

<b>Taxon:</b> Thyrsostachys siamensis Gamble	<b>Family:</b> Poaceae
<b>Common Name(s):</b> monastery bamboo umbrella Bamboo umbrella-handle bamboo	<b>Synonym(s):</b> Bambusa regia Munro

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 27 Oct 2020
<b>WRA Score:</b> 1.0	<b>Designation:</b> L	<b>Rating:</b> Low Risk

**Keywords:** Unconfirmed Naturalization, Clumping Bamboo, Forms Pure Stands, Sympodial, Edible

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets	y=1, n=0	y
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	y
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation		
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal		
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m <sup>2</sup> )	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Cultivated, but no evidence of domestication] "can be propagated by seed and rhizome cuttings, flowering sporadic and gregarious, flowering cycle not known, after flowering culms usually die, plants deciduous in the dry season, graceful and ornamental, elegant and decorative, delicious edible shoots pickled or steamed, wild or cultivated elsewhere, used as a wind break, fishing rod, parasol handle, basketry, for rural house building, materials for papermaking, occurs in mixed deciduous forest, dry or semievergreen forest, teak forest, hill forest, poor soil, not waterlogged areas"

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	NA

201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Oct 2020]	"Native Asia-Temperate CHINA: China [Yunnan Sheng (s.)] Asia-Tropical INDO-CHINA: Myanmar, Thailand Cultivated Asia-Temperate CHINA: China (s.e.) EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, India INDO-CHINA: Myanmar, Thailand MALESIA: Malaysia"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Oct 2020]	

203	Broad climate suitability (environmental versatility)	n
	Source(s)	Notes
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 26 Oct 2020]	"Its growth is not much hampered by partial shading. In Thailand it grows in mixed deciduous and teak forest in the north and north-east and pure stands often occur in hill forest in the central part, at altitudes 300-400 m, with annual rainfall of 800-1000 mm. "
	Plants for a Future. (2020). <i>Thyrsostachys siamensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 26 Oct 2020]	"USDA hardiness 9-12"

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Oct 2020]	"Native Asia-Temperate CHINA: China [Yunnan Sheng (s.)] Asia-Tropical INDO-CHINA: Myanmar, Thailand Cultivated Asia-Temperate CHINA: China (s.e.) EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, India INDO-CHINA: Myanmar, Thailand MALESIA: Malaysia"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"References: Philippines-nC-1099, Singapore-U-1290, Sri Lanka-N-1796, Singapore-U-1839, India-W-1977, Singapore-W-1977."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

Qsn #	Question	Answer
205	Does the species have a history of repeated introductions outside its natural range?	y
	<b>Source(s)</b>	<b>Notes</b>
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 23 Oct 2020]	"In many other tropical regions, especially in South-East Asia, it has been introduced and is cultivated widely as an ornamental and as wind-break."
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	" <i>Thyrsostachys</i> is native to Thailand and Burma (Myanmar) and consists of two species. <i>T. siamensis</i> Gamble is one of the most useful bamboos in Thailand. It has been introduced into other countries in South-East Asia."

301	Naturalized beyond native range	
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[Reports of naturalization have not been verified] "References: Philippines-nC-1099, Singapore-U-1290, Sri Lanka-N-1796, Singapore-U-1839, India-W-1977, Singapore-W-1977"
	Imada, C. (2019). <i>Hawaiian Naturalized Vascular Plants Checklist</i> (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

302	Garden/amenity/disturbance weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	[Reports of weediness have not been verified] "References: Philippines-nC-1099, Singapore-U-1290, Sri Lanka-N-1796, Singapore-U-1839, India-W-1977, Singapore-W-1977"

