

Assessment date 12 February 2015

<i>Dendrocalamus asper</i> ALL ZONES		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 Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	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 habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	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	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	n	0
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	n	0
4.07	Causes allergies or is otherwise toxic to humans	n	0
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.	unk	0
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	y	1
6.02	Produces viable seed	y	1

6.03	Hybridizes naturally		
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)	60	-1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	unk	-1
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		
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	n	-1
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			
Total Score			1
Implemented Pacific Second Screening			yes
Risk Assessment Results			EVAL

section	# questions answered	satisfy minimum?
A		11 yes
B		11 yes
C		17 yes
total		39 yes

	Reference	Source data
1.01		Cultivated, but no evidence of selection for reduced weediness.
1.02		skip to 2.01
1.03		skip to 2.01
2.01	<p>1. PERAL NAPPFAST Global Plant Hardiness (http://www.nappfast.org/Plant_hardiness/NAPPFAST%20Global%20zones/10-year%20climate/PLANT_HARDINESS_10YR%20lgnd.tif). 2. 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?409896 (12 March 2014). 3. Mansfeld's World Database of Agricultural and Horticultural Crops. Contributed by R. Fritsch, April 2001. http://mansfeld.ipk-gatersleben.de/apex/f?p=185:1:2769827532762::NO:: 4. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. Accessed from Internet: 18 March 2014.</p>	<p>No computer analysis was performed. 1. Global hardiness zone: 9-13 (able to survive in zones 4-8); equivalent to USDA Hardiness zones 8a-11b+ (able to survive [$<4a?->$] 4b-7b). 2. Native distribution possibly in northern Malaysia (uncertain). 3. Wild distribution: Only known under cultivation; may be wild in Thailand and adjacent areas. 4. The origin of <i>Dendrocalamus asper</i> is not certain, but is thought to be somewhere in South-East Asia.</p>
2.02		No computer analysis was performed. Native range is well known; refer to 2.01 source data.
2.03	<p>1. Köppen-Geiger climate map (http://www.hydrol-earth-syst-sci.net/11/1633/2007/hess-11-1633-2007.pdf). 2. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. Accessed from Internet: 18 March 2014.</p>	<p>1. Distribution in the cultivated and naturalized range occurs in more than 3 climactic zones. 2. In tropical Asia <i>Dendrocalamus asper</i> is planted or naturalized from low altitudes up to 1500 m altitude. It thrives best, however, at 400—500 m above sea-level.</p>
2.04	<p>1. World Climate Maps. http://www.climate-charts.com/World-Climates-Maps.html. Accessed 5 February 2014.</p>	<p>1. Cultivated and naturalized areas: 975 mm-4974 mm+ (38.5"-195.9"+). 2. Thrives best in areas with average annual rainfall of about 2400 mm.</p>
2.05	<p>1. 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?409896 (12 March 2014). 2. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. Accessed from Internet: 18 March 2014.</p>	<p>1. Cultivated in Africa (Madagascar); Asia-Temperate: China [Yunnan], Taiwan; Asia-Tropical: Indonesia, Laos, Malaysia, Myanmar, Philippines, Sri Lanka, Thailand, Vietnam [south]; North America: United States. 2. It has been planted in botanical, experimental or private gardens in the New World and Australia, even in warm temperate areas.</p>
3.01	<p>1. 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?409896 (12 March 2014).</p>	<p>1. Naturalized in Indonesia and Australia; status uncertain in Malaysia (possibly native in north).</p>
3.02		No evidence found.
3.03		No evidence found.
3.04		No evidence found.

