

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>Tabernaemontana sananho</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)	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	?	
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		
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	n	0
4.06	Host for recognised pests and pathogens		
4.07	Causes allergies or is otherwise toxic to humans	n	0
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	n	0
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)		
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)	?	
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.		
<b>Total Score</b>			<b>-2</b>

<b>Outcome</b>	<b>Accept</b>
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<b>section</b>	<b># questions answered</b>	<b>satisfy minimum?</b>
A	8	Yes
B	6	Yes
C	8	Yes
total	22	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	<p>1. PERAL NAPPFAST Global Plant Hardiness (<a href="http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif">http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20gnd.tif</a>). 2. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 3. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 4. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i>. Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.</p>	<p>1. Global hardiness zones (7-10?-)11-13. 2. Peru. "Depts.: AM, AY, HU, JU, LO, MD, PA, SM, UC". 3. "Peru: San Martín: Pongo de Cainarachi; Huánuco: Monzón Valley; Cuchero; Tingo María; Junín: Río Paucartambo Valley; Loreto: Caballo-cocha; Alto Río Itaya; Yurimaguas; Manfinja; Iquitos; Aguaitia; To Brazil and Colombia". 4. "Northern and western South America; Colombia, Venezuela, Guyana, French Guiana, Brazil, Ecuador, Peru".</p>
2.02		
2.03	<p>1. Köppen-Geiger climate map (<a href="http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf">http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf</a>). 2. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 3. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 4. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i>. Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.</p>	<p>1. Distribution range is uncertain -- possibly 2-3 climatic regions. 2. Peru. "Depts.: AM, AY, HU, JU, LO, MD, PA, SM, UC". 3. "Peru: San Martín: Pongo de Cainarachi; Huánuco: Monzón Valley; Cuchero; Tingo María; Junín: Río Paucartambo Valley; Loreto: Caballo-cocha; Alto Río Itaya; Yurimaguas; Manfinja; Iquitos; Aguaitia; To Brazil and Colombia". 4. "Northern and western South America; Colombia, Venezuela, Guyana, French Guiana, Brazil, Ecuador, Peru".</p>
2.04	<p>1. World Trade Press (<a href="http://www.worldtradepress.com/Precipitation_Ma">http://www.worldtradepress.com/Precipitation_Ma</a></p>	<p>1. Average annual precipitation ranges from 3.9 in/yr to greater than</p>

	<p>p_Ecuador.html). 2. Atlapedia Online (<a href="http://www.atlapedia.com/online/countries/venezual.htm">http://www.atlapedia.com/online/countries/venezual.htm</a>). 3. World Trade Press (<a href="http://www.worldtradepress.com/Precipitation_Map_Colombia.html">http://www.worldtradepress.com/Precipitation_Map_Colombia.html</a>). 4. Atlapedia Online (<a href="http://www.atlapedia.com/online/countries/peru.htm">http://www.atlapedia.com/online/countries/peru.htm</a>). 5. Atlapedia Online (<a href="http://www.atlapedia.com/online/countries/frenguin.htm">http://www.atlapedia.com/online/countries/frenguin.htm</a>).</p>	<p>98.4 in/yr. 2. 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. 3. Most of Colombia receives between 49.2 and 98.4 inches of rainfall per year, depending upon the region. 4. For Peru: average annual precipitation varies from 2,540 mm (100 inches) to 3,960 mm (156 inches) depending on the region. 5. Average annual precipitation is more than 2,500 mm (100 inches).</p>
2.05		no evidence
3.01		no evidence
3.02		no evidence
3.03		no evidence
3.04		no evidence
3.05		
4.01	<p>1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago.</p>	no description of these traits
4.02		
4.03	<p>1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago.</p>	no description of parasitism
4.04		

