil. New research on forest ecosystems. New York, Nova Science Publishers, 1-19	[Does not resprout after fire] "Other pioneer species besides R. communis and T. micrantha that also colonized the area quickly, such as S. parahyba, Solanum robustum H.L. Wendl., Croton piptocalyx Müll. Arg., Vernonia polyanthes Less. and Solanum pycnanthemum Mart., did not present regeneration by resprouting after the fire. This indicates that these species used as regeneration strategy the germination of seeds that were already in the soil and resisted the fire action or that arrived in the area after the fire event, from other areas of the fragment less affected by the fire, or nearby fragments."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	[Unknown] "in Hawai'i naturalized in guava-infested cattle pastures, ca. 230 m, only in Kailua Gulch, Maui. First collected in 1977 (Hobdy 288, BISH)."

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Naturalized on Maui, Hawaiian Islands and possibly elsewhere
• A Hawaii state noxious weed, invading pastures
• Other Solanum species have become invasive
• Armed with strong prickles
• Forms impenetrable thickets
• Reproduces by seeds
• Self-compatible
• Can reach reproductive maturity in <1 year
• Seeds dispersed by birds, frugivorous mammals and intentionally by people

Low Risk Traits
• Ornamental (widely grown in botanical gardens, occasionally grown as a novelty because of handsome leaves and winged petioles and stems)
• Herbicides may provide effective control