3.05	1. Brink, M., 2008. <i>Dendrocalamus asper</i> (Schult. & Schult.f.) Backer ex K.Heyne. [Internet] Record from PROTA4U. Louppe, D., Oteng Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://www.prota4u.org/search.asp >. Accessed 18 March 2014.	1. <i>Dendrocalamus</i> comprises about 35 species, distributed from India to China and the Philippines. No evidence suggests that these species are weeds.
4.01		These structures are not included in the description of this species.
4.02		No evidence found.
4.03	1. 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?409896 (12 March 2014).	1. Family: Poaceae (not a parasitic family).
4.04	1. Kigomo, BN (2007). Guidelines for Growing Bamboo. KEFRI Guideline Series: No. 4. Kenya Forestry Research Institute; Nairobi, Kenya KEFRI Guidelines Series: No. 4 – April 2007 Kenya Forestry Research Institute Printed by: Downtown Printing.	1. Bamboos (seedlings) are palatable to many animals, especially in dry grazing areas where goats are left loose.
4.05	1. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391.	1. There is no evidence that bamboo seed contains the toxic secondary compounds normally found in tropical tree seeds, but bamboo seeds can cause diarrhea if eaten in excess, and they are not eaten when other grains are available (Watt 1889).
4.06	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne [Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. Not known to be hosts of toxic pathogens and alternate/alternative hosts of crop pests and diseases. The powder-post beetles <i>Dinoderus minutus</i> and <i>Dendrocalamus brevis</i> cause considerable damage to harvested culms.
4.07	1. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391 & 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?409896 (12 March 2014).	1. There is no evidence that bamboo seed contains the toxic secondary compounds normally found in tropical tree seeds; young shoots are consumed (human food, vegetable).
4.08	1. Kigomo, BN (2007). Guidelines for Growing Bamboo. KEFRI Guideline Series: No. 4. Kenya Forestry Research Institute; Nairobi, Kenya KEFRI Guidelines Series: No. 4 – April 2007 Kenya Forestry Research Institute Printed by: Downtown Printing.	1. Fire is a major hazard to a bamboo plantation especially during the dry season and in drier areas. To safeguard the area, firebreaks should be established. A 10 m wide fire-line is enough to stop fire from spreading into the plantation. In some species, the amount of bamboo litter on the ground is too thick. During the dry seasons, this needs to be reduced by collecting it and thus improving the degree of success in fire control.
4.09	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne [Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. Young plants require regular watering and weeding during the growing period because they cannot compete for nutrients, light and moisture.

4.10	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. <i>Dendrocalamus asper</i> will grow well on sandy and rather acidic soils.
4.11	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. Culm erect with pendulous tip, 20—30 m tall.
4.12	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. Densely tufted, sympodial bamboo (clumping).
5.01	1. 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?409896 (12 March 2014).	1. Family: Poaceae.
5.02		
5.03	1. 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?409896 (12 March 2014).	1. Family: Poaceae.
5.04	1. Dransfield, S. & Widjaja, E.A., 1995. <i>Dendrocalamus asper</i> (Schultes f.) Backer ex Heyne[Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014.	1. Sympodial bamboo (clumping).
6.01	1. Brink, M., 2008. <i>Dendrocalamus asper</i> (Schult. & Schult.f.) Backer ex K.Heyne. [Internet] Record from PROTA4U. Louppe, D., Oteng Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://www.prota4u.org/search.asp >. Accessed 18 March 2014. 2. Arya, S et al. 2008. Direct regeneration of shoots from immature inflorescences in <i>Dendrocalamus asper</i> (edible bamboo) leading to mass propagation. <i>Bamboo Science and Culture: The Journal of the American Bamboo Society</i> , 21(1): 14-20.	1. Due to its vegetative reproduction, the genetic diversity of the species is low. 2. Bamboo is monocarpic, i.e. a plant flowers only once and then dies. <i>Dendrocalamus asper</i> flowers gregariously after 60-100 years.
6.02	1. CAES publications "Growing Bamboo in Georgia" University of Georgia (http://www.caes.uga.edu/publications/pubDetail.cfm?pk_id=7830 [Accessed 2/11/2013]). 2. Arya, S et al. 2008. Large scale plant production of edible bamboo <i>Dendrocalamus asper</i> through somatic embryogenesis. <i>Bamboo Science and Culture: The Journal of the American Bamboo Society</i> , 21(1): 21-31.	1. <i>Dendrocalamus asper</i> seeds are available online from a number of sources; however, as a rule, bamboo does not set many viable seed even though the whole grove may flower gregariously. 2. Conventional propagation methods are beset with many problems such as seed sterility, non-availability of seeds, etc.

