Taxon: Magnolia stellata **Family:** Magnoliaceae

Common Name(s): shide-kobushi
star magnolia

Synonym(s): Magnolia kobus var. stellata (Siebold
Magnolia stellata var. rosea J. H.

Assessor: Assessor **Status:** Assessor Approved **End Date:** 18 May 2014

WRA Score: 1.5 **Designation:** EVALUATE **Rating:** Evaluate

Keywords: Naturalized, Temperate Tree, Ornamental, Deer Resistant, Bird-Dispersed

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)	Low
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
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	y = 1*multiplier (see Appendix 2), n= question 205	y
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	y
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	y=1, n=0	n
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	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	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	y
605	Requires specialist pollinators	y=-1, n=0	y
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
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	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)	y=1, n=-1	y
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**
	Hirayama, K., Ishida, K., Setsuko, S., & Tomaru, N. 2007. Reduced seed production, inbreeding, and pollen shortage in a small population of a threatened tree, Magnolia stellata. Biological Conservation, 136(2): 315-323	[No evidence for wild type. Cultivars exist that may have traits that decrease ability to spread] "Magnolia stellata Maxim. is endemic to the Tokai region (the area around Ise Bay) of central Japan. The species occurs in nutrient-poor wetlands at 40–700m elevation, where anthropogenic disturbance is high (Japan Association for Shidekobushi Conservation, 1996). Populations of M. stellata are patchily distributed in this region, and individual populations are generally small and isolated (Fig. 1). Magnolia stellata is a deciduous tree, grows to approximately 10m in height, and often produces multiple stems."

102	Has the species become naturalized where grown?	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	**Notes**
	WRA Specialist. 2014. 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"	Low
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 17 May 2014]	"Native: ASIA-TEMPERATE Eastern Asia: Japan - Honshu"

202	Quality of climate match data	High
	Source(s)	**Notes**
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 17 May 2014]	"Native: ASIA-TEMPERATE Eastern Asia: Japan - Honshu"

203	Broad climate suitability (environmental versatility)	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Floridata. 2012. Magnolia stellata. http://www.floridata.com/ref/m/magno_st.cfm. [Accessed 18 May 2014]	"Hardiness: USDA Zones 4 to 9." [Grows in >Hardiness zones, e3xhbiting broad climate suitability in temperate regions]
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"Magnolia stellata Maxim. (Nooteboom, 1994; Magnolia tomentosa Thunb. is its synonym, Ueda, 1986) is a narrow endemic to the Tokai region of central Japan, where human impact is high, and is found in wetlands from 40–700 m in elevation (Japan Association for Shidekobushi Conservation, 1996)."

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	"Magnolia stellata (Sieb. & Zucc.) Maxim. Magnoliaceae Cultivated Refs: 6 919-U, 823-N, 819-N, 380-W, 101-N, 85-N" [Naturalized or casual in temperate regions]

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Basinger, M. A. 2001. Additions to the vascular flora of Illinois. Transactions of the Illinois State Academy of Science, 94(4), 199-205	"Magnolia stellata (Sieb. & Zucc.) Maxim. (Star magnolia, Magnoliaceae): Jackson Co., IL, is rare, with only two shrubs in Thompson Woods on the Southern Illinois University campus, Carbondale, NE/4 NW/4 Sec. 28, T9S R1W, 29 May 1999, M.A. Basinger 11980a (ILLS)." ... "Star magnolia is native to Japan and is commonly planted as an ornamental in Illinois. This species is flowers before the leaves appear, and the flowers have linear to oblong sepals and petals that are both white and fragrant. The leaves are alternate and elliptic to obovate. The cone-like fruit is an aggregate of follicles approximately 5 cm long (Rehder 1940, Bailey 1949)."
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Magnolia stellata (Sieb. et Zucc.) Maxim. is a deciduous broadleaved tree found in Japan. It is favoured as a garden plant not only in Japan, but also in North America and Europe, where it is known as star magnolia (Callaway 1994)."