303	Agricultural/forestry/horticultural weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

401	Produces spines, thorns or burrs	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. ( eds.). 2006. Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Culms to 12 m, to 6 cm in diam.; internodes initially green, becoming gray-green, 20–30 cm; wall thick; nodes slightly thickened, with a white ring below. Branches several, main mid-culm ones to 1 cm in diam. Culm sheaths pale brown, 3/4–1 × as long as internodes, papery, appressed pubescent, margins ciliate, apex truncate; ciliate; auricles small; ligule ca. 1 mm; blade erect, base ca. 3/4 width of sheath apex. Leaf sheaths white pubescent and ciliate; ligule very short, pubescent; blade linear, 7.5–15 × 0.7–1.2 cm. Pseudospikelets 1.2– 1.4 cm; prophylls to 0.8 cm; gemmiferous bracts 2 or 3; glumes 2 or 3; fertile florets 1–3. Fertile lemma 1–1.3 cm; palea slightly longer than lemma, narrow, bifid for 1/3 of its length; lodicules absent to 3. Anthers pale yellow, apex purple, apiculate. Ovary ovoid to turbinate; style 1, ca. 1.2 cm; stigmas 1–3. Caryopsis ca. 0.6 cm."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 23 Oct 2020]	"Densely tufted, sympodial bamboo. Culm erect or with arching tips, 8-14 m tall, 2-7.5 cm in diameter, wall very thick, solid in lower part, smooth, greyish-green, usually covered with persistent old culm sheaths; internodes 15-30 cm long, bearing a white ring below the nodes; nodes not swollen." [Poaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes

Qsn #	Question	Answer
	McShea, W. J., Sukmasuang, R., Erickson, D. L., Herrmann, V., Ngoprasert, D., Bhumpakphan, N., & Davies, S. J. (2019). Metabarcoding reveals diet diversity in an ungulate community in Thailand. <i>Biotropica</i> , 51(6), 923-937	"The diverse large mammal communities found in Asian dry forests and savannas should segregate based on their diet selection. We examined the diet composition of sympatric ungulate species using metabarcoding to determine whether their diet was segregated and whether obvious attributes (i.e., body size, phylogeny, ecology) explained the structure. We collected fecal samples from eight ungulate species in Huai Kha Khaeng Wildlife Sanctuary in the western forest complex of Thailand. The fecal collections occurred around a plot where all woody species were codified within a genetic barcode library, and this library was supplemented with samples from plant species known to be consumed by these species. Of 273 plant species tested, at least 93 were found within the fecal samples. Over half of the identified species were not previously known by experts as forage species. All ungulate species showed a strong consumption of grasses and forbs. For the three species with sufficient sample size (sambar, banteng, and guar), there were seasonal differences in their diet, with each showing increased occurrence of woody plants during the dry season. The pattern of forage consumption did not follow obvious paradigms of body size or taxonomy, with significant diet differences found in two similar-sized bovids (gaur, banteng), while the diet of sambar was more similar to bovids than to the other deer species. Asian ungulates differ in their forage consumption and metabarcoding should allow for testing of diet shifts in response to seasonal rains and fires which dominate the phenology of Asian dry forests and savannas."
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	[Shoots palatable to people] "In general, young shoots of many bamboo species are edible, but only a few bamboos produce superior shoots, i.e. <i>Dendrocalamus asper</i> , <i>Gigantochloa leuis</i> , <i>G. albociliata</i> (Munzo) Kurz and <i>Thyrsostachys siamensis</i> ."

405	Toxic to animals	n
	Source(s)	Notes
	Plants for a Future. (2020). <i>Thyrsostachys siamensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 26 Oct 2020]	"Known Hazards - None known"
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	"Diseases and pests - No serious diseases or pests have been reported for <i>T. siamensis</i> . Powder-post beetles and fungi can cause damage to harvested culms, although 3-year-old culms are considered relatively resistant."

407	Causes allergies or is otherwise toxic to humans	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Plants for a Future. (2020). <i>Thyrsostachys siamensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 26 Oct 2020]	"Known Hazards - None known"
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	[No evidence] "In general, young shoots of many bamboo species are edible, but only a few bamboos produce superior shoots, i.e. <i>Dendrocalamus asper</i> , <i>Gigantochloa leuis</i> , <i>G. albociliata</i> (Munzo) Kurz and <i>Thyrsostachys siamensis</i> ."
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 23 Oct 2020]	[No evidence] "Young shoots are consumed as a vegetable and considered as among the best bamboo shoots. Because of its elegant habit (compact clumps of outcurving slender culms bearing many small leaves on slender branches) <i>T. siamensis</i> is a popular ornamental plant. It is also planted in rows as wind-break."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	<b>Source(s)</b>	<b>Notes</b>
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	[Unknown. Pure stands could presumably carry fire in drought conditions, but naturally occurs in relatively wet areas] "In Thailand it grows in mixed deciduous and teak forest in the north and north-east and pure stands often occur in hill forest in the central part, at altitudes 300–400 m, with annual rainfall of 800-1000 mm."

