

<i>Dendrocalamus strictus (Bambusa stricta, Dendrocalamus sericeus)</i> <i>Calcutta bamboo, male bamboo, solid bamboo, bans, bambu6grande</i>		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 FL 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)	y	1
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?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed		
3.03	Weed of agriculture		
3.04	Environmental weed		
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	n	-1
4.05	Toxic to animals	n	0
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans		
4.08	Creates a fire hazard in natural ecosystems	y	1
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.		
4.11	Climbing or smothering growth habit	n	0
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	y	1
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0
6.01	Evidence of substantial reproductive failure in native habitat	?	
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	n	-1
6.04	Self compatible or apomictic	n	-1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	y	1
6.07	Minimum generative time (years)	25	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
7.02	Propagules dispersed intentionally by people	y	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	y	1
7.06	Propagules bird dispersed	n	-1
7.07	Propagules dispersed by other animals (externally)	n	-1
7.08	Propagules dispersed by other animals (internally)	n	-1

8.01	Prolific seed production	?	
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides	y	-1
8.04	Tolerates, or benefits from, mutilation or cultivation		
8.05	Effective natural enemies present in U.S.		
Total Score		1	
Implemented Pacific Second Screening		Yes	
Risk Assessment Results		Evaluate	

section	# questions answered	satisfy minimum?
A	7	yes
B	9	yes
C	19	yes
total	30	yes

	Reference	Source data
1.01		Cultivated, but no evidence of selection for reduced weediness
1.02		Skip to question 2.01
1.03		Skip to question 2.01
2.01	1. Flora of Pakistan (http://www.efloras.org/flora_page.aspx?flora_id=5 {accessed 22 Jan 2014}). 2. Floria of China (http://www.efloras.org/flora_page.aspx?flora_id=2 [accessed 22 Jan 2014]) 3. Tropicos, Missouri Botanical Garden (www.tropicos.org [accessed 22 jan 2014]). 4. Clayton et al. (2006 onwards) Grassbase-the Online World Grass Flora. (http://www.kew.org/data/grasses-db.html [accessed 22 Jan 2014]). 5. Guadua Bamboo(http://www.guaduabamboo.com/dendrocalamus-strictus.html [accessed 4 Feb 2014])	No computer analysis was performed. 1. Distribution in Pakistan, Nepal, throughout much of India to Burma, Singapore and Java. 2. Cultivated in Guangdong, Taiwan. 3. Also found in Brazil, Bangladesh, Burma, the Caribbean, Guatamala, Puerto Rico, Honduras, Malaysia, Panama, Singapore, South Africa, Thailand, and the United States. 3. Africa: western Indian Ocean, Asia temperate: eastern Asia, Asisa tropical: Inia, Indo-China, and Maleasia, Pacific: northwestern
2.02		No computer analysis was performed. Native range is well known; refer to 2.01 source data.
2.03	1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. E-Prosea (http://proseanet.org [accessed 4 Feb 2014]). See source data for 2.01.	1. Distribution in the native and cultivated ranges in at least 3 climatic groups (Cfa, Am, Aw, Af). 2. The optimum mean annual temperature is between 20—30°C, but it can withstand extremes as low as —5°C and as high as 45°C. Mature plants are frost hardy but frost will kill young plants. Optimum annual rainfall is between 1000—3000 mm (39.4-118 inches) with 300 mm per month during the growing season.
2.04	1. World Climate Maps (http://www.climate-charts.com [accessed 29 Jan 2014]).2. E-Prosea (http://proseanet.org [accessed 4 Feb 2014]). See source data for 2.01.	1. Distibution includes areas receiving 38-97 inches of rain. 2. Optimum annual rainfall is between 1000—3000 mm (39.4-118 inches) with 300 mm per month during the growing season.
2.05	1. Flora of China (http://flora.huh.harvard.edu/china/index.html [accessed 22 Jan 2014]). 2. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?405679 [accessed 22 Jan 2014]). 3. YUNNAN Bamboo Nursery (http://www.ynbambus.com/index.html [accessed 4 Feb 2014]) 4. Tropical Bamboo (http://www.tropicalbamboo.com/shopping.asp [accessed 29 Jan 2014]).	1. Cultivated in Guangdong and Taiwan 2. Cultivated in Guangdong, Taiwan, Sri Lanka, Vietnam, Indonesia, Malaysia, Phillipines, US,Cuba, and Puerto Rico 3 & 4. Seeds and plants for sale online.
3.01	1. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. J Trop Ecol 16:499-516.	1. D. strictus and Bambusa spp. introduced to montaine rain forests of the Luquillo Mountains, Puerto Rico in the 30s and 40s are now monocultures in numerous riparian areas.
3.02		No Evidence
3.03		No Evidence
3.04		No Evidence
3.05		No Evidence
4.01		No Evidence
4.02		No Evidence
4.03		No Evidence
4.04	1. Prasad (1985) Impacts of grazing, fire, and extraction on the bamboo (<i>Dendrocalamus strictus</i> and <i>Bamusa arundinacea</i>) populations of Karnataka. Agric Ecosyst Env 14:1-14. 2. E-Prosea (http://proseanet.org [accessed 4 Feb 2014]).	1. Cattle, water buffalo, langurs, rodents, wild pigs, and porcupines all feed on D. strictus. in the deciduous forests of Uttara Kannada in southern India. 2. Young shoots and seeds are edible. Leaves are used as forage.