301	Naturalized beyond native range	y
	Source(s)	**Notes**
	Howell, C. J., & Sawyer, J. W. (2006). New Zealand naturalised vascular plant checklist. New Zealand Plant Conservation Network, Wellington, NZ	"Magnolia stellata - Naturalised plant status = Casual"
	Heenan, P. B., de Lange, P. J., Cameron, E. K., Ogle, C. C., & Champion, P. D. 2004. Checklist of dicotyledons, gymnosperms, and pteridophytes naturalised or casual in New Zealand: additional records 2001–2003. New Zealand Journal of Botany, 42(5): 797-814	"Magnolia stellata (Siebold & Zucc.) Maxim. NEW RECORD: AK 256163, P. J. de Lange 5392, 26 Dec 2001, South Auckland, Hamilton, St Andrews, Dover Road. NOTES: A self-sown plant growing in an unkempt garden. A fruiting specimen grows on an adjacent property."

Qsn #	Question	Answer
	USDA, ARS, National Genetic Resources Program. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: http://www.ars-grin.gov/. [Accessed 17 May 2014]	"Naturalized: naturalized elsewhere "
	Vincent, M. A., & Cusick, A. W. 1998. New records of alien species in the Ohio vascular flora. Ohio Journal of Science 98(2):	"Some taxa cited in this paper represent first reports as escapes for North America. These are Cotoneaster divaricatus (Rosaceae), Fontanesia fortunei (Oleaceae), Magnolia X soulangeana (Magnoliaceae), Magnolia stellata (Magnoliaceae), Viburnum buddleifolium (Caprifoliaceae), and Viburnum x rhytidiphylloides (Caprifoliaceae." ... "Magnolia stellata (Siebold & Zucc.) Maxim. (Magnoliaceae) - Star magnolia BUTLER CO: Weed under trees where starlings are known to roost, Bishop Woods, Miami University campus, Oxford, 10 Oct 1995, Vincent 7169 & Seidel (MU), same locality, 2 Jun 1997, Shockey 41 (MU). Star magnolia, a native of mountain woodlands in Japan, is very widely planted (Griffiths 1994, Rehder 1947)."

302	Garden/amenity/disturbance weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	Agricultural/forestry/horticultural weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
305	**Congeneric weed**	**n**
	Source(s)	**Notes**
	Richardson, D. M., & Rejmánek, M. 2011. Trees and shrubs as invasive alien species–a global review. Diversity and Distributions, 17(5): 788-809	"Many large, particularly tropical, woody genera are clearly underrepresented. Examples (with number of known invasive species/total number of species) ..." ... "Magnolia (0/220)" [This publication reports no invasive Magnolia spp.]
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Several Magnolia species are listed as naturalized, but none are regarded as serious weeds

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., Setsuko, S., & Tomaru, N. 2007. Reduced seed production, inbreeding, and pollen shortage in a small population of a threatened tree, Magnolia stellata. Biological Conservation, 136(2): 315-323	"Magnolia stellata is a deciduous tree, grows to approximately 10m in height, and often produces multiple stems."
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). 2008. Flora of China. Vol. 7 (Menispermaceae through Capparaceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Genus Description: No evidence] "Trees or shrubs, evergreen. Bark usually gray and smooth or sometimes coarsely deeply furrowed. Twigs with annular stipular scar. Stipules membranous, free or adnate to petiole and leaving a stipular scar on petiole. Leaves spirally arranged, folded in bud, erect when young; leaf blade thickly papery or leathery, margin entire. Flowers terminal on terminal brachyblasts, solitary, bisexual, large, usually fragrant. Tepals9–12, in 3 or 4 whorls, subequal. Stamens caducous; filaments flat; connective elongated, forming a short or long tip; anthers dehiscing introrsely. Gynoecium linked to androecium, without a gynophore. Carpels few to many, distinct; styles curved outward; ovules 2 per carpel or rarely in basal carpels 3 or 4; stigmas papillate, located in adaxial side of carpel. Fruit usually ovoid; mature carpels distinct, leathery or woody, dehiscing along dorsal sutures, apex long or shortly beaked. Seeds 1 or 2 per carpel; testa orangish red or bright red, fleshy, oily; endotesta rigid, hilum connected to placentation by filiform funiculus."

