

Family: Solanaceae
Taxon: Solanum mauritianum
Synonym: Solanum auriculatum

Common Name: bugtree
wild tobacco-tree
liusboom
cuvitinga
couvetinga
fumeira
fumo-bravo

Questionnaire :	current 20090513	Assessor:	Patti Clifford	Designation: H(HPWRA)
Status:	Assessor Approved	Data Entry Person:	Patti Clifford	WRA Score 24
101	Is the species highly domesticated?		y=-3, n=0	n
102	Has the species become naturalized where grown?		y=1, n=-1	
103	Does the species have weedy races?		y=1, n=-1	
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)	
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)	y
305	Congeneric weed		n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs		y=1, n=0	n
402	Allelopathic		y=1, n=0	
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	
406	Host for recognized pests and pathogens		y=1, n=0	
407	Causes allergies or is otherwise toxic to humans		y=1, n=0	y
408	Creates a fire hazard in natural ecosystems		y=1, n=0	

409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	y=1, n=-1	
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
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	y
702	Propagules dispersed intentionally by people	y=1, n=-1	n
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	y
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	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)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	
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)	y=-1, n=1	

Designation: H(HPWRA)

WRA Score 24

Supporting Data:

101	2010. WRA Specialist. Personal Communication.	No evidence of domestication.
201	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/genus.pl?1738	Brazil - Espirito Santo, Minas Gerais, Parana, Rio Grande do Sul, Rio de Janeiro, Santa Catarina, Sao Paulo; Argentina - Buenos Aires; Uruguay
202	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/genus.pl?1738	Brazil - Espirito Santo, Minas Gerais, Parana, Rio Grande do Sul, Rio de Janeiro, Santa Catarina, Sao Paulo; Argentina - Buenos Aires; Uruguay
203	1972. Roe, K.E.. A revision of <i>Solanum</i> section <i>Brevantherum</i> (Solanaceae). <i>Brittonia</i> . 24: 239-278.	"A species of disturbed forest openings, roadsides, or field borders, <i>S. mauritianum</i> is found from sea level to 2000 m. It may occur sporadically or in large thickets and has become a troublesome weed in some areas of Australia."
203	1999. McGregor, P.G.. Prospects for biological control of woolly nightshade, <i>Solanum mauritianum</i> (Solanaceae: Solanoideae). Landcare Research,	<i>Solanum mauritianum</i> 's distribution on the South Island New Zealand is constrained by several factors: it is frost-sensitive; it seldom establishes in dense vegetation, most commonly establishes in areas of open gorse but rarely in native vegetation other than occasional occurrences in manuka; and soil conditions may also limit its ability to infest new areas.
203	2010. Efloras. Madagascar catalogue: <i>Solanum mauritianum</i> Scop.. Efloras.org, http://www.efloras.org/florataxon.aspx?flora_id=12&taxon_id=242425634	Elevation (m): 500-999, 1000-1499.
204	2010. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/cgi-bin/npgs/html/genus.pl?1738	Brazil - Espirito Santo, Minas Gerais, Parana, Rio Grande do Sul, Rio de Janeiro, Santa Catarina, Sao Paulo; Argentina - Buenos Aires; Uruguay
205	1972. Roe, K.E.. A revision of <i>Solanum</i> section <i>Brevantherum</i> (Solanaceae). <i>Brittonia</i> . 24: 239-278.	" <i>Solanum mauritianum</i> is a native of Uruguay and southeastern Brazil, but now it is introduced into Africa, India, Australia, and the islands of the Atlantic, Indian, and Pacific Oceans. It was possibly first introduced to Africa, Madagascar, Mauritius, and India by way of the Portuguese trade route, Manila-Sao Paulo-Capetown-Goa, beginning in the early 16th century."
301	1995. Wagner, W.L./Herbst, D.R.. Contributions to the flora of Hawaii. IV. New records and name changes. Bishop Museum Occasional Paper. 42: 14-15. http://hbs.bishopmuseum.org/pdf/OP42.pdf	<i>Solanum mauritianum</i> is naturalized on Oahu on slopes and ridges in disturbed wet forest and near sea level in a koa haole thicket, 200-450 m. First collected in 1909.
302	2003. Weber, E.. <i>Invasive Plant Species of the World. A Reference Guide to Environmental Weeds..</i> CABI Publishing, Wallingford, UK	Primarily invades disturbed sites. Grass and heathland, riparian habitats, wet forests, coastal beaches. [scored as and environmental weed]
303	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	" <i>Solanum mauritianum</i> Scop. is rated the worst invader species in pine plantations throughout the Republic of South Africa. Control is costly and apparently ineffectual since the species is spreading in pine plantations at a rate of 16% per annum. This is due to the high reproductive potential of the species."
304	1999. McGregor, P.G.. Prospects for biological control of woolly nightshade, <i>Solanum mauritianum</i> (Solanaceae: Solanoideae). Landcare Research,	<i>Solanum mauritianum</i> is widely established in New Zealand and is a serious environmental weed in northern areas of the country. It forms dense infestations and spreads rapidly. The cost of control is prohibitive, as even after areas are cleared it regenerates from seed for many years.
305	2009. Tscheulin, T./Petanidou, T./Potts, S.G./Settele, J.. The impact of <i>Solanum elaeagnifolium</i> , an invasive plant in the Mediterranean, on the flower visitation and seed set of the native co-flowering species <i>Glaucium flavum</i> . <i>Plant Ecology</i> . 205: 77-85.	<i>Solanum elaeagnifolium</i> is invasive in the Mediterranean region, where it lowers crop yield through competition, contaminates hay, and is toxic to grazing animals.
401	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. <i>Manual of the flowering plants of Hawaii</i> . Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	No spines, thorns, burrs.

