

Taxon: *Asplenium antiquum* Makino

Family: Aspleniaceae

Common Name(s): ō-tani-watari

Synonym(s):

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 27 Aug 2018

WRA Score: 1.0

Designation: L

Rating: Low Risk

Keywords: Epiphytic, Subtropical, Ornamental, Shade Tolerant, Wind-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)	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		
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		
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	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		

Qsn #	Question	Answer Option	Answer
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		
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		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed	y=1, n=-1	n
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/m2)	y=1, n=-1	y
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		
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.). 2013. Flora of China. Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence of domestication] "On rocks or tree trunks in forests; 600–1600 m. Fujian, ?Hunan, Taiwan [Japan, Korea]."

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
	Jian, P. Y., Hu, F. S., Wang, C. P., Chiang, J. M., & Lin, T. C. (2013). Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. PLoS One, 8(5), e64599	" <i>Asplenium antiquum</i> Makino (Fig. 1) is one of the most common vascular epiphytes in Taiwan and other parts of the old world tropical forests [22]."
	USDA, ARS, Germplasm Resources Information Network. 2018. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 15 Aug 2018]	"Native Asia-Temperate CHINA: China (Hong Kong) EASTERN ASIA: Japan, [Honshu, Kyushu, Ryukyu Islands, Shikoku] Korea, South, [Cheju] Taiwan"
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	"Temp. -S. Trop." [Temperate to subtropical]

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 15 Aug 2018]	

Qsn #	Question	Answer
203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	[Elevation range 2500 m, demonstrating environmental versatility] "Asplenium antiquum is the elevationally most widespread species, ranging from the coast to up to c. 2,500 m above sea level [asl], among the three species of bird's nest ferns in Taiwan."

204	Native or naturalized in regions with tropical or subtropical climates	y
	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 27 Aug 2018]	"Native Asia-Temperate CHINA: China (Hong Kong) EASTERN ASIA: Japan, [Honshu, Kyushu, Ryukyu Islands, Shikoku] Korea, South, [Cheju] Taiwan"
	Jones, D. L. 1987. <i>Encyclopedia of Ferns</i> . Timber Press, Portland, OR	"Temp. -S. Trop." [Temperate to subtropical]

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Kauai Nursery and Landscaping. (2018). <i>Asplenium antiquum</i> "Victoria'. http://www.kauainursery.com . [Accessed 27 Aug 2018]	"A spectacular fern popular for its neat rosette of spreading fronds. Wavy margins set this easy to grow Bird's Nest fern apart from the others."
	Vermeulen, N. 1998. <i>Encyclopedia of House Plants</i> . 2nd Print. Rebo Productions, Lisse, Netherlands	[Cultivated as an ornamental. Unclear how often cultivation occurs outdoors] "This species from Taiwan and Japan has smaller, more pointed leaves than the bird's nest fern The leaves often have slightly wavy edges, are more V-shaped and are also sturdier than the leaves of <i>Asplenium nidus</i> , and therefore less vulnerable."
	WRA Specialist. 2018. Personal Communication	Cultivated & sold as an ornamental plant in the Hawaiian Islands.

301	Naturalized beyond native range	n
	Source(s)	Notes
	Vander Velde, N. 2003. <i>The Vascular Plants of Majuro Atoll, Republic of the Marshall Islands</i> . <i>Atoll Research Bulletin</i> 503: 1-141	" <i>Asplenium antiquum</i> ... Recent introduction. Southern Japan. Rare. Introduced in 1998 by RRE as an ornamental houseplant. Some specimens may survive in houses and offices, but may be confused with the local indigenous species, <i>Asplenium nidus</i> , which is sometimes also utilized as an ornamental (NVV 1999).**"
	Randall, R.P. (2017). <i>A Global Compendium of Weeds</i> . 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence to date
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2018. <i>Flora of the Hawaiian Islands</i> . Smithsonian Institution, Washington, D.C. http://botany.si.edu/ . [Accessed 27 Aug 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 to date

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 to date

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 to date

305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Possibly. A number of taxa have been listed as naturalized, and/or weeds of unspecified impacts