402	Allelopathic	
	Source(s)	**Notes**
	gardenguides.com. 2010. Star Magnolia (Stellata). http://www.gardenguides.com/taxonomy/star-magnolia-magnolia-stellata/. [Accessed 18 May 2014]	"Toxic to Nearby Plants - No"

Qsn #	Question	Answer
	Abdelgaleil, S. A., & Hashinaga, F. 2007. Allelopathic potential of two sesquiterpene lactones from Magnolia grandiflora L. Biochemical Systematics and Ecology, 35 (11), 737-742	[Unknown for Magnolia stellata. Allelopathic properties present in other members of the genus] "The allelopathic effects of the two sesquiterpene lactones, costunolide and parthenolide, isolated from the leaves of Magnolia grandiflora L. were evaluated on the wheat (Triticum aestivum L.), lettuce (Lactuca sativa L.), radish (Raphanus sativus L.) and onion (Allium cepa L.). Seed germination of the test species was significantly reduced at 500 mg/ml by both compounds. Both sesquiterpenes showed pronounced inhibition of root length of the test species and the inhibitory effect was concentrationdependent. In addition, shoot growth of the four species was significantly inhibited at all the concentrations tested (10e500 mg/ml). Parthenolide reduced germination and inhibited seedling growth more than costunolide. Inhibition of root growth was generally greater than that of shoot growth. The results encourage the use of these sesquiterpenes as models for development of new herbicides."

403	Parasitic	n
	Source(s)	**Notes**
	Sarker, S.D. & Maruyama, Y. (eds.). 2003. Magnolia: The Genus Magnolia. Taylor & Francis, London, UK	No evidence in genus

404	Unpalatable to grazing animals	y
	Source(s)	**Notes**
	Connon Nurseries. 2014. Royal Star Magnolia - Magnolia stellata 'Royal Star', http://plants.connon.ca/11100004/Plant/960/Royal_Star_Magnolia. [Accessed 18 May 2014]	"Deer don't particularly care for this plant and will usually leave it alone in favor of tastier treats." [Palatability of cultivar likely similar to that of wild type]
	USDA NRCS. 2014. Plants Topics - Magnolia stellata. http://plants.usda.gov/java/charProfile?symbol=MAST6. [Accessed 18 May 2014]	"Fodder Product - No"
	Burke, E. 2010. Oh Deer! Rocky Dale Gardens Volume 1. Issue 14. June 9th. www.rockydalegardens.com	"The deer don’t like the lemon-scented wood of Magnolia. Something extremely beautiful that the deer don’t like!"
	Soderstrom, N. 2009. Deer-Resistant Landscaping: Proven Advice and Strategies for Outwitting Deer and 20 Other Pesky Mammals. Rodale, New York	Magnolia stellata included in a list of deer resistant plants. Suggests trees may be unpalatable

