Taxon: Aphananthe aspera (Thunb.) Planch. **Family:** Cannabaceae

Common Name(s): mukutree
scabrous aphananthe

Synonym(s): Homoioceltis aspera (Thunb.) Blume
Prunus aspera Thunb.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 25 Jan 2018

WRA Score: **0.0** **Designation:** L **Rating:** Low Risk

Keywords: Deciduous Tree, Unarmed, Wind-Pollinated, Bird-Dispersed, Coppices

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	y
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	?
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
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		
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	y=1, n=0	y

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	n
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
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		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)		
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	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"The wood is fine and strong, the fiber is used for manufacturing ropes and staple rayon, and the leaves are used as feed for horses." [No evidence of domestication]

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2018. 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, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 Jan 2018]	"Native: Asia-Temperate China: China - Anhui, - Fujian, - Guangdong, - Guangxi, - Guizhou, - Hubei, - Hunan, - Jiangsu, - Jiangxi, - Shaanxi, - Shandong, - Shanxi, - Sichuan, - Yunnan, - Zhejiang Eastern Asia: Japan - Honshu, - Kyushu, - Shikoku; Korea; Taiwan Asia-Tropical Indo-China: Vietnam"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 Jan 2018]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Hills, valleys, streamsides, slopes; 100-1600 m." ... 'Aphananthe aspera var. aspera ... Valleys, streamsides;100-600 m in E and N China, 500-1000 m in SE and SC China." ... "Aphananthe aspera var. pubescens ... Hills, slopes, valleys; 300-1600 m." [Elevation range exceeds 1000 m, demonstrating environmental versatility]
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 24 Jan 2018]	"USDA hardiness: 6-9"

Qsn #	Question	Answer
204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Hills, valleys, streamsides, slopes; 1001600 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shandong, Shanxi, Sichuan, Taiwan, Yunnan, Zhejiang [Japan, Korea, Vietnam]."

Qsn #	Question	Answer
205	**Does the species have a history of repeated introductions outside its natural range?**	**?**
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unclear. Mentioned on commercial websites, but records of introduction outside native range are not well documented.

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2018. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 24 Jan 2018]	No evidence to date

Qsn #	Question	Answer
302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

Qsn #	Question	Answer
304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

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

401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Trees or rarely shrubs, to 25 m tall, d.b.h. to 50 cm, deciduous. Bark brown or grayish brown, scabrous, longitudinally fissured. Branchlets yellowish green when young, brownish red in second year, old ones grayish brown, with distinct rounded lenticels. Stipules linear, 58 mm. Petiole 0.51.5 cm, puberulous; leaf blade ovate to ovate-elliptic, 510 × 35 cm, base broadly cuneate to ± cordate, margin serrate, apex acuminate to narrowly acuminate; 3-veined from base; secondary veins 610 on each side of midvein, extending to margin, each ending in a tooth."

402	**Allelopathic**	
	Source(s)	**Notes**
	He, P. Y., & Ding, G. J. (2007). Effects of allelopathy of the aqueous extract of Aphananthe aspera on physiological activities of Pinus massoniana seedling. Journal of Guizhou Normal University (Natural Sciences), 4, 003	[Potentially. Demonstrated in laboratory setting] The effects of allelopathy of Aphananthe aspera on the physiological activities of masson pine seedling was studied, using the biological identification method with litter extract solution. The results showed that chlorophyll content and cell membrane permeability of the receptor plant were increased with different treatments of the donor; but were reduced on photosynthetic rate and transpiration rate. The nitrogen and phosphorus absorption of donor Aphananthe aspera presented a trend of promotion in low concentration and an inhibition in high concentration, on the potassium absorption they expressed a certain accelerative effect."