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. Flora of China. Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "Plants 80–100 cm tall. Rhizome erect, massive; scales on apex brown to dark grayish brown, ovate-triangular, entire to fibrillose. Fronds caespitose; stipe pale brown to dark brown, 2–5(–7) cm, woody, terete abaxially, adaxially grooved, scales at stipe base numerous, similar to those on rhizome, 15–30 × 2–6 mm; lamina narrowly lanceolate, 75–100 × 6.5–8.5(–15) cm, cuneate at base, margin entire and cartilaginous. Midrib raised on both sides, semiterete abaxially, dark brown, subglabrous; veins slightly raised on both sides, forked or simple, parallel, connected to marginal vein. Fronds leathery, after drying brownish green or brownish. Sori linear, 3–4 cm, on acroscopic veins, occupying 2/3–3/4 of subtending vein, lower parts of lamina usually sterile; indusia brownish or grayish brown, linear, thickly membranous, entire, persistent. Spores with lophate perispore."

402	Allelopathic	
	Source(s)	Notes

Qsn #	Question	Answer
	Jian, P. Y., Hu, F. S., Wang, C. P., Chiang, J. M., & Lin, T. C. (2013). Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. PloS One, 8(5), e64599	[Facilitates at least one other epiphytic species; i.e. no evidence of allelopathy] "We assessed the interactions of two widespread epiphyte species, <i>Asplenium antiquum</i> and <i>Haplopteris zosterifolia</i> , by examining their co-occurrence and size-class association in the field. To elucidate factors controlling their interactions, we conducted reciprocal-removal and greenhouse-drought experiments, and nutrient and isotope analyses. Forty-five percent of <i>H. zosterifolia</i> co-occurred with <i>A. antiquum</i> , whereas only 17% of <i>A. antiquum</i> co-occurred with <i>H. zosterifolia</i> . Removing the fronds plus substrate of <i>A. antiquum</i> reduced the relative frond length and specific leaf area of <i>H. zosterifolia</i> , but removing fronds only had little effect. Removing <i>H. zosterifolia</i> had no significant effects on the growth of <i>A. antiquum</i> ."
	WRA Specialist. 2018. Personal Communication	Unknown. No evidence found

403	Parasitic	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. Flora of China. Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Plants 80–100 cm tall." [Aspleniaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Wada, M. (2007). The fern as a model system to study photomorphogenesis. Journal of Plant Research, 120(1), 3-16	[Reportedly edible to people. Palatability to animals unknown] "In Asia <i>Pteridium aquilinum</i> (L.) Kuhn, <i>Osmunda japonica</i> Thunb., <i>Matheuccia struthiopteris</i> (L.) Todaro, and, recently, <i>Asplenium antiquum</i> Makino are well-known edible species, although <i>P. aquilinum</i> is reported to be carcinogenic (Evans and Mason 1965)."

405	Toxic to animals	n
	Source(s)	Notes
	Indoor Plants. (2018). <i>Asplenium antiquum</i> . https://indoor-plants.net/asplenium-antiquum/ . [Accessed 27 Aug 2018]	"Toxic - No but not edible"
	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

406	Host for recognized pests and pathogens	n
	Source(s)	Notes
	De Winter, W.P. and Amoroso, V.B. (eds.). (2003). Plant Resources of South-East Asia No 15(2). Cryptogams: Ferns and fern allies. Backhuys Publishers, Leiden, The Netherlands	"In potted <i>A. nidus</i> for ornamental use, a leaf spot and blight caused by <i>Pseudomonas gladioli</i> and <i>P. asplenii</i> are serious diseases. The impatiens necrotic spot virus causes ring spots and necrotic lesions. Because of its rather fleshy foliage, damage caused by slugs can also be serious."

Qsn #	Question	Answer
	Missouri Botanical Garden. (2018). <i>Asplenium nidus</i> 'Antiquum'. http://www.missouribotanicalgarden.org . [Accessed 27 Aug 2018]	"Problems - No serious insect or disease problems. Watch for slugs and scale. Drafts may cause fronds to brown at the edges. Chemical insecticides will damage plants (use soaps if necessary). Mealybugs. Bacterial leaf diseases. Leaf nematode is also common."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Indoor Plants. (2018). <i>Asplenium antiquum</i> . https://indoor-plants.net/asplenium-antiquum/ . [Accessed]	"Toxic - No but not edible"
	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. Medicinal uses] "Plant tonic, antibacterial, stimulant, depurative and sedative, for general body weakness, tuberculosis, for ulcers or scrofulous sores, for children with mouth sores; childbirth, infuse in cold water and drink in labor; for fever, pound the leaves in cold water and apply the water to the head. Root paste applied on sore between toes. Ceremonial, used in worship."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	[No evidence of increased fire risk. Not reported from fire prone habitats] " <i>Asplenium antiquum</i> is a widespread epiphytic fern native to China, Japan, Korea, and Taiwan." ... "The clumped plant bases are composed of fibrous roots and trapped humus, which sponge up rainwater to facilitate successful establishment in the forest canopy. <i>Asplenium antiquum</i> is the elevationally most widespread species, ranging from the coast to up to c. 2,500 m above sea level"