Qsn #	Question	Answer
405	**Toxic to animals**	**n**
	Source(s)	**Notes**
	gardenguides.com. 2010. Star Magnolia (Stellata). http://www.gardenguides.com/taxonomy/star-magnolia-magnolia-stellata/. [Accessed 18 May 2014]	"Toxic to Livestock - No"
	Soderstrom, N. 2009. Deer-Resistant Landscaping: Proven Advice and Strategies for Outwitting Deer and 20 Other Pesky Mammals. Rodale, New York	"Toxicity: Our sources suggest no toxins."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	The Royal Horticultural Society. 2014. Magnolia stellata - Star magnolia. http://www.rhs.org.uk/Plants/10721/Star-magnolia/Details. [Accessed 18 May 2014]	"Pests May be damaged by horse chestnut scale, snails and capsid bug Diseases May be affected by coral spot, grey mould, honey fungus, a virus or fungal leaf spot "
	Missouri Botanical Garden. 2014. Magnolia stellata. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=l130. [Accessed 18 May 2014]	"Problems - No serious disease or insect problems. Spring frosts often damage flowers of this early bloomer."
	Shoot Gardening. 2014. Magnolia stellata (Star magnolia). http://www.shootgardening.co.uk/plant/magnolia-stellata. [Accessed 18 May 2014]	"Specific pests: Horse chestnut scale , Capsid bug Diseases: Generally disease free."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	University of California. 2012. Safe and Poisonous Garden Plants - Toxic Plants (by common name). http://ucanr.edu/sites/poisonous_safe_plants/Toxic_Plants_by_co mon_Name_659/. [Accessed]	[Magnolia stellata listed among safe plants] "Safe Plants (by common name) A note on “safe” plants: The plants on this list are generally believed to be safe. However, if you suspect that a child (or adult) has eaten quantities of any of these plants (or any of their parts), or if you notice symptoms such as illness or dermatitis after handling these plants, call your Poison Control Center for additional information: (800) 222-1222. It is assumed that the plants listed here are not being used as teas, herbs, or medicines."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

Qsn #	Question	Answer
408	**Creates a fire hazard in natural ecosystems**	**n**
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"Magnolia stellata Maxim. (Nooteboom, 1994; Magnolia tomentosa Thunb. is its synonym, Ueda, 1986) is a narrow endemic to the Tokai region of central Japan, where human impact is high, and is found in wetlands from 40–700 m in elevation (Japan Association for Shidekobushi Conservation, 1996)." [No evidence, and not from a fire prone area]

409	**Is a shade tolerant plant at some stage of its life cycle**	
	Source(s)	**Notes**
	Missouri Botanical Garden. 2014. Magnolia stellata. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=l130. [Accessed 18 May 2014]	"Easily grown in average, medium, well-drained soil in full sun to part shade."
	gardenguides.com. 2010. Star Magnolia (Stellata). http://www.gardenguides.com/taxonomy/star-magnolia-magnolia-stellata/. [Accessed 18 May 2014]	"Shade Tolerance Intolerant"
	Odenwald, N.G, Fryling, C.F. & Pope, T.E. 2004. Plants for American Landscapes. LSU Press, Baton Rouge, LA	"This magnolia performs best in a fertile, moist, well-drained soil in full sunlight or partial shade. In shade, it grows open and airy with fewer flowers."

410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	Ohio State University. 2003. Plant Facts. Magnolia stellata - Star Magnolia (Magnoliaceae). plantfacts.osu.edu/pdf/0247-716.pdf	"-performs best in partial sun in moist, acidic, deep soils but is quite adaptable to a wide range of soils, soil pHs, pollution, and even wet soils"
	Shoot Gardening. 2014. Magnolia stellata (Star magnolia). http://www.shootgardening.co.uk/plant/magnolia-stellata. [Accessed 18 May 2014]	"Soil type: Loamy, Sandy, Clay Soil drainage: Moist but well-drained, Well-drained Soil pH: Acid, Neutral, Alkaline"

411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"The species is a deciduous tree, grows up to 10m in height, 20 cm in diameter at breast height, and often produces multiple stems."

412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	Setsuko, S., Ishida, K., Ueno, S., Tsumura, Y., & Tomaru, N. 2007. Population differentiation and gene flow within a metapopulation of a threatened tree, Magnolia stellata (Magnoliaceae). American Journal of Botany, 94(1): 128-136	"M. stellata is distributed in clumps along small rivers and valleys" [No evidence of dense thicket formation, however]

Qsn #	Question	Answer
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	[No evidence from this study] "Individuals of M. stellata are patchily distributed in wetlands at the periphery of the pond and are accompanied by Ilex spp., Quercus spp., Clethra barvinervis, Evodiopanax innovans and Rhododendron reticulatum. Based on data from almost all populations of M. stellata in the Tokai region, this population is regarded as a large one, although about 75 % of the other populations are small, with less than 100 individuals (Japan Association for Shidekobushi Conservation, 1996)."