409	Is a shade tolerant plant at some stage of its life cycle	
	<b>Source(s)</b>	<b>Notes</b>
	Plants for a Future. (2020). <i>Thyrsostachys siamensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 26 Oct 2020]	"It cannot grow in the shade." ... "Succeeds in full sun and in light shade[418 ]."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	<b>Source(s)</b>	<b>Notes</b>
	Plants for a Future. (2020). <i>Thyrsostachys siamensis</i> . <a href="https://pfaf.org">https://pfaf.org</a> . [Accessed 26 Oct 2020]	"Prefers a heavy soil [418 ]. Often found in poor soils in the wild, though it can tolerate a range of soils if they are well drained [310 ]. Prefers a pH in the range 6 - 6.5, tolerating 5.5 - 7 [418 ]."
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 26 Oct 2020]	"The natural habitat of <i>T. siamensis</i> is a dry or semi-evergreen forest on poor soils. However it will grow on a wide range of soils, provided they are not waterlogged."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Sympodial, smooth, grayish green, erect, arching, curved outwards at the tips, solid at the base, densely tufted, closely growing, very thick-walled almost solid, nodes not swollen, a white ring below the nodes, slender branches arising from midculm upward, most of the branches fascicled, culm sheaths persistent or rotten closely covering the culm, sheath auricles absent and no cilia on sheath mouth, sheath ligule low and very short, sheath blade erect and narrow triangular or narrowly lanceolate, small leaves narrow lanceolate or linear,"

412	Forms dense thickets	y
	Source(s)	Notes
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 23 Oct 2020]	" <i>T. siamensis</i> is native in Burma (Myanmar) and Thailand, where it occurs widely and often abundantly in pure stands."
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	" <i>Thyrsostachys siamensis</i> , for instance, is a native in the drier areas covering central Thailand and Vietnam, and also Burma (Myanmar). It is often found in pure bamboo forest as well."

501	Aquatic	n
	Source(s)	Notes
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Terrestrial] "occurs in mixed deciduous forest, dry or semievergreen forest, teak forest, hill forest, poor soil, not waterlogged areas"

502	Grass	y
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Oct 2020]	Family: Poaceae Subfamily: Bambusoideae Tribe: Bambuseae Subtribe: Bambusinae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2020). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. <a href="https://npgsweb.ars-grin.gov/">https://npgsweb.ars-grin.gov/</a> . [Accessed 23 Oct 2020]	Family: Poaceae Subfamily: Bambusoideae Tribe: Bambuseae Subtribe: Bambusinae

Qsn #	Question	Answer
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. ( eds.). 2006. Flora of China. Vol. 22 (Poaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Arborescent bamboos, moderately sized; clumps very dense. Rhizomes short necked, pachymorph. Culms unicaespitose, erect; internodes terete. Branches several to many, 1 dominant."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	[No evidence] "Thyrsostachys siamensis, for instance, is a native in the drier areas covering central Thailand and Vietnam, and also Burma (Myanmar). It is often found in pure bamboo forest as well." ... "Flowering of T. siamensis is sporadic and gregarious. In Thailand sporadic flowering is common, and usually occurs between November and February. Mature seed can be collected from February to April. After flowering, culms usually die. Gregarious flowering is rare and the flowering cycle is not known. In seasonal climates, T. siamensis is deciduous in the dry season."

