

Australia/New Zealand Weed Risk Assessment adapted for United States.

Data used for analysis published in: Gordon, D.R. and C.A. Gantz. 2008. Potential impacts on the horticultural industry of screening new plants for invasiveness. Conservation Letters 1: 227-235. Available at: <http://www3.interscience.wiley.com/cgi-bin/fulltext/121448369/PDFSTART>

<i>Strychnos toxifera</i>			
Question number	Question	Answer	Score
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to U.S. climates (USDA hardiness zones; 0-low, 1-intermediate, 2-high)	1	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	n	0
2.04	Native or naturalized in regions with an average of 11-60 inches of annual precipitation	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	?	
3.01	Naturalized beyond native range	n	-1
3.02	Garden/amenity/disturbance weed	n	0
3.03	Weed of agriculture	n	0
3.04	Environmental weed	n	0
3.05	Congeneric weed	n	0
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic		
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals		
4.05	Toxic to animals	y	1
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans	?	
4.08	Creates a fire hazard in natural ecosystems		
4.09	Is a shade tolerant plant at some stage of its life cycle	?	
4.1	Grows on one or more of the following soil types: alfisols, entisols, or mollisols	y	1
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets		

5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	?	
6.03	Hybridizes naturally		
6.04	Self-compatible or apomictic		
6.05	Requires specialist pollinators	?	
6.06	Reproduction by vegetative fragmentation		
6.07	Minimum generative time (years)		
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n	-1
7.02	Propagules dispersed intentionally by people	n	-1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	n	-1
7.05	Propagules water dispersed		
7.06	Propagules bird dispersed	?	
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	?	
8.01	Prolific seed production		
8.02	Evidence that a persistent propagule bank is formed (>1 yr)		
8.03	Well controlled by herbicides		
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05	Effective natural enemies present in U.S.		
Total Score			-2

Outcome	Accept
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section	# questions answered	satisfy minimum?
A	10	Yes
B	5	Yes
C	10	Yes
total	25	yes

Data collected 2008

Question number	Reference	Source data
1.01		used horticulturally, but no evidence of significant modification
1.02		
1.03		
2.01	1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif). 2. Fanshawe D.B. (1954) The genus <i>Strychnos</i> in British Guiana. <i>Brittonia</i> 8(1): 65-68. 3. Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field Museum of Natural History. 4. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?312989). 5. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	1. Global hardiness zones 12-13. 2. "Generally distributed throughout the colony [British Guiana, now Guyana]...also in Panama, Venezuela, Guiana [now Suriname], Brazil, and Ecuador." 3. "Peru (doubtless; also at least in Colombia)...To Panama and the Guianas" 4. Mesoamerica: Panama; Western South America: Colombia. 5. "Costa Rica to Ecuador and Amazonian Brazil. In Panama, known from tropical moist forest in the Canal Zone, San Blas, and Darién." [distribution lies in the tropics]
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Fanshawe D.B. (1954) The genus <i>Strychnos</i> in British Guiana. <i>Brittonia</i> 8(1): 65-68. 3. Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field Museum of Natural History. 4. USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm	1. 2-3 climatic regions, although 3 does not seem as likely. 2. "Generally distributed throughout the colony [British Guiana, now Guyana]...also in Panama, Venezuela, Guiana [now Suriname], Brazil, and Ecuador." 3. "Peru (doubtless; also at least in Colombia)...To Panama and the Guianas" 4. Mesoamerica: Panama; Western South America: Colombia [At least 3 biomes]. 5. "Costa Rica to

	Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?312989). 5. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	Ecuador and Amazonian Brazil. In Panama, known from tropical moist forest in the Canal Zone, San Blas, and Darién."
2.04	1. Atlapedia Online (http://www.atlapedia.com/online/countries/). 2. World Trade Press (http://www.worldtradeexpress.com/Precipitation_Map_Ecuador.html). 3. World Trade Press (http://www.worldtradeexpress.com/Precipitation_Map_Colombia.html).	1. For Panama: average annual precipitation varies from 1,780 mm (70 inches) to 2,540 (100 inches) depending on the region; For Venezuela: the wet season is from May to November with an average annual precipitation varying from 1,400 mm (55 inches) in the Andes to 280 mm (11 inches) on the coast; Suriname has a tropical climate that is characterized by high rainfall, high humidity and hot temperatures which are modified by the NE trade winds. Average annual precipitation in Paramaribo is 2,200 mm (87 inches); For Brazil: "the nationwide average annual precipitation varies between 1,010 mm (40 inches) and 2,030 mm (80 inches)."; For Peru: average annual precipitation varies from 2,540 mm (100 inches) to 3,960 mm (156 inches) depending on the region. 2. Average annual precipitation ranges from 3.9 in/yr to greater than 98.4 in/yr. 3. Most of Colombia receives between 49.2 and 98.4 inches of rainfall per year, depending upon the region.
2.05		no evidence
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05		no evidence
4.01	Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field	no description of these traits