501	Aquatic	n
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	[Terrestrial Tree] "Magnolia stellata Maxim. (Nooteboom, 1994; Magnolia tomentosa Thunb. is its synonym, Ueda, 1986) is a narrow endemic to the Tokai region of central Japan, where human impact is high, and is found in wetlands from 40–700 m in elevation (Japan Association for Shidekobushi Conservation, 1996). The species is a deciduous tree, grows up to 10m in height, 20 cm in diameter at breast height, and often produces multiple stems."

502	Grass	n
	Source(s)	**Notes**
	Sarker, S.D. & Maruyama, Y. (eds.). 2003. Magnolia: The Genus Magnolia. Taylor & Francis, London, UK	Magnoliaceae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Sarker, S.D. & Maruyama, Y. (eds.). 2003. Magnolia: The Genus Magnolia. Taylor & Francis, London, UK	Magnoliaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., Setsuko, S., & Tomaru, N. 2007. Reduced seed production, inbreeding, and pollen shortage in a small population of a threatened tree, Magnolia stellata. Biological Conservation, 136(2): 315-323	"Magnolia stellata is a deciduous tree, grows to approximately 10m in height, and often produces multiple stems."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	[Endangered due to human impacts, but still able to reproduce] "Magnolia stellata is an endangered tree species (Environment Agency of Japan, 2000) endemic to the Tokai region of central Japan." ... "Magnolia stellata Maxim. (Nooteboom, 1994; Magnolia tomentosa Thunb. is its synonym, Ueda, 1986) is a narrow endemic to the Tokai region of central Japan, where human impact is high, and is found in wetlands from 40–700 m in elevation (Japan Association for Shidekobushi Conservation, 1996)." ... "However, all individual trees of M. stellata produced fruits and seeds, and the fruit set and seed set per tree were 57.8 % and 13.7 %, respectively: these results do not indicate a late-acting self-incompatibility system in which the seed set from self-pollination is zero (or near zero) in most individuals (Seavey and Bawa, 1986)."

602	Produces viable seed	y
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"However, all individual trees of M. stellata produced fruits and seeds, and the fruit set and seed set per tree were 57.8 % and 13.7 %, respectively: these results do not indicate a late-acting self-incompatibility system in which the seed set from self-pollination is zero (or near zero) in most individuals (Seavey and Bawa, 1986)."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Muranishi, S., Tamaki, I., Setsuko, S., & Tomaru, N. 2013. Asymmetric introgression between Magnolia stellata and M. salicifolia at a site where the two species grow sympatrically. Tree Genetics & Genomes, 9(4): 1005-1015	"Abstract In order to understand the ongoing evolutionary relationships between species, it is important to elucidate patterns of natural hybridization. In the zone where two species are sympatrically distributed, we examined 274 individuals of Magnolia stellata, Magnolia salicifolia, and their putative hybrids by means of 16 nuclear and three chloroplast microsatellite markers." ... "The occurrences of F2 and backcross hybrids indicate that F1 hybrids are fertile. The chloroplast DNA haplotypes of all F1 hybrids corresponded to those detected in M. salicifolia, so that maternal parents of the F1 hybrids were all M. salicifolia. Furthermore, no hybrid individuals derived from a backcross to M. stellata were detected. These results suggest that the direction of hybridization and the subsequent introgression have been quite asymmetric and that the introgression occurred from M. stellata into M. salicifolia."
	Flint, H.L. & Lyverse, J.M. 1997. Landscape plants for eastern North America: exclusive of Florida and the immediate Gulf Coast. John Wiley and Sons, New York, NY	"Related Hybrids. The following hybrids between M. liliiflora and M. stellata were developed by William Kosar and introduced by the U.S. National Arboretum in 1968."