602	Produces viable seed	y
	Source(s)	Notes
	Chaiyarat, R. (2018). The effects of different treatments on seed germination and growth of monastery bamboo, <i>Thyrsostachys siamensis</i> . Journal of Bamboo and Rattan, 17(3): 61-71	"Monastery bamboo, <i>Thyrsostachys siamensis</i> , is a gregarious flowering species. They can produce large number of seeds but there are few seeds that can germinate and grow in the natural forest areas." ... "Monastery bamboos produce flowers during October and February and the seeds are ready during March. In Thailand, normally, monastery bamboos are simultaneously producing seeds in large areas (Sungkaew et al., 2011). In 2007, monastery bamboos were flowered and unusually produced seeds in less than 5% of the total study area in Mahidol University, Kanchanaburi Campus." ... "Although, monastery bamboo produced a large number of seeds in the flowering season, in an unusual year, they will produce lower number of seeds."
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"T. siamensis can be propagated by seed, rhizome cuttings and by tissue culture. Due to its common sporadic flowering, seed is always available."

603	Hybridizes naturally	y
	Source(s)	Notes

Qsn #	Question	Answer
	Goh, W., et al. (2018). The hybrid origin of Phai Liang, a bamboo of recent introduction into horticulture in Southeast Asia, and a new nothogenus, $\times$ <i>Thyrsocalamus</i> (Bambuseae: Bambusinae). <i>Phytotaxa</i> , 362(3), 271-281.	"Indeed, Phai Liang appears to be an intergeneric hybrid bamboo due to its intermediacy in morphological characteristics between <i>Dendrocalamus membranaceus</i> Munro (1868: 149) and <i>T. siamensis</i> . This agrees with the unpublished preliminary assessments of Dr. Chakkrapong Rattanamane of Kasetsart University (Rattanamane pers. comm.). Likewise, Leksungnoen (2017) listed Pai Liang as <i>Dendrocalamus membranaceus</i> $\times$ <i>Thyrsostachys siamensis</i> , although this bamboo has never been scientifically diagnosed or described. Previously, natural inter-generic bamboo hybrids have been investigated (Clark et al. 1989, Takahashi et al. 1994, Triplett et al. 2010, Goh et al. 2011, Triplett et al. 2014)."

604	Self-compatible or apomictic	
	Source(s)	Notes
	Selvan, T. (2018) Bamboo resources, their status, conservation and strategies for improvement. Pp. 263-286 in Gopal Chakravarty SaS, Nazir Pala, Vineeta Vineeta (Eds.), <i>Forest, Climate Change and Biodiversity</i>	[General description] "Most of the bamboo species are known to be highly heterozygous in nature (Indira and Koshi, 1986; Indira, 1988). Bamboos are pre-dominantly wind pollinated like other grasses. They have physical/physiological barriers to self-pollination. These biological aspects lead to high degree of genetic variability and provide ample scope for selection (John et al., 1994)."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Kellogg, E. A. 2015. <i>The Families and Genera of Vascular Plants. Volume XIII. Flowering Plants. Monocots: Poaceae.</i> Springer International Publishing, Switzerland	[Family description] "Most grasses are wind-pollinated. The tiny flowers, feathery stigmas, versatile anthers, and lack of nectar are all characteristic of the wind pollination syndrome, and anyone who suffers from hay fever is painfully aware of the large amount of grass pollen that may be airborne at some times of year."
	Recht, C. & Wetterwald, M. F.(2015). <i>Bamboos.</i> Pavilion Books Company Limited, London	[General description] "Wind carries the pollen from the bright yellow anthers to the stigmas, the long filaments assisting this process. After pollination the cereal-like grain develops from the ovary."

606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos.</i> Backhuys Publishers, Leiden, the Netherlands	[A clumping bamboo propagated vegetatively from rhizomes. Unclear how far it spreads naturally on its own] "Propagation by rhizome cuttings (offsets) is most generally practised. The cuttings are taken from 1-year-old culms with rhizome part, roots and up to 1 m long culm part, planted in a nursery for 2-3 months and transplanted to the field in the rainy season. In general, 10 rhizome cuttings can be taken from a 5-6-year-old clump, retaining 4-5 one-year-old culms in the clump. Optimum planting distance for <i>T. siamensis</i> is 4 m $\times$ 4 m."