403	**Parasitic**	**n**
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees or rarely shrubs, to 25 m tall, d.b.h. to 50 cm, deciduous." [No evidence]

404	**Unpalatable to grazing animals**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Aphananthe aspera ... leaves used as feed for horses, fruits eaten"
	Kawamichi, T. (1997). Seasonal Changes in the Diet of Japanese Giant Flying Squirrels in Relation to Reproduction. Journal of Mammalogy, 78(1), 204-212	"Appendix I. Food items and the percentage of feeding records (<2% total) in 30 food trees not listed in Table 1." [Includes Aphananthe aspera. Leaves, buds & seeds consumed]

405	Toxic to animals	n
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 24 Jan 2018]	"Known Hazards - None known"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Aphananthe aspera ... leaves used as feed for horses, fruits eaten"

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Matsumoto, K. (1996). A new species of the genus Trioza (Homoptera, Psylloidea), gall-maker on Aphananthe aspera (Ulmaceae) from Japan. Japanese Journal of Systematic Entomology, 2(1), 39-43	"Abstract : Trioza usubai sp. nov. is described from leaf margin roll galls on Aphananthe aspera in Chiba, Japan."
	CABI. 2018. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Aphananthe aspera (muku) ... Wild host of: Paratrichodorus porosus"
	Plantwise. 2018. Plantwise Technical Factsheet. Paratrichodorus porosus. https://www.plantwise.org. [Accessed 25 Jan 2018]	"P. porosus is an ectoparasite of roots and is found in soil around the roots but never inside the roots. Feeding by P. porosus causes extensive damage to the root system which becomes reduced and stunted, hence the common name 'stubby root' disease. Nishizawa (1973a, 1973b) found P. porosus to be a causal agent of black-rot disease of Chinese yam (Dioscorea batatus). The disease was successfully transmitted by inoculation to healthy Chinese yam plants (Nishizawa, 1973a)."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 24 Jan 2018]	"Known Hazards - None known"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "Aphananthe aspera ... leaves used as feed for horses, fruits eaten" ... Stem bark used in the treatment of inflammation and pain."

408	Creates a fire hazard in natural ecosystems	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Nakamura, S. (1956). Fire resistance tests of leaves of deciduous trees by a cylindrical electric furnace. Journal of the Japanese Forest Society, 38(4), 136-137	"Deciduous broad-leaves seem far less fire-resistive than evergreens and are especially poor in the defoliation for the fire-preventive plantings. Yet I have found some fire-resistive plants among them, such as Hydrangea macrophylla and Deutzia crenata in their foliate state. Species on the antipole are bamboos and next come Zelkowa serrata, Aphananthe aspera, Robinia pseudo-Acacia etc." [Unknown, but possibly not resistant to fire]
	WRA Specialist. 2018. Personal Communication	Fire ecology unknown, but no evidence of increased fire risk found

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 25 Jan 2018]	"It can grow in semi-shade (light woodland) or no shade."
	Rozendale. 2018. Muku tree - Aphananthe aspera. https://www.rozendale.org/index.php/component/fabrik/details/64/212. [Accessed 25 Jan 2018]	"Shade tolerance: partial shade"
	Hagiwara, N., Ozawa, T., & Kurakubo, T. 1970. On shade tolerance of some trees and shrubs by surveying chlorophyllous content variation produced in more or less sunlight site. Journal of the Japanese Institute of Landscape Architects 34(3): 24-30	[Half-tolerant - Aphananthe aspera] "Abstract: In the condition of more or less sunlight, some trees and shrubs, generally, take possession of difference between tolerant and intolerant. No survey-method of such difference due to scientific basis, hitherto, but by experience. Intending to find such grade data simply and practically, we come to keep some base, which is a handy chlorophyllous instrument. Leaf y branches of some trees and shrubs were set under a classified lux in our campus, we expected chlorophyllous content produced in leaves at limited hours. Having read result of such content quality indicated at instrument under each lux, we concluded biological character in tolerance as follows:"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 25 Jan 2018]	"Succeeds in most soils, including dry gravels, but prefers a deep fertile soil [200]. "

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees or rarely shrubs, to 25 m tall, d.b.h. to 50 cm, deciduous."