604	Self-compatible or apomictic	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"Thus the decrease in seed production due to self-pollination for M. stellata is probably explained by inbreeding depression rather than late-acting self-incompatibility." ... "This study indicates that seed production in M. stellata, a tree with a large floral display, is limited by both pollen shortage and self-pollination. First, 80.8 % of ovules failed to develop into seeds because of pollen shortage, although a large floral display is generally expected to reduce an insufficiency of pollen quantity. Second, the large floral display with an automimicry system caused frequent geitonogamous self-pollination, which resulted in a decrease in seed production to 45.9 %." [Self-compatible, but self-pollination results in reduced seed set]

605	Requires specialist pollinators	y
	Source(s)	**Notes**
	Hirayama, K., Ishida, K., & Tomaru, N. 2005. Effects of pollen shortage and self-pollination on seed production of an endangered tree, Magnolia stellata. Annals of Botany, 95(6): 1009-1015	"Conclusions It is concluded that seed production of M. stellata is strongly limited by both pollen shortage and selfpollination. Inefficient beetle-pollination and the automimicry system via asynchronous flowering might be responsible for the high level of pollen shortage and frequent geitonogamy. This is despite a large, showy floral display and the dichogamous system of the species." ... "Magnolia stellata flowers in the studied population were visited by a substantial number of small beetles belonging to the Staphylinidae, and a few flies and bees (K. Ishida et al., unpubl. data). We observed these small beetles foraging for pollen and/or crawling on stigmas and stamens in both male and female flowers, indicating that they are probably the main pollinators of M. stellata. In other Magnolia species predominantly pollinated by beetles, pollen shortage or inefficient pollination has been reported." [Predominantly beetle-pollinated]

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	gardenguides.com. 2010. Star Magnolia (Stellata). http://www.gardenguides.com/taxonomy/star-magnolia-magnolia-stellata/. [Accessed 18 May 2014]	"Vegetative Spread - None" "Propagations (Ways to Grow) - Bare Root, Container, Cuttings, Seed"
	USDA NRCS. 2014. Plants Topics - Magnolia stellata. http://plants.usda.gov/java/charProfile?symbol=MAST6. [Accessed 18 May 2014]	"Vegetative Spread Rate - None"

Qsn #	Question	Answer
607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Shoot Gardening. 2014. Magnolia stellata (Star magnolia). http://www.shootgardening.co.uk/plant/magnolia-stellata. [Accessed 18 May 2014]	"10-20 Years To maturity"
	Ohio State University. 2003. Plant Facts. Magnolia stellata - Star Magnolia (Magnoliaceae). plantfacts.osu.edu/pdf/0247-716.pdf	"-maturing slowly to 15' tall x 15' wide -upright oval growth habit in youth, becoming spreading and mounding -slow growth rate"

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)." [No evidence, and fruits/seeds lack means of external attachment]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Magnolia stellata (Sieb. et Zucc.) Maxim. is a deciduous broadleaved tree found in Japan. It is favoured as a garden plant not only in Japan, but also in North America and Europe, where it is known as star magnolia (Callaway 1994)."
	Missouri Botanical Garden. 2014. Magnolia stellata. http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=l130. [Accessed 18 May 2014]	"Magnolia stellata, commonly called star magnolia, is native to Japan. It is a small deciduous tree that typically grows 15-20' tall with a spreading, rounded crown. It is also often grown as a large oval to rounded shrub. It is noted for its compact size and late winter to early spring bloom of star-shaped white flowers. Each flower typically has 12-18 narrow strap-like tepals." ... "Excellent specimen tree for the lawn or shrub border. Also effective in foundation plantings, near patios or on the periphery of woodland areas. May be grown as an informal hedge." [Ornamental]

703	**Propagules likely to disperse as a produce contaminant**	**n**
	Source(s)	**Notes**
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	[No evidence] "Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)."

704	**Propagules adapted to wind dispersal**	**n**
	Source(s)	**Notes**

Qsn #	Question	Answer
	Setsuko, S., Ishida, K., Ueno, S., Tsumura, Y., & Tomaru, N. 2007. Population differentiation and gene flow within a metapopulation of a threatened tree, Magnolia stellata (Magnoliaceae). American Journal of Botany, 94(1): 128-136	"The fruits are aggregated, with at most two red seeds per follicle, and may be dispersed by birds (Callaway, 1994)."