	Museum of Natural History.	
4.02		
4.03	Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field Museum of Natural History.	no description of parasitism
4.04		
4.05	1. Fanshawe, DB (1954) The genus Strychnos in British Guiana. Brittonia 8(1): 65-68. 2. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	1. "The bark contains, besides other alkaloids, a quaternary alkaloid, curarine, with a paralyzing action on the peripheral nerves...It is used by the Makushi Indians in the preparation of their famous blowpipe poison." 2. "Source of toxiferin, one of the most potent curare alkaloids".
4.06		
4.07	1. Fanshawe, DB (1954) The genus Strychnos in British Guiana. Brittonia 8(1): 65-68. 2. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	1. "The bark contains, besides other alkaloids, a quaternary alkaloid, curarine, with a paralyzing action on the peripheral nerves...It is used by the Makushi Indians in the preparation of their famous blowpipe poison." 2. "Source of toxiferin, one of the most potent curare alkaloids".
4.08		
4.09	Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	"In the forest".
4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html).	Costa Rica: mostly ultisols with a small amount of inceptisols (also with a small amount andisols); Panama: almost all ultisols with a very small amount of inceptisols (and also a very small amount of andisols); Colombia: mostly alfisols, entisols, and ultisols (also with oxisols and andisols present in the south and along the Pacific Coast); Venezuela: mostly alfisols, inceptisols, and ultisols with some entisols and a very small amount of mollisols in the north (also primarily oxisols in southern Venezuela); Suriname: almost entirely ultisols with a small amount of entisols and a very small amount of oxisols; Brazil: a large amount of

		oxisols, with ultisols and entisols the next most prevalent types, alfisols, aridisols, mollisols, and inceptisols on the eastern side/east coast; Ecuador: primarily andisols and oxisols, but there are also small amounts of entisols, inceptisols, mollisols and ultisols, mostly along the west coast; Peru: ultisols (mostly in central Peru), inceptisols (some), mollisols (some), entisols all along the Pacific Coast, (also oxisols in the north, a very small amount of andisols, and some rocky land along the border of the Pacific Coast entisols).
4.11	1. Fanshawe D.B. (1954) The genus <i>Strychnos</i> in British Guiana. <i>Brittonia</i> 8(1): 65-68. 2. Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field Museum of Natural History. 3. de Padua, LS, Bunyaphatsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden. 4. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California.	1. "A canopy climber". 2. "All the Peruvian species are lianas". 3. "Lianas or sometimes shrubs (often scrambling) to treelets" [genus description]. 4. "Liana".
4.12		
5.01		terrestrial
5.02	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?312989).	Loganiaceae
5.03	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?312989).	Loganiaceae
5.04	1. Fanshawe D.B. (1954) The genus <i>Strychnos</i> in British Guiana. <i>Brittonia</i> 8(1): 65-68. 2. Macbride, JF (1959) Flora of Peru. Field Museum of Natural	1. "A canopy climber". 2. "All the Peruvian species are lianas". 3. "Lianas or sometimes shrubs (often

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6.01		no evidence
6.02	de Padua, LS, Bunyaphatsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden.	"Seedling with epigeal germination" [genus description].
6.03		
6.04		
6.05	de Padua, LS, Bunyaphatsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden.	"The flowers of <i>Strychnos</i> are pollinated by insects. Mammals (e.g., monkeys and civet-cats) and birds digest the fruit pulp and disperse the seeds" [genus description].
6.06		
6.07		
7.01		Large fruit/seed, no means of attachment, not growing in pastures, etc.
7.02		no evidence
7.03		no evidence
7.04	1. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California. 2. Macbride, JF (1959) Flora of Peru. Field Museum of Natural History: Botanical Series, Volume 13, Part V, Number 1. Publication 880. Chicago: Field Museum of Natural History. 3. de Padua, LS, Bunyaphatsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden.	1. "Fruits globose, 4-7 cm diam, gray-green turning bluish green; seeds usually 10-15, ca. 2.5 cm diam." 2. "Fruits globose, to about 7 cm. in diameter...smooth, seeds obliquely reniform, about 23 mm. long". 3. "Fruit a globose or ellipsoid berry, with hard shell...orange to red when ripe, with fleshy, usually orange pulp"; "seeds lenticular, orbicular to ellipsoid, often convex on one side and concave on the other side...endosperm copious, bony" [genus description]. [no evidence of

		adaptations to wind dispersal]
7.05		
7.06	1. Croat, TB (1978) Flora of Barro Colorado Island. Stanford University Press, Stanford, California. 2. de Padua, LS, Bunyaphratsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden.	1. "Fruits globose, 4-7 cm diam, gray-green turning bluish green; seeds usually 10-15, ca. 2.5 cm diam." 2. "Mammals (e.g., monkeys and civet-cats) and birds digest the fruit pulp and disperse the seeds" [genus description].
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7.08	de Padua, LS, Bunyaphratsara, and Lemmens, RHMJ (Editors) (1999) Plant Resources of South-East Asia (PROSEA). Medicinal and Poisonous Plants 1. No 12(1). Backhuys Publishers, Leiden.	"Mammals (e.g., monkeys and civet-cats) and birds digest the fruit pulp and disperse the seeds" [genus description].
8.01		
8.02		
8.03		
8.04		
8.05		