402	2004. Van Den Bosch, E./Ward, B.G./Clarkson, B.D.. Woolly nightshade (<i>Solanum mauritianum</i>) and its allelopathic effects on New Zealand native <i>Hebe stricta</i> seed germination. New Zealand Plant Protection. 57: 98-101.	"Trials investigating possible allelopathic effects of woolly nightshade on seed germination of the native shrub <i>Hebe stricta</i> were carried out over a 22-day period. In this trial, seeds were germinated on filter paper saturated with various concentrations of woolly nightshade leaf, stem and root leachates or rainwater. Rainwater was used as a control treatment to simulate field conditions. Results show woolly nightshade does have significant allelopathic effects: 54% of seeds treated with rainwater germinated compared to 0% of seeds treated with 100% leaf leachate concentration." [not a field study]
403	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Not parasitic.
404	2007. Meat & Livestock Australia Limited. Weed control using goats: a guide to using goats for weed control in pastures. Meat & Livestock Australia Limited, http://www.mla.com.au/CustomControls/PaymentGateway/ViewFile.aspx?zSr+u1kXsUiXaXG0nSz13MyVoBdsj7M	Moderate palatability to goats.
405	1999. McGregor, P.G.. Prospects for biological control of woolly nightshade, <i>Solanum mauritianum</i> (Solanaceae: Solanoideae). Landcare Research,	<i>Solanum mauritianum</i> is suspected to be toxic to stock animals.
406	2010. WRA Specialist. Personal Communication.	Unknown.
407	1999. McGregor, P.G.. Prospects for biological control of woolly nightshade, <i>Solanum mauritianum</i> (Solanaceae: Solanoideae). Landcare Research,	<i>Solanum mauritianum</i> is recognized as a potential hazard to human health, irritating the skin and respiratory tract and sometimes causing nausea when handled. Its berries are considered poisonous. [However, no toxicity is mentioned in PubMed or Toxnet]
407	2010. Queensland Government. Fact sheet Pest Plant: wild tobacco <i>Solanum mauritianum</i> . Queensland Government, http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Wild-Tobacco-PP104.pdf	All parts of the plants are poisonous to humans especially the berries. "Be aware that some people react to the fine hairs that become airborne when working with this weed. Cover your arms and mouth."
408	2010. WRA Specialist. Personal Communication.	Unknown.
409	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.. CABI Publishing, Wallingford, UK	Shade tolerant.
410	2010. Queensland Government. Fact sheet Pest Plant: wild tobacco <i>Solanum mauritianum</i> . Queensland Government, http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Wild-Tobacco-PP104.pdf	<i>Solanum mauritianum</i> is tolerant of a variety of soils.
411	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Shrub or small trees 2-4 m tall.
412	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.. CABI Publishing, Wallingford, UK	Forms dense thickets shading out all other vegetation.
501	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Terrestrial.
502	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Solanaceae.