4.05	1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago.	no evidence
4.06		
4.07	Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	"Some species have medicinal interest, e.g., <i>T. sananho</i> ." [no evidence of toxicity]
4.08		
4.09		
4.1	<p>USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (<a href="http://soils.usda.gov/use/worldsoils/mapindex/order.html">http://soils.usda.gov/use/worldsoils/mapindex/order.html</a>).</p>	<p>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); Guyana: primarily ultisols and entisols in the north and oxisols and inceptisols in the south; Suriname: almost entirely ultisols with a small amount of entisols and a very small amount of oxisols; French Guiana: almost entirely oxisols, with a small amount of inceptisols and a very small amount of entisols; 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</p>

		andisols, and some rocky land along the border of the Pacific Coast entisols).
4.11	1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 3. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	1. "Shrub or tree". 2. "Tree, often 5 to 8 meters tall". 3. "Shrub or tree 1-15 m high. Trunk 1-15 cm in diameter or more" [species description]; "Shrubs or trees, repeatedly dichotomously branched from low down" [genus description].
4.12	Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	Shrub or tree 1-15 m high. Trunk 1-15 cm in diameter or more [species description]; "Shrubs or trees, repeatedly dichotomously branched from low down" [genus description].
5.01		terrestrial
5.02	Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri.	Apocynaceae
5.03	Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri.	Apocynaceae
5.04	1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 3. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The	1. "Shrub or tree". 2. "Tree, often 5 to 8 meters tall". 3. "Shrub or tree 1-15 m high. Trunk 1-15 cm in diameter or more".

	New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	
6.01	1. Brako, L and Zarucchi, JL (1993) Catalogue of the Flowering Plants and Gymnosperms of Peru. Monographs in Systematic Botany from the Missouri Botanical Garden, Volume 45. Missouri Botanical Garden, St. Louis, Missouri. 2. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago.	no evidence
6.02	Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	"Rootlet 1-1.6 x as long as the cotyledons, 4-6 x 0.5-0.8 mm".
6.03		
6.04		
6.05		
6.06		
6.07		
7.01		
7.02		no evidence
7.03		no evidence
7.04	1. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 2. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	1. "Follicles smooth, to 6 cm. long, 5 cm. in diameter, the many somewhat compressed brownish seeds striate dorsally". 2. "Fruit of 2 separate mericarps; mericarps yellow or orange, obliquely subglobose, 35-50 x 35-50 x 30-50 mm, rounded or sometimes mucronate at the apex, with 2-3 faint ridges, especially near the base, smooth, not dotted, immature broadly ellipsoid, about 20-40-seeded; wall 2-3 mm thick; aril white, enveloping the seed only at the hilar side. Seed...obliquely and irregularly ellipsoid, 8-12 x 4-6 x 4-5 mm, with clear longitudinal grooves, papillose." [no evidence of

		adaptations to wind dispersal].
7.05		
7.06	Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands.	"Fruit of 2 separate mericarps; mericarps yellow or orange, obliquely subglobose, 35-50 × 35-50 × 30-50 mm, rounded or sometimes mucronate at the apex, with 2-3 faint ridges, especially near the base, smooth, not dotted, immature broadly ellipsoid, about 20-40-seeded; wall 2-3 mm thick; aril white, enveloping the seed only at the hilar side. Seed...obliquely and irregularly ellipsoid, 8-12 × 4-6 × 4-5 mm, with clear longitudinal grooves, papillose."
7.07	1. Macbride, JF (1959) Flora of Peru. Botanical Series. Field Museum of Natural History. Volume XIII, Part V, Number 1. Publication 880. Field Museum of Natural History, Chicago. 2. Leeuwenberg, AJM (1994) A Revision of <i>Tabernaemontana</i> Two: The New World Species and <i>Stemmadenia</i> . Royal Botanic Gardens, Kew and Wageningen Agricultural University, London and Wageningen, The Netherlands. 3. Foster, SA and Janson, CH (1985) The relationship between seed size and establishment conditions in tropical woody plants. <i>Ecology</i> 66(3): 773-780.	1. "Follicles smooth, to 6 cm. long, 5 cm. in diameter, the many somewhat compressed brownish seeds striate dorsally". 2. "Fruit of 2 separate mericarps; mericarps yellow or orange, obliquely subglobose, 35-50 × 35-50 × 30-50 mm, rounded or sometimes mucronate at the apex, with 2-3 faint ridges, especially near the base, smooth, not dotted, immature broadly ellipsoid, about 20-40-seeded; wall 2-3 mm thick; aril white, enveloping the seed only at the hilar side. Seed...obliquely and irregularly ellipsoid, 8-12 × 4-6 × 4-5 mm, with clear longitudinal grooves, papillose." 3. Disperser = mammal.
7.08	Foster, SA and Janson, CH (1985) The relationship between seed size and establishment conditions in tropical woody plants. <i>Ecology</i> 66(3): 773-780.	Disperser = mammal.
8.01		
8.02		
8.03		
8.04		
8.05		