607	Minimum generative time (years)	>3
	Source(s)	Notes

Qsn #	Question	Answer
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Flowering of <i>T. siamensis</i> is sporadic and gregarious. In Thailand sporadic flowering is common, and usually occurs between November and February. Mature seed can be collected from February to April. After flowering, culms usually die. Gregarious flowering is rare and the flowering cycle is not known. In seasonal climates, <i>T. siamensis</i> is deciduous in the dry season."
	Akinlabi, E. T., Anane-Fenin, K., & Akwada, D. R. (2017). Bamboo: The Multipurpose Plant. Springer International Publishing, Cham, Switzerland	"Table 1.7 Some important bamboo species and their characteristics" [ <i>Thyrsostachys siamensis</i> - "This species of bamboo produces both sporadic and gregarious flowering within 48 years. It can be propagated using offset cuttings, seeds, and macroproliferation"
	Gaur, R. C. (1985). Bamboo research in India. Recent research on bamboos, Pp. 26-32 in A.N. Rao, G. Dhanarajan, C.B. Sastry (Eds.). Recent Research on Bamboos. The International Development Research Centre, Ottawa, Canada	[Related species takes decades to reach maturity] " <i>Thyrsostachys olieri</i> - Flowering cycle = 48 - 50 Years"

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Caryopsis cylindrical, about 5 mm × 2.5 mm, surmounted by a yellowish, glabrous, soft, long beak." [No evidence. Seeds produced after long periods of vegetative growth. No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	" <i>Thyrsostachys</i> is native to Thailand and Burma (Myanmar) and consists of two species. <i>T. siamensis</i> Gamble is one of the most useful bamboos in Thailand. It has been introduced into other countries in South-East Asia."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Caryopsis cylindrical, about 5 mm × 2.5 mm, surmounted by a yellowish, glabrous, soft, long beak." [No evidence. Seeds produced after long periods of vegetative growth and lose viability relatively quickly]

704	Propagules adapted to wind dispersal	
	Source(s)	Notes
	Banik, R. L. (2015). Bamboo silviculture. In Bamboo (pp. 113-174). Springer, Cham	[General description. Wind may influence distance and direction of gravity-dispersed seeds] "Immediately after ripening, seeds fall on the ground during monsoon (later part of May-August) and start germinating within a week."

Qsn #	Question	Answer
	Akinlabi, E. T., Anane-Fenin, K., & Akwada, D. R. (2017). Bamboo: The Multipurpose Plant. Springer International Publishing, Cham, Switzerland	[Wind may influence distance and direction of seed dispersal] "Table 1.7 Some important bamboo species and their characteristics" [Thyrsostachys siamensis - "This species of bamboo produces both sporadic and gregarious flowering within 48 years. It can be propagated using offset cuttings, seeds, and macroproliferation"

705	Propagules water dispersed	
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"In Thailand it grows in mixed deciduous and teak forest in the north and north-east and pure stands often occur in hill forest in the central part, at altitudes 300-400 m, with annual rainfall of 800-1000 mm." [Unknown. Seeds, when produced may be moved by water]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Caryopsis cylindrical, about 5 mm × 2.5 mm, surmounted by a yellowish, glabrous, soft, long beak." [No evidence. Not fleshy-fruited. Seeds produced after long periods of vegetative growth]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Caryopsis cylindrical, about 5 mm × 2.5 mm, surmounted by a yellowish, glabrous, soft, long beak." [No evidence. Seeds produced after long periods of vegetative growth. No means of external attachment]

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). Plant Resources of South-East Asia No. 7, Bamboos. Backhuys Publishers, Leiden, the Netherlands	"Caryopsis cylindrical, about 5 mm × 2.5 mm, surmounted by a yellowish, glabrous, soft, long beak." [No evidence. Seeds produced after long periods of vegetative growth]
	Banik, R. L. (2015). Bamboo silviculture. In Bamboo (pp. 113-174). Springer, Cham	[Descriptions of other bamboo species may apply if or when <i>Thyrsostachys siamensis</i> seeds are produced] "The bamboo seeds, usually, are eaten heavily by rats, birds, wild boars, porcupines, deer and other animals and also by the local hill tribes and usually carry these far away from the seeding mother, thus assisting in dispersal."