503	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Solanaceae.
504	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Shrub or small tree.
601	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	No evidence.
602	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	"S. mauritianum seeds require the presence of both light and alternating temperatures for optimum germination. Transfer of seeds from unfavourable to optimum conditions or the application of gibberellic acid (GA $\sb3$) can promote high germination percentages. However, the germination requirements of S. mauritianum are highly variable. Germination is influenced by site, season and year of seed shed. Seeds varied in terms of primary dormancy; conditional dormancy; the response to transfer from unfavourable to favourable conditions; the response to application of GA $\sb3$; and the occurrence of secondary dormancy. Germination requirements of seeds were also influenced by site, duration and depth of burial. All these factors contribute to a sporadic seedling emergence over a prolonged period, which results in current control operations being both costly and ineffective."
603	1972. Roe, K.E.. A revision of <i>Solanum</i> section <i>Brevantherum</i> (Solanaceae). <i>Brittonia</i> . 24: 239-278.	A type specimen of <i>Solanum mauritianum</i> is unknown. <i>S. mauritianum</i> and <i>S. granusoso-leprosum</i> appear to intergrade in southeastern Brazil, judging from herbarium specimens. Some specimens of possible hybrid origin show high pollen stainability while others appear nearly sterile.
604	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Self-compatible.
605	2006. Gikungu, M.W.. Bee diversity and some aspects of their ecological interactions with plants in a successional tropical community. Rheinischen Friedrich-Wilhelms-Universität Bonn, http://deposit.ddb.de/cgi-bin/dokserv?idn=980943205&dok_var=d1&dok_ext	This study on bee diversity and their ecological interactions in the Kakamega Forest, Kenya indicated that <i>Solanum mauritianum</i> is pollinated by a wide variety of bee species including: <i>Anthophora affvestita</i> , <i>Apis mellifera</i> , <i>Braunsapis</i> sp., <i>Meliponula bocaudei</i> , <i>Meliponula lendliana</i> , <i>Braunsapis foveata</i> , <i>Ceratina</i> spp. and others.
606	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	Reproduces by seed.
607	1999. McGregor, P.G.. Prospects for biological control of woolly nightshade, <i>Solanum mauritianum</i> (Solanaceae: Solanoideae). Landcare Research,	<i>Solanum mauritianum</i> grows quickly and can flower and fruit within one year of germination.
701	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	" <i>Solanum mauritianum</i> Scop. is rated the worst invader species in pine plantations throughout the Republic of South Africa. Control is costly and apparently ineffectual since the species is spreading in pine plantations at a rate of 16% per annum. This is due to the high reproductive potential of the species."
702	2010. WRA Specialist. Personal Communication.	No evidence of intentional dispersal.
703	2009. MAF biosecurity New Zealand import health standard BNZ.GCFP.PHR importation of grains/seeds for consumption, feed or processing plant health requirements. MAF Biosecurity New Zealand, http://members.wto.org/crnattachments/2009/sps/NZL/09_2123_00_e .	"The following weed seeds are prohibited. All consignments of imported grains must be managed according to the phytosanitary requirements specified in the specific schedules for entry (refer to Section 3) and MAF Biosecurity New Zealand Standard: Grain for Processing, Import System Requirements." [<i>Solanum mauritianum</i> is listed as a prohibited plant that contaminates grain]
704	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Fruit a berry. [no adaptation for wind dispersal]

