

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>Protium glabrum</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)	1	
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	?	
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	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	n	-1
6.05	Requires specialist pollinators	n	0
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)	n	-1
7.08	Propagules dispersed by other animals (internally)	y	1
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			-4

Outcome	Accept
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section	# questions answered	satisfy minimum?
A	9	Yes
B	6	Yes
C	12	Yes
total	27	yes

Data collected 2008

Question number	Reference	Source data
1.01		no evidence of cultivation
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. Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf).	1. Global hardiness zones 9-13. 2. Distribution: Honduras to Panama.
2.02		
2.03	1. Köppen-Geiger climate map (http://www.hydro-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf).	1. Only one climatic region. 2. Distribution: Honduras to Panama.
2.04	Honduras: Atlapedia Online (http://www.atlapedia.com/online/countries/honduras.htm).	For Honduras: Average annual precipitation varies from 1,770 mm (70 inches) to 2,540 mm (100 inches) in the north, while along the Pacific coastal plains it varies from 1,520 mm (60 inches) to 2,030 mm (80 inches).
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	Stevens, WD, C Ulloa, A Pool, and OM Montiel, eds (2001) Flora de Nicaragua. Missouri Botanical Garden Press, St. Louis.	no description of these traits
4.02		
4.03	Stevens, WD, C Ulloa, A Pool, and OM Montiel, eds (2001) Flora de Nicaragua. Missouri Botanical Garden Press, St. Louis.	no description of this
4.04		
4.05		no evidence
4.06		
4.07		no evidence
4.08		
4.09	Schierenbeck, KA, M Skupski, D Lieberman, and M Lieberman (1997) Population structure and genetic diversity in four tropical tree species in Costa Rica. Molecular Ecology 6: 137-144.	"All of our study species [including <i>P. glabrum</i>] show a broad ecological amplitude with respect to light levels".
4.1	USDA, National Resources Conservation Services (NRCS), Soil Survey Division, World Soil Resources (http://soils.usda.gov/use/worldsoils/mapindex/order.html).	Honduras: mostly alfisols, inceptisols, and ultisols, with very small amounts of entisols and mollisols; Nicaragua: mostly ultisols, with some alfisols and inceptisols (also with some andisols on the Pacific Coast); 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).
4.11	Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/lorula3/families/BURSERACEAE.pdf).	small trees or shrubs, 3-15 m in height
4.12		
5.01		terrestrial
5.02	Stevens, WD, C Ulloa, A Pool, and OM Montiel, eds (2001) Flora de Nicaragua. Missouri Botanical Garden Press, St. Louis.	Burseraceae

5.03	Stevens, WD, C Ulloa, A Pool, and OM Montiel, eds (2001) Flora de Nicaragua. Missouri Botanical Garden Press, St. Louis.	Burseraceae
5.04	Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf).	woody (small tree or shrub)
6.01		no evidence
6.02		
6.03		
6.04	Schierenbeck, KA, M Skupski, D Lieberman, and M Lieberman (1997) Population structure and genetic diversity in four tropical tree species in Costa Rica. Molecular Ecology 6: 137-144.	dioecious; "The high variability and lack of genetic structuring suggest that... <i>P. glabrum</i> ...[is] outcrossing".
6.05	Schierenbeck, KA, M Skupski, D Lieberman, and M Lieberman (1997) Population structure and genetic diversity in four tropical tree species in Costa Rica. Molecular Ecology 6: 137-144.	"thought to be pollinated by a diverse array of small insects"
6.06		
6.07		
7.01		
7.02		no evidence
7.03		no evidence
7.04	Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf).	fruits are ovoid or globose drupaceous capsules, to 2.5 x 2.5 cm
7.05		
7.06	1. Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf). 2. Schierenbeck, KA, M Skupski, D Lieberman, and M Lieberman (1997) Population structure and genetic diversity in four tropical tree species in Costa Rica. Molecular Ecology 6: 137-144.	1. fruits are ovoid or globose drupaceous capsules, to 2.5 x 2.5 cm 2. "Seeds are dispersed by mammals in... <i>P. glabrum</i> "
7.07	Zamora, N (2006) Flora Digital de la Selva. Burseraceae. (http://sura.ots.ac.cr/local/florula3/families/BURSERACEAE.pdf).	fruits are ovoid or globose drupaceous capsules, to 2.5 x 2.5 cm
7.08	Schierenbeck, KA, M Skupski, D Lieberman, and M	"Seeds are dispersed by mammals"

	Lieberman (1997) Population structure and genetic diversity in four tropical tree species in Costa Rica. Molecular Ecology 6: 137-144.	in... <i>P. glabrum</i> "
8.01		
8.02		
8.03		
8.04		
8.05		