4.05	1. Prasad (1985) Impacts of grazing, fire, and extraction on the bamboo (<i>Dendrocalamus strictus</i> and <i>Bamusa arundinacea</i>) populations of Karnataka. <i>Agric Ecosyst Env</i> 14:1-14. 2. E-Prosea (http://proseanet.org [accessed 4 Feb 2014]).	1. Cattle, water buffalo, langurs, rodents, wild pigs, and porcupines all feed on <i>D. strictus</i> . in the deciduous forests of Uttara Kannada in southern India
4.06	1. E-Prosea (http://proseanet.org [accessed 4 Feb 2014]). 2. Revathi & Remadevi (2011) Aphids as major pests of Bamboos in nurseries of South India and association of potential biocontrol agents. <i>Bamboo Species Culture</i> 24:29-34. 3. Salam & Pongen (2008) Hand Book of Bamboo. Choudhary & Sarma eds. Cane and Bamboo Tech Centre, Guwahati. 25 pp. 4. Sittichaya et al. (2009) An illustrated key to powder post beetles (Coleoptera, Bostrichidae) associated with rubberwood in Thailand, with new records and a checklist of species found in Southern Thailand. <i>ZooKeys</i> 26:33-51. 5. Plantwise Knowledge Bank: bamboo borer (<i>Dinoderus minutus</i>) (http://www.plantwise.org/KnowledgeBank/Datasheet.aspx?dsid=19035 [8 Feb 2014])."	1. "Major nursery diseases of <i>Dendrocalamus strictus</i> are damping-off (caused by <i>Rhizoctonia solani</i> and <i>Fusarium</i> spp.) and leaf blight (many causal fungi, e.g. <i>Alternaria</i> spp., <i>Colletotrichum gloeosporioides</i> , <i>Cercospora</i> sp., <i>Dactylaria</i> sp.). Major diseases of adult plants are: rhizome rot (<i>Ganoderma lucidum</i>), culm rot (<i>Fusarium</i> sp.), culm sheath rot (<i>Glomerella cingulata</i>) and leaf rust (<i>Dasturella divina</i>). Witches' broom disease is rather common in <i>Dendrocalamus strictus</i> (infected plants show excessive branches at the nodes), but does not visually harm the culms. Major pests are defoliators (e.g. the greater bamboo leaf roller <i>Pyrausta coclesalis</i>), shoot and culm borers (e.g. bamboo weevils (<i>Cyrtotrachelus</i> spp.) and the bamboo hispine beetle (<i>Estigmaena chinensis</i>), and sap-suckers of shoots (e.g. the aphid <i>Oregma bambusae</i>), stems, leaves and seeds (e.g. the pentatomid bug <i>Ochrophara montana</i>). Integrated pest management practices with the emphasis on cultural, biological and genetic control still have to be evolved. Bamboo seedlings have many natural enemies (e.g. rats, squirrels, pigs, porcupines, hares, deer, goats and cattle). The major pests of felled or dried culms are the powder-post beetles <i>Dinoderus ocellaris</i> , <i>Dinoderus minutus</i> and <i>Dinoderus brevis</i> , and termites, which may cause immense damage. Protection can be obtained by prophylactic and preservative treatments (e.g. soaking in a 5% aqueous solution of a copper-chrome-arsenic (CCA) mixture gives good results) but safer, environmentally friendly insecticides still have to be developed." 2. Aphid <i>Astegopteryx bambusae</i> (Buckton) on <i>D. strictus</i> in nurseries of S India. 3. Disease like damping off, wilt, seedling stem infection, leaf blight, leaf rust are seen to attack this
4.07		No Evidence
4.08	1. Keeley & Bond (1999) Mast flowering and semelparity in bamboos: the bamboo fire cycle hypothesis. <i>Am Nat</i> 154:383-391. 2. Kadambi (1949) On the ecology and silviculture of <i>Dendrocalamus strictus</i> in the bamboo forests of Bhadravati Division, Mysore State, and comparative notes on the species <i>Bamusa</i> , <i>Arundinacea</i> <i>ochladra</i> <i>travancorica</i> , <i>Oxytenanthera monostigma</i> and <i>O. stocksii</i> . <i>Indian Forester</i> 75:289-299.	1. Post masting event, standing dead culms become fuel for fires described on the landscape scale as fuel loads that are phenomenal owing to the size of clones, density and size of culms. Generating dry fuel rates of 10-105 kg per hectare or more. 2. Forest fires in Inida followed the death of <i>D. strictus</i> described as disasterous whose ravage is indescribable.
4.09		Many nursery sites indicate grows in full sun to partial shade, but no definitive evidence of shade tolerance.
4.10	1 Singh & Singh (1999) Biomass, net primary production and impact of bamboo plantation on soil redevelopment in a dry tropical region. <i>For Ecol Manag</i> 119:195-207. 2. Yadav (1963) Site and soil characteristics of bamboo forests. <i>Indian Forester</i> 89:177.	1. Planted on mine spoils characterized as "physically, nutritionally, and biologically impoverished habitats." Authors describe <i>D. strictus</i> as a hardy species occurring on a wide range of soil conditions 2. "with particularly luxuriant growth of porous, coarse-grained dry soils withlow moisture retaining capacity and on well drained, sandy loam soils" with an optimum pH of 5.5-7.6.
4.11		No Evidence