705	Propagules water dispersed	n
	Source(s)	**Notes**
	Kisanuki, H., Oguro, H., Nakai, A., Setsuko, S., Nishimura, N., & Tomaru, N. 2008. The soil seed bank of the threatened plant Magnolia stellata is subordinate to the emergence of current-year seedlings. Journal of Forest Research, 13(2): 143-146	"Current-year seedlings were abundant in water channels, on moss, or under mature crowns, suggesting that the seeds may require wet soil conditions for germination." ... "It occurs primarily in areas that are sunny but moist with continuous water flow (Ueda 1988). Thus, nearby swamps or springs are indispensable for maintenance of its populations (Goto and Kikuchi 1997; Hiroki 1995; Kisanuki et al. 2006)." [Water may move seeds in these habitats, or moisture may be required for germination, thus accounting for their occurrence in these areas]
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)." [Unknown. Water may secondarily disperse seeds in wetter habitats]

706	Propagules bird dispersed	y
	Source(s)	**Notes**
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)."
	Setsuko, S., Ishida, K., Ueno, S., Tsumura, Y., & Tomaru, N. 2007. Population differentiation and gene flow within a metapopulation of a threatened tree, Magnolia stellata (Magnoliaceae). American Journal of Botany, 94(1): 128-136	"The fruits are aggregated, with at most two red seeds per follicle, and may be dispersed by birds (Callaway, 1994)." ... "At the among population level, gene flow by seeds occurs randomly, probably by birds, while at the within-population level, spatially distance-dependent gene dispersal by seeds occurs. In contrast, gene dispersal by pollen is restricted by spatial distance at both the within- and among-population levels."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	"Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)."

Qsn #	Question	Answer
	Kisanuki, H., Oguro, H., Nakai, A., Setsuko, S., Nishimura, N., & Tomaru, N. 2008. The soil seed bank of the threatened plant Magnolia stellata is subordinate to the emergence of current-year seedlings. Journal of Forest Research, 13(2): 143-146	[Rodent seed predators may cache seeds & thereby disperse those that escape predation, but internal dispersal by birds appears to be the most important dispersal vector] "Predation by vertebrates is another factor leading to seed loss post-dispersal (Masaki et al. 1998). Vertebrates, particularly mice, are known to predate Magnolia seeds on the forest floor (Corral-Aguirre and Sanchez-Velasquez 2006) and may have been responsible for the low number of M. stellata seeds in the soil."

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Kisanuki, H., Oguro, H., Nakai, A., Setsuko, S., Nishimura, N., & Tomaru, N. 2008. The soil seed bank of the threatened plant Magnolia stellata is subordinate to the emergence of current-year seedlings. Journal of Forest Research, 13(2): 143-146	"Predation by vertebrates is another factor leading to seed loss post-dispersal (Masaki et al. 1998). Vertebrates, particularly mice, are known to predate Magnolia seeds on the forest floor (Corral-Aguirre and Sanchez-Velasquez 2006) and may have been responsible for the low number of M. stellata seeds in the soil." [Seeds may be subject to predation by rodents]
	Tamaki, I., Ishida, K., Setsuko, S., & Tomaru, N. 2009. Interpopulation variation in mating system and late-stage inbreeding depression in Magnolia stellata. Molecular Ecology, 18(11), 2365-2374	[Presumably Yes, if dispersed by birds] "Fruits are aggregated and contain between 1 and about 40 seeds per fruit. The number of seeds within fruits varies within and among individual trees (Tamaki et al. 2009). Its seeds are dispersed by gravity (Setsuko et al. 2004) and/or birds (T. Kimura, unpublished)."
	Herrera, C. M., Jordano, P., Guitián, J., & Traveset, A. 1998. Annual variability in seed production by woody plants and the masting concept: reassessment of principles and relationship to pollination and seed dispersal. The American Naturalist, 152(4): 576-594	[Presumably Yes] "Three of the seed dispersal contrasts were among genera within families: Fraxinus (nonzoochorous) versus Olea and Phillyrea (endozoochorous) within the Oleaceae (contrast 1, fig. 3B), Liriodendron (nonzoochorous) versus Magnolia (endozoochorous) within the Magnoliaceae..." [Magnolia are endozoochoruous = Dispersal by the agency of animals, typically and especially after passage of non-digestable fruits or seeds through the gut]