412	Forms dense thickets	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Hills, valleys, streamsides, slopes; 100-1600 m." [No evidence]
	Tabata, K., & Morimoto, Y. (2017). Regeneration Traits of Celtis sinensis Pers. and Aphananthe aspera (Thunb.) Planch. in a Created Urban Tree Plantation approximately 20 years after construction. Journal of Environmental Information Science, 45, 1-8	"Through the analysis of fossil pollen, it is estimated that a deciduous broad-leaved forest dominated by C. sinensis and A. aspera covered the Kyoto basin approximately8,500–5,000 years ago (Takahara, 1998). Therefore, C. sinensis and A. aspera forests are thought to be the native vegetation of the Kyoto basin (Shidei, 1993; Morimoto and Natuhara, 2005)."
	Bhuju, D. R., & Ohsawa, M. (2001). Patch implications in the maintenance of species richness in an isolated forest site. Biological Conservation, 98(1), 117-125	[No evidence] "Species richness per square meter was also high in the selective-cut patches (8.2 spp. 1 m-2) and low in protected (5.1 spp. 1 m-2) and clear-felled (5.9 spp. 1 m-2). However, major species specially Pleoblastus chino, perennial herbs (e.g. Houttuynia cordata.), tree species (e.g. Aphananthe aspera, Celtis sinensis, Neolitsea sericea), and liana (e.g. Hedera rhombea) were recorded from all the patches indicating an inter- patch turn over of the species." ... "Abundance of pioneers (e.g. Morus bombysis) and serals (Celtis sinensis, Aphananthe aspera) were high in selective-cut while that of climax species (Neolitsea sericea, Persea thunbergii) were high in the protected patches. However, the shrub species totaling 20 species did not show any management-related preferences."

501	Aquatic	n
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Terrestrial] "Trees or rarely shrubs, to25 m tall, d.b.h. to 50 cm, deciduous." ... "Hills, valleys, streamsides, slopes; 1001600 m."

502	Grass	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 Jan 2018]	Family: Cannabaceae Altfamily: Celtidaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 24 Jan 2018]	Family: Cannabaceae Altfamily: Celtidaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees or rarely shrubs, to 25 m tall, d.b.h. to 50 cm, deciduous."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 25 Jan 2018]	[No evidence. Widespread distribution] "Native Asia-Temperate China: China Anhui, Zhejiang, Fujian, Hunan, Hubei, Jiangxi, Jiangsu, Guangdong, Guizhou, Shanxi, Shandong, Shaanxi, Sichuan, Yunnan, Guangxi Eastern Asia: Japan Honshu, Kyushu, Shikoku; Korea ; Taiwan Asia-Tropical Indo-China: Vietnam"

602	Produces viable seed	y
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 24 Jan 2018]	"Propagation. Seed - it probably requires 2 - 3 months stratification. It is best to sow the seed as soon as it is ripe in a cold frame, otherwise sow as soon as possible in the year. Remove any pulp from the seed before sowing it[200]. When large enough to handle, prick the seedlings out into individual pots and grow them on in the greenhouse for at least their first winter before planting them out in late spring or early summer, after the last expected frosts."

603	Hybridizes naturally	
	Source(s)	**Notes**
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and Genera of Vascular Plants: Volume II. Flowering Plants. Dicotyledons: Magnoliid, Hamamelid and Caryophyllid Families. Springer-Verlag, Berlin, Heidelberg, New York	"Five spp., one in the New World, one in Madagascar, and the other three ranging from India to Japan and eastern Australia." [Unknown. No evidence found]

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Unknown] "Male flowers: in proximal leaf axil of young branchlets. Tepals obovate-rounded, ca. 1.5 mm, with clustered hairs at center. Female flowers: solitary in distal leaf axil of young branchlets. Tepals linear-lanceolate, ca. 2 mm. Ovary pubescent."

605	Requires specialist pollinators	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Kubitzki, K., Rohwer, J.G. & Bittrich, V. (eds.). 1993. The Families and Genera of Vascular Plants: Volume II. Flowering Plants. Dicotyledons: Magnoliid, Hamamelid and Caryophyllid Families. Springer-Verlag, Berlin, Heidelberg, New York	"Aphananthe and Ulmus have also been suggested to be wind-pollinated (Soepadmo 1977; Elias 1970)."
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Male flowers: in proximal leaf axil of young branchlets. Tepals obovate-rounded, ca. 1.5 mm, with clustered hairs at center. Female flowers: solitary in distal leaf axil of young branchlets. Tepals linear-lanceolate, ca. 2 mm. Ovary pubescent."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 25 Jan 2018]	"Propagation Seed - it probably requires 2 - 3 months stratification. It is best to sow the seed as soon as it is ripe in a cold frame, otherwise sow as soon as possible in the year. Remove any pulp from the seed before sowing it [200]." [No evidence of vegetative spread]