4.12	1. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. <i>J Trop Ecol</i> 16:499-516.	1. Bamboo monocultures of <i>Bambusa</i> spp and <i>D. strictus</i> present in montane rain forests of Puerto Rico. While both <i>Bamusa</i> spp and <i>D. strictus</i> have naturalized in PR, it is not clear what species spread as monoculture.
5.01	1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?405679 [accessed 22 Jan 2014]). 2. Clayton et al. (2006 onwards) Grassbase-the Online World Grass Flora. (http://www.kew.org/data/grasses-db.html [accessed 22 Jan 2014]).	No evidence of aquatic growth habit. 1 & 2. Family Poaceae
5.02	1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?405679 [accessed 22 Jan 2014]). 2. Clayton et al. (2006 onwards) Grassbase-the Online World Grass Flora. (http://www.kew.org/data/grasses-db.html [accessed 22 Jan 2014]).	1 & 2. Family Poaceae
5.03	1. USDA/ARS-GRIN [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland (http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?405679 [accessed 22 Jan 2014]). 2. Clayton et al. (2006 onwards) Grassbase-the Online World Grass Flora. (http://www.kew.org/data/grasses-db.html [accessed 22 Jan 2014]).	1 & 2. Family Poaceae
5.04	1. Ziv & Noar (2006) Flowering of geophytes in vitro. <i>Propagation of Ornamental Plants</i> 6: 3-16. 2. Prasad (1985) Impacts of grazing, fire, and extraction on the bamboo (<i>Dendrocalamus strictus</i> and <i>Bamusa arundinacea</i>) populations of Karnataka. <i>Agric Ecosyst Env</i> 14:1-14.	1. Geophyte 2. Large rhizome with sympodial underground growth of the clump.
6.01	1. Prasad (1985) Impacts of grazing, fire, and extraction on the bamboo (<i>Dendrocalamus strictus</i> and <i>Bamusa arundinacea</i>) populations of Karnataka. <i>Agric Ecosyst Env</i> 14:1-14. 2. Jantzen (1976) Why bamboos wait so long to flower. <i>Ann Rev Ecol Syst</i> 7:347-391. 3. Banik (1994) Diversities, reproductive biology and strategies for germplasm conservation of bamboos. In: Ramanatha, Rao eds. <i>Bamboo and Rattan genetic resources and use. Proceedings of the 1st INBAR Biodiversity, genetic resources and conservation working group.</i> 1994, Singapore, 1-22.	1. Populations in southern India on the decline after last flowering, presumably due to increases in grazing, fire, and extraction. 2. Bamboos are woody perennials that gregariously flower, seed, and die with intermast periods of 29-76 years. Observed intermast periods of 23 and 24 years in Tharrawaddy, India. But, there is observed 320 pounds of seed yield from a 40 sq yd clump with 800-1000 seeds per ounce. D333. Intermast periods if 40-45 years in Bangladesh, North, East, and Central India. 65 year intermast observed in western India.
6.02	1. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. <i>J Trop Ecol</i> 16:499-516.	1. Since introduction in the 1930s and 40s in Puerto Rico, bamboos (including <i>D. strictus</i>) have spread by vegetative reproduction and in 1996 by flowering and seed-set.
6.03		The peculiar flowering behaviour in bamboos make genetic improvement by hybridizations very difficult. The flowering and seeding at long intervals (7-120 years) render the overlapping of flowering in more than one species, in the same locality very difficult to obtain, making attempts at hybridizations impossible.
6.04	1. Nadgauda & Mascarenhas (1993) Floral biology and breeding behavior in the bamboo <i>Dendrocalamus strictus</i> Nees. <i>Tree Phys</i> 13:401-408.	1. " <i>Dendrocalamus strictus</i> is typically dichogamous and protogynous. The gynoecium matures 3-4 days before the androecium, effectively preventing self pollination."
6.05	1. Nadgauda & Mascarenhas (1993) Floral biology and breeding behavior in the bamboo <i>Dendrocalamus strictus</i> Nees. <i>Tree Phys</i> 13:401-408.	1. Wind pollinated: "When wind was excluded by enclosing the inflorescences in bags there was no seed set."