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Ohio State University. 2003. Plant Facts. Magnolia stellata - Star Magnolia (Magnoliaceae). plantfacts.osu.edu/pdf/0247-716.pdf	"-sparse aggregate fruits split open in Sept., but are not ornamental and seldom produced in significant quantities"
	Kisanuki, H., Oguro, H., Nakai, A., Setsuko, S., Nishimura, N., & Tomaru, N. 2008. The soil seed bank of the threatened plant Magnolia stellata is subordinate to the emergence of current-year seedlings. Journal of Forest Research, 13(2): 143-146	"We studied seed bank formation of the threatened star magnolia, Magnolia stellata, to examine the early stage of regeneration. Forty-five seedling plots (2 x 2 m), each including a soil-sampling quadrat (40 x 40 cm), were established randomly under or around the crowns of mature M. stellata trees. Seeds of M. stellata were collected from each quadrat to a depth of 5 cm. Only four seeds of M. stellata were found (0.56 seeds/m2) and all were located under mature crowns."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Kisanuki, H., Oguro, H., Nakai, A., Setsuko, S., Nishimura, N., & Tomaru, N. 2008. The soil seed bank of the threatened plant Magnolia stellata is subordinate to the emergence of current-year seedlings. Journal of Forest Research, 13(2): 143-146	[A small percentage of seeds persist in the soil seed bank] "Magnolia stellata seeds show considerable germination below the crowns of mature trees in the year following masting, while some seeds remain dormant in the soil. Considering the soil seed bank and the current-year seedling bank of M. stellata, a frequent supply of seed is essential for the regeneration of this species." ... "Seedlings occurred below the crown, and most M. stellata seeds that are dispersed appear to germinate in the year following masting, with the remaining seeds acting as a seed bank. This seed bank will be important for regeneration, although only a few saplings ([1 year old) emerged in the study plot, indicating high mortality of seedlings under the crown. The seed bank of M. stellata may contribute to regeneration in future years after soil disturbance."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	WRA Specialist. 2014. 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**
	USDA NRCS. 2014. Plants Topics - Magnolia stellata. http://plants.usda.gov/java/charProfile?symbol=MAST6. [Accessed 18 May 2014]	"Coppice Potential - Yes" "Resprout Ability - Yes" "Fire Tolerance - Low"
	gardenguides.com. 2010. Star Magnolia (Stellata). http://www.gardenguides.com/taxonomy/star-magnolia-magnolia-stellata/. [Accessed 18 May 2014]	"Responds to Coppicing - Yes" "Fire Resistant - No"

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	WRA Specialist. 2014. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Able to grow in >5 hardiness zones in temperate climates
• Naturalized in Ohio & possibly New Zealand
• Unpalatable to deer
• Possibly shade tolerant
• Tolerates many soil types
• Seeds dispersed by birds & intentionally by people
• Limited self-compatibility (although reduced seed set)
• Hybridizes with other Magnolia species
• May form a persistent seed bank
• Able to coppice & resprout after cutting

Low Risk Traits
• May be able to naturalize only in higher, cooler elevations in tropical islands
• Despite naturalization, no negative impacts documented
• Unarmed (no spines, thorns or burrs)
• Non-toxic
• Ornamental
• Requires beetle for effective pollination
• Does not spread vegetatively
• Reaches maturity in >4 years
• Does not seed prolifically

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Not known to form dense stands. Shade tolerance inconclusive
(B) Bird-dispersed?> Dispersed by birds
(C) Life cycle < 4 years? No
Outcome = Evaluate Further