705	1992. Carr, G.W./Yugovic, J.V./Robinson, K.E.. Environmental weed invasions in Victoria conservation and management implications. Department of Conservation and Environment, East Melbourne	Dispersed by birds and water.
705	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.. CABI Publishing, Wallingford, UK	Primarily invades disturbed sites. Grass and heathland, riparian habitats, wet forests, coastal beaches.
706	1992. Carr, G.W./Yugovic, J.V./Robinson, K.E.. Environmental weed invasions in Victoria conservation and management implications. Department of Conservation and Environment, East Melbourne	Dispersed by birds and water.
706	2003. Florentin, S.K./Craig, M./Westbrooke, M.E.. Flowering, fruiting, germination and seed dispersal of the newly emerging weed <i>Solanum mauritianum</i> Scop. (Solanaceae) in the wet tropics of north Queensland. Plant Protection Quarterly. 18: 116-120.	In this study on the seed dispersal of <i>Solanum mauritianum</i> in north Queensland, five bird species were noted as dispersing the seed.
707	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Fruit a berry. [no adaptation for external attachment]
708	2003. Florentin, S.K./Craig, M./Westbrooke, M.E.. Flowering, fruiting, germination and seed dispersal of the newly emerging weed <i>Solanum mauritianum</i> Scop. (Solanaceae) in the wet tropics of north Queensland. Plant Protection Quarterly. 18: 116-120.	In this study on the seed dispersal of <i>Solanum mauritianum</i> in north Queensland, five bird species were noted as dispersing the seed.
801	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	<i>S. mauritianum</i> produces fruits throughout the year. Fruit and seed yield is related to tree size. <i>S. mauritianum</i> produced approximately 7.2 million viable seeds per hectare during 20 months when growing under conditions unfavourable for growth.
801	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.. CABI Publishing, Wallingford, UK	"Each berry contains numerous seeds of 1.5-2 mm length.
802	1991. Campbell, P.L.. Reproductive potential of <i>Solanum mauritianum</i> Scop.: implications for control. University of Natal (South Africa),	" <i>S. mauritianum</i> seeds require the presence of both light and alternating temperatures for optimum germination. Transfer of seeds from unfavourable to optimum conditions or the application of gibberellic acid (GA) can promote high germination percentages. However, the germination requirements of <i>S. mauritianum</i> are highly variable. Germination is influenced by site, season and year of seed shed. Seeds varied in terms of primary dormancy; conditional dormancy; the response to transfer from unfavourable to favourable conditions; the response to application of GA; and the occurrence of secondary dormancy. Germination requirements of seeds were also influenced by site, duration and depth of burial. All these factors contribute to a sporadic seedling emergence over a prolonged period, which results in current control operations being both costly and ineffective."
802	2008. Witkowski, E.T.F./Garner, R.D.. Seed production, seed bank dynamics, resprouting and long-term response to clearing of the alien invasive <i>Solanum mauritianum</i> in a temperate to subtropical riparian ecosystem. South African Journal of Botany. 74: 476-	"This study assessed the aerial cover and density of <i>S. mauritianum</i> , prior to and after Working for Water (WfW) clearing on the Sabie River, in both higher altitude grassland and lower altitude savanna reaches, using 40, 50 x 20 m (modified Whittaker) plots. Seed persistence increased with depth of burial and was higher under canopy shade versus 'open' in the field. Seed half life ranged 11-16 months. Hence seedling emergence from the dense relatively long-lived seed bank is a considerable challenge."
803	2010. Queensland Government. Fact sheet Pest Plant: wild tobacco <i>Solanum mauritianum</i> . Queensland Government, http://www.dpi.qld.gov.au/documents/Biosecurity_EnvironmentalPests/IPA-Wild-Tobacco-PP104.pdf	There are a number of herbicides registered for control in Queensland, Australia. [no mention of control effectiveness]
804	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds.. CABI Publishing, Wallingford, UK	"Seed germination is enhanced after fire, and fire leads to mass germination, resulting in a dense cover of seedlings. The shrub resprouts prolifically from the base and trunk if damaged."

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| 804 | 2008. Witkowski, E.T.F./Garner, R.D.. Seed production, seed bank dynamics, resprouting and long-term response to clearing of the alien invasive <i>Solanum mauritianum</i> in a temperate to subtropical riparian ecosystem. South African Journal of Botany. 74: 476- | "This study assessed the aerial cover and density of <i>S. mauritianum</i> , prior to and after Working for Water (WfW) clearing on the Sabie River, in both higher altitude grassland and lower altitude savanna reaches, using 40, 50 x 20 m (modified Whittaker) plots. High proportions of cut <i>S. mauritianum</i> resprouted after clearing (40–80%). Cutting lower on the stem increased mortality substantially, with cutting lower than 18 cm resulting in 100% mortality, while cutting above 50 cm resulted in 100% resprouting recovery. Variation in basal stem (stump) diameter of cut plants had no effect on survival." |
| 805 | 2010. WRA Specialist. Personal Communication. | Unknown. |
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