6.06	1. Kumar (2011) Taxonomy of Bamboos: Bamboos of Peninsular India. KFRI Research Report No. 399. Kerala Forest Research Institute, Kerala India 148pp. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. J Trop Ecol 16:499-516. 2. 1. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. J Trop Ecol 16:499-516.	1. pachymorph rhizome. The culms developed from long-necked pachymorph rhizomes resemble leptomorph rhizomes. 2. Since introduction in the 1930s and 40s in Puerto Rico, bamboos (including <i>D. strictus</i>) have spread by vegetative reproduction through extensive rhizome networks, downslope transport, and re-rooting of broken culms.
6.07	1. Kumar (2011) Taxonomy of Bamboos: Bamboos of Peninsular India. KFRI Research Report No. 399. Kerala Forest Research Institute, Kerala India 148pp. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. J Trop Ecol 16:499-516. 2. 1. Scurlock (2000) Bamboo: an overlooked biomass resource? US DOE, Office of Transportation and technology, Oak Ridge, TN. ORNL/TM-1999/264.	1. The gregarious flowering cycle various from 25-45 years. But, sporadic flowering is common in this species. 2. <i>Dendrocalamus strictus</i> – display gregarious flowering, whereby an entire clump at one location produces flowers and then dies back over the course of 2-3 years. This happens typically every 30-40 years
7.01		No Evidence, but transportation of rhizome pieces in garden refuse could spread plants as is the case with other rhizomatous plants (i.e. <i>Arundo donax</i>)
7.02	1. Scurlock (2000) Bamboo: an overlooked biomass resource? US DOE, Office of Transportation and technology, Oak Ridge, TN. ORNL/TM-1999/264	1. Increasingly promoted as a biomass resource. 2. Cultivated in Guangdong and Taiwan 3. Cultivated in Guangdong, Taiwan, Sri Lanka, Vietnam, Indonesia, Malaysia, Phillipines, US, Cuba, and Puerto Rico 4 & 5. Seeds and plants for sale online.
7.03		No Evidence
7.04		No Evidence
7.05	1. O'Connor et al. (2000) Non-indigenous bamboo along headwater streams of the Luquillo mountains, Puerto Rico: leaf fall, aquatic leaf decay and patterns of invasion. J Trop Ecol 16:499-516.	1. Observations of <i>D. strictus</i> and <i>Bambusa</i> spp. Along a stream in Puerto Rico indicate bamboo spread along streams due to disturbance events such as high flows and hurricanes where culms may break free and re-root downstream.
7.06		No Evidence
7.07		No Evidence
7.08		No Evidence
8.01		No Evidence
8.02		No Evidence
8.03	1. Cruzado, Muzik, Kennard (1961) Control of Bamboo in Puerto Rico by Herbicides. Weeds. 9:20-26.	1. Observations 24 months after treatment showed that the following bamboo species were eradicated by basal application of monuron at the rate of 1.6 pounds of chemical in 2 gallons of water per 50 culms: <i>B. tulda</i> , <i>B. textilis</i> , <i>G. apus</i> , <i>D. asper</i> , and <i>D. strictus</i> . <i>B. textilis</i> , <i>D. asper</i> , and <i>D. strictus</i> also were eradicated with dalapon at the 1.6 pound rate.
8.04	1. Prasad (1985) Impacts of grazing, fire, and extraction on the bamboo (<i>Dendrocalamus strictus</i> and <i>Bamusa arundinacea</i>) populations of Karnataka. Agric Ecosyst Env 14:1-14.	1. Fire appears to enhance seedling survival
8.05		No Evidence

Both sides of the screening applied. The conclusion for the herb or low stature shrub side is accept, however there is no evidence to answer questions regarding shade tolerance or dispersal for the tree, large stature shrub side. Therefore the conclusion is evaluate further.