6.03	1. John CK et al. 1994. Selection - A valuable method for bamboo improvement. Current science (Bangalore), 66(11): 822-824.	1. 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. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391.	1. There is no direct information as to whether bamboos are outcrossed, obligatorily or otherwise. It is possible to conclude from indirect evidence that mast-seeding bamboos are obligatory outcrossers. 2. Dendrocalamus strictus is typically dichogamous and protogynous. The gynoecium matures 3-4 days before the androecium, effectively preventing self pollination.
6.05	1. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391.	1. Bamboo are apparently wind-pollinated since they have inflorescences like those of other grasses. Bamboos may be at least in part insect pollinated (Bodekar 1930, Bradley 1914, Gunckel 1948, Morris 1886, Soderstrom & Calderon 1971, 1974).
6.06	1. Dransfield, S. & Widjaja, E.A., 1995. Dendrocalamus asper (Schultes f.) Backer ex Heyne [Internet] Record from Proseabase. Dransfield, S. & Widjaja, E.A. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org . Accessed from Internet: 18 March 2014. 2. Brink, M., 2008. Dendrocalamus asper (Schult. & Schult.f.) Backer ex K.Heyne. [Internet] Record from PROTA4U. Louppe, D., Oteng Amoako, A.A. & Brink, M. (Editors). PROTA (Plant Resources of Tropical Africa / Ressources végétales de l'Afrique tropicale), Wageningen, Netherlands. < http://www.prota4u.org/search.asp >. Accessed 18 March 2014. 3. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391.	1. Dendrocalamus asper can be propagated by rhizome, culm and branch cuttings and by tissue culture. 2. Due to its vegetative reproduction, the genetic diversity of the species is low. 3. As might be expected of a plant that seeds only after a long interval and then dies, mast-seeding bamboos are extremely plastic and vigorous in vegetative growth and have very broad geographic distributions.
6.07	1. Arya, S et al. 2008. Direct regeneration of shoots from immature inflorescences in Dendrocalamus asper (edible bamboo) leading to mass propagation. Bamboo Science and Culture: The Journal of the American Bamboo Society, 21(1): 14-20.	1. Dendrocalamus asper flowers gregariously after 60-100 years.
7.01		Unintentionally dispersement not likely based on the growth form, biology, ecology, or habitat of the species.
7.02	1. 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?409896 (12 March 2014). 2. Mansfeld's World Database of Agricultural and Horticultural Crops. Contributed by R. Fritsch, April 2001. http://mansfeld.ipk-gatersleben.de/apex/f?p=185:1:2769827532762::NO::	1. Economic importance: human food (vegetable), material (cane). 2. In Thailand, Malaysia, and China grown on a large scale for the shoots which are canned as a vegetable, pickled in vinegar, preserved in salt, etc. In tropical S Asia commonly planted for the strong and rather durable culms used as construction material and for furniture, household implements, etc.
7.03		Contamination not likely based on the growth form, biology, ecology, or habitat of the species.
7.04		No morphological features (i.e., wings) that would suggest seeds are adapted for wind.
7.05		No evidence found.

7.06	1. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391. 2. Collias, NE & P Saichuae. 1967. Ecology of the red jungle fowl in Thailand and Malaya with reference to the origin of domestication. Natural History Bulletin of the Siam Society, 22:189-209.	1. Larger animals should have a powerful nomadic response to a bamboo seed crop (and a reproductive one as well, if the seeding period is long enough), as exemplified by the wild chicken (jungle fowl, Gallus spp.) and other pheasants in India and Burma. 2. A Thai jungle fowl cock had 519 bamboo seeds in its crop
7.07		No morphological features that would suggest seeds are adapted for attachment to fur or able to come into contact with hooves of animals due to the biology of the species (forms a dense, nearly impenetrable thicket in the lower part of the clump. Undisturbed clumps are almost impenetrable after some years because of the interlacing thorny branches).
7.08	1. Janzen, DH. 1976. Why Bamboos Wait so Long to Flower. Annual Review of Ecology and Systematics, 7: 347-391.	1. Local animals should be major predators on bamboo seeds from the day the mast crop begins until the day it ends. In addition to the local individuals of the more nomadic species of animals, all regions (with the exception of Jamaica) with mast-cropping bamboos have a number of indigenous species of terrestrial rodents of various sizes (e.g., rats, voles, fox, squirrels, etc.).
8.01		No evidence found.
8.02	1. Banerjee, M., S Gantait, & BR Pramanik. 2011. A two step method for accelerated mass propagation of Dendrocalamus asper and their evaluation in field. Physiology and Molecular Biology of Plants, 17(4):387-393.	1. Availability of seeds is limited and available seeds are of short-lived viability.
8.03	1. Cruzado, Muzik, Kennard (1961) Control of Bamboo in Puerto Rico by Herbicides, Weeds 9:20-26.	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: B. tulda, B. textilis, G. apus, D. asper, and D. strictus. B. textilis, D. asper, and D. strictus also were eradicated with dalapon at the 1.6 pound rate.
8.04	1. Kigomo, BN (2007). Guidelines for Growing Bamboo. KEFRI Guideline Series: No. 4. Kenya Forestry Research Institute; Nairobi, Kenya KEFRI Guidelines Series: No. 4 – April 2007 Kenya Forestry Research Institute Printed by: Downtown Printing.	1. The removal of mature culms maintains the vigour of the plant and allows for the continuous generation of new shoots. The clumping habit enables the plant to regenerate naturally after harvesting.
8.05		No evidence found.