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes

Qsn #	Question	Answer
	Chaiyarat, R. (2018). The effects of different treatments on seed germination and growth of monastery bamboo, <i>Thyrsostachys siamensis</i> . <i>Journal of Bamboo and Rattan</i> , 17(3): 61-71	[Presumably yes, although densities are unknown] "Monastery bamboo, <i>Thyrsostachys siamensis</i> , is a gregarious flowering species. They can produce large number of seeds but there are few seeds that can germinate and grow in the natural forest areas." ... "Monastery bamboos produce flowers during October and February and the seeds are ready during March. In Thailand, normally, monastery bamboos are simultaneously producing seeds in large areas (Sungkaew et al., 2011). In 2007, monastery bamboos were flowered and unusually produced seeds in less than 5% of the total study area in Mahidol University, Kanchanaburi Campus." ... "Although, monastery bamboo produced a large number of seeds in the flowering season, in an unusual year, they will produce lower number of seeds."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	Notes
	PlantUse English contributors. (2020). <i>Thyrsostachys siamensis</i> (PROSEA). <a href="https://uses.plantnet-project.org">https://uses.plantnet-project.org</a> . [Accessed 23 Oct 2020]	"Seeds of <i>T. siamensis</i> germinate immediately after ripening and germination percentage is 90-95%. Stored at 25-30°C, at moisture content of 10% or 6%, seed remained viable for 3 months; after 6 months, germination percentage had dropped to 60% and 86%, after 9 months to 33% and 82%, after 15 months to 1.5% and 71% and after 21 months to 0% and 1% respectively. With storage at 2-4°C and at -5°C, with moisture content between 6-10%, seed remains viable for at least 27 months."
	Banik, R. L. (2015). Bamboo silviculture. In <i>Bamboo</i> (pp. 113-174). Springer, Cham	[General description] "Bamboo seeds are short lived and loss viability within 1-2 months of collection."

803	Well controlled by herbicides	y
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown. No evidence that this species has been controlled using herbicides. Chemical methods to control invasive bamboos would probably be effective if needed

804	Tolerates, or benefits from, mutilation, cultivation, or fire	y
	Source(s)	Notes
	Dransfield, S. & Widjaja, E.A. (eds.). <i>Plant Resources of South-East Asia No. 7, Bamboos</i> . Backhuys Publishers, Leiden, the Netherlands	[Can be repeatedly harvested] "Preferably, 3-4-year-old culms are cut in a 3-year-felling cycle. One-year-old culms are left to produce new shoots and 2-year-old culms serve to support the clump. In Thailand, in the dry season one person can harvest about 1700 culms per month from natural stands, giving an income of 4500 Baht (225 US\$) per month. In the rainy season about 1500 kg young shoots per month can be harvested, giving an income of 1500-6000 Baht."

Qsn #	Question	Answer
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2020). Personal Communication	Unknown

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**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Grows, and could potentially spread, in regions with tropical climates
- Unconfirmed reports of naturalization (but no evidence in Hawaiian Islands)
- Tolerates many soil types
- Forms pure stands in native range
- Reproduces by seeds (after many years or decades of vegetative growth)
- Hybridizes with other bamboo species
- Prolific seed production (after decades of vegetative growth)
- Resprouts after repeated cutting and harvesting

Low Risk Traits

- No reports of naturalization in the Hawaiian Islands, and no evidence of negative impacts where cultivated
- Unarmed (no spines, thorns, or burrs)
- Palatable to animals and people
- Non-toxic
- A clumping bamboo that spreads vegetatively only locally
- Reaches maturity after several decades of growth
- Lack of flowering for much of life cycle limits potential for long distance dispersal

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Forms pure stands in native range

(B) Bird or clearly wind-dispersed?> No. Wind may influence distance and direction of dispersal, but seeds lack obvious adaptations for wind dispersal

Outcome = Accept (Low Risk)