607	Minimum generative time (years)	
	Source(s)	**Notes**
	Tabata, K., & Morimoto, Y. (2017). Regeneration Traits of Celtis sinensis Pers. and Aphananthe aspera (Thunb.) Planch. in a Created Urban Tree Plantation approximately 20 years after construction. Journal of Environmental Information Science, 45, 1-8	"For tree height class, height relative growth rate of A. aspera was 0.21 cm/cm/year in the smaller than 15-cm height class and was 0.13 cm/cm/year in the 15–50-cm height class." [Time to maturity unknown]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Drupes green or black, ± globose, ellipsoid, or ovoidglobose, 813 × 69 mm, pubescent; perianth and styles persistent; stalk 510 mm, pubescent." [No evidence. No means of external attachment]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 25 Jan 2018]	Cultivated as an ornamental
	Sandeman Seeds UK. 2018. Seeds of Trees and Shrubs. http://www.sandemanseeds.com. [Accessed 25 Jan 2018]	Seeds sold commercially

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Trees or rarely shrubs, to 25 m tall, d.b.h. to 50 cm, deciduous." ... "Drupes green or black, ± globose, ellipsoid, or ovoidglobose, 8-13 × 6-9 mm, pubescent; perianth and styles persistent; stalk 5-10 mm, pubescent." [No evidence. Unlikely given plant habit & relative fruit size]

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Drupes green or black, ± globose, ellipsoid, or ovoidglobose, 813 × 69 mm, pubescent; perianth and styles persistent; stalk 510 mm, pubescent."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Higa, M., Moriyama, T., & Ishikawa, S. (2012). Effects of complete submergence on seedling growth and survival of five riparian tree species in the warm-temperate regions of Japan. Journal of Forest Research, 17(2), 129-136	"U. parvifolia is an anemochory species, and C. sinensis var. japonica and A. aspera are ornithochory species." [Possible, but primarily bird-dispersed]

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Yoshikawa, T., & Kikuzawa, K. (2009). Pre-dispersal seed predation by a granivorous bird, the masked Grosbeak (Eophona personata), in two bird-dispersed Ulmaceae species. Journal of Ecology and Environment, 32(3), 137-143	"At the study site, fruits of Celtis and Aphananthe are eaten by similar assemblages of frugivorous birds. Frugivorous birds, including the brown-eared bulbul (Microscelis amaurotis, Pycnonotidae), jungle crow (Corvus levaillantii, Corvidae), carrion crow (C. corone, Corvidae), and dusky thrush (Turdus naumanii, Turdidae), swallow fruits and disperse seeds tjf both plant species, whereas the Japanese white-eye (Zosterops japonica, Zosteropidae) disperses only seeds of Celtis, because of its small gape size (T. Yoshikawa, personal observation)."
	Tabata, K., & Morimoto, Y. (2017). Regeneration Traits of Celtis sinensis Pers. and Aphananthe aspera (Thunb.) Planch. in a Created Urban Tree Plantation approximately 20 years after construction. Journal of Environmental Information Science, 45, 1-8	"C. sinensis and A. aspera bear sap fruits (Okamoto and Kitajima, 1988) which provide food to wild birds such as gray starlings (Okamoto and Kitajima, 1988)."
	Higa, M., Moriyama, T., & Ishikawa, S. (2012). Effects of complete submergence on seedling growth and survival of five riparian tree species in the warm-temperate regions of Japan. Journal of Forest Research, 17(2), 129-136	"U. parvifolia is an anemochory species, and C. sinensis var. japonica and A. aspera are ornithochory species."
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Fleshy-fruited] "Drupes green or black, ± globose, ellipsoid, or ovoidglobose, 813 × 69 mm, pubescent; perianth and styles persistent; stalk 510 mm, pubescent."

707	Propagules dispersed by other animals (externally)	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2003. Flora of China. Vol. 5 (Ulmaceae through Basellaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Drupes green or black, ± globose, ellipsoid, or ovoidglobose, 813 × 69 mm, pubescent; perianth and styles persistent; stalk 510 mm, pubescent." [No evidence. No means of external attachment]

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Hwang, M., Garshelis, D., & Wang, Y. (2002). Diets of Asiatic Black Bears in Taiwan, with Methodological and Geographical Comparisons. Ursus, 13, 111-125	"During summer, scats were comprised primarily of fruits (Fig. 2). Fruits of nanmu (Machi/us spp.) were most prevalent (FO = 81 %, RV = 77%) but these were found only in 2000, when they were noticeably more abundant in the forest than in the previous 2 years. We also found Taiwan loquats (Eriobotrya deflexa), Luzon viburnums (Viburnum luzanicum), mountain viburnums (Viburnum propinqum), rough-leaved trees (Aphananthe aspera), and wild plums (Prunus spp.)."
	Tsuji, Y., Tatewaki, T., & Kanda, E. (2011). Endozoochorous seed dispersal by sympatric mustelids, Martes melampus and Mustela itatsi, in western Tokyo, central Japan. Mammalian Biology 76(5), 628-633	"Table 2. Physical characteristics of seeds included within the feces of martens and weasels at Bonbori Forest Path, central Japan from 2007 to 2008. aY: appeared within feces," [Aphananthe aspera seeds present in Marten feces]

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Yoshikawa, T., & Kikuzawa, K. (2009). Pre-dispersal seed predation by a granivorous bird, the masked Grosbeak (Eophona personata), in two bird-dispersed Ulmaceae species. Journal of Ecology and Environment, 32(3), 137-143	"A ripe drupe (10 mm in radius), which is larger than that of Ce/tis, consists of a single, nearly round seed (6 mm in radius) surrounded by a fleshy pulp." [No evidence & unlikely. Relatively large, single-seeded fruit produced]
	Tabata, K., & Morimoto, Y. (2017). Regeneration Traits of Celtis sinensis Pers. and Aphananthe aspera (Thunb.) Planch. in a Created Urban Tree Plantation approximately 20 years after construction. Journal of Environmental Information Science, 45, 1-8	"Both C. sinensis and A. aspera bear fruit well every year. However, the amount of fruit per individual of these species is unknown (Silvics of Japan Editorial Board, 2009). Fruit amount per individual of these species might influence differences in recruitment."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	**Notes**
	Plants for a Future. 2018. Aphananthe aspera. http://www.pfaf.org. [Accessed 25 Jan 2018]	"Seed - it probably requires 2 - 3 months stratification. It is best to sow the seed as soon as it is ripe in a cold frame, otherwise sow as soon as possible in the year."
	Baskin, C.C. & Baskin, J.M. 2014. Seeds Ecology, Biogeography, and Evolution of Dormancy and Germination. Second Edition. Academic Press, San Francisco, CA	[Longevity in seed bank unknown] "TABLE 10.10 Dormancy in seeds of trees of moist warm temperature woodlands." [Aphananthe aspera - PD - Seeds with PD are water-permeable, and according to Nikolaeva (1969, 1977) they have a physiological inhibiting mechanism in the embryo that prevents radicle emergence.]

803	Well controlled by herbicides	

Qsn #	Question	Answer
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Useful Temperate Plants. 2018. Aphananthe aspera. http://temperate.theferns.info/plant/Aphananthe+aspera. [Accessed 25 Jan 2018]	"Plants can be coppiced, and are sometimes grown this way when the bark is being utilized for its fibre. Young plants often make long, succulent growths each year that is then cut back in cold winter [11]."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2018. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Elevation range exceeds 1000 m, demonstrating environmental versatility
• Able to grow in regions with subtropical climates
• Shade tolerant
• Tolerates many soil types
• Reproduces by seeds
• Seeds dispersed by birds, frugivorous mammals & intentionally by people
• Able to coppice & resprout after cutting
• Limited ecological information reduces accuracy or risk prediction

Low Risk Traits
• No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
• Unarmed (no spines, thorns, or burrs)
• Provides fodder for horses
• Not reported to be toxic
• Ornamental
• Not reported to spread vegetatively