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Tuft, J. (2015). <i>Ferns and Shrubs: Diversity, Cultivation and Implications for the Environment</i> . Nova Science Publishers, New York	" <i>Pyrrosia lingus</i> , a slight-shade-adapted fern, could use more sunlight with high photosynthetic capacity, whereas <i>Asplenium antiquum</i> , a slight- to medium-shade fern, and <i>Diplazium donianum</i> , a medium- to heavy-shade fern, could dissipate excess light energy via xanthophyll-cycle-dependent energy quenching"
	Missouri Botanical Garden. (2018). <i>Asplenium nidus</i> 'Antiquum'. http://www.missouribotanicalgarden.org . [Accessed 27 Aug 2018]	"Winter hardy to USDA Zones 10-11 where plants may be grown outside in the ground in warm, bright but shady locations in humus-rich, moist but well-drained soils with added leaf mold, sand and grit. Avoid direct sun." ... "Avoid direct sun or dense shade locations. It does best in warm, moderately bright areas of the home, but tolerates some shade."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes

Qsn #	Question	Answer
	Plantmark. (2018). <i>Asplenium Victoria</i> . https://www.plantmark.com.au/asplenium-victoria-12cm . [Accessed 27 Aug 2018]	" <i>Asplenium antiquum Victoria</i> ... Soil Type: Loam, Sandy, Well Drained"
	GardensOnline. (2018). <i>Asplenium antiquum Victoria</i> . https://www.gardensonline.com.au . [Accessed 27 Aug 2018]	"Soil: Humus rich soils, though it will tolerate dry soil on rocks or branches."
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	[Epiphytic. Unknown if soil or hummus on trees limita successful establishment] "The clumped plant bases are composed of fibrous roots and trapped humus, which sponge up rainwater to facilitate successful establishment in the forest canopy."

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	[Epiphytic, but not really climbing or smothering] " <i>Asplenium antiquum</i> is a widespread epiphytic fern native to China, Japan, Korea, and Taiwan. Its common name, "bird's nest fern," is derived from its rosette growth form, which traps fallen leaves and other debris. Adult plants may reach 300 cm in diameter (pers. observation). The clumped plant bases are composed of fibrous roots and trapped humus, which sponge up rainwater to facilitate successful establishment in the forest canopy."

412	Forms dense thickets	n
	Source(s)	Notes
	Jian, P. Y., Hu, F. S., Wang, C. P., Chiang, J. M., & Lin, T. C. (2013). Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. <i>PloS One</i> , 8(5), e64599	[No evidence] "A. <i>antiquum</i> is a litter-basket epiphyte with a bowl-shaped crown that can effectively intercept canopy litter to form humus-rich substrate. The size of A. <i>antiquum</i> reaches up to 2 m in crown diameter, but individuals of various sizes are common at our study site [26]. A. <i>antiquum</i> exists at all locations on the host trees, from less than 1 m above ground to near the top of the tree canopies and from the trunk to small branches."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence] "On rocks or tree trunks in forests"

501	Aquatic	n
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	" <i>Asplenium antiquum</i> is a widespread epiphytic fern native to China, Japan, Korea, and Taiwan."

Qsn #	Question	Answer
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 15 Aug 2018]	Family: Aspleniaceae

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 15 Aug 2018]	Family: Aspleniaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	" <i>Asplenium antiquum</i> is a widespread epiphytic fern native to China, Japan, Korea, and Taiwan." ... "The clumped plant bases are composed of fibrous roots and trapped humus, which sponge up rainwater to facilitate successful establishment in the forest canopy."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Jian, P. Y., Hu, F. S., Wang, C. P., Chiang, J. M., & Lin, T. C. (2013). Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. <i>PloS One</i> , 8(5), e64599	" <i>Asplenium antiquum</i> Makino (Fig. 1) is one of the most common vascular epiphytes in Taiwan and other parts of the old world tropical forests [22]. The extraordinary water holding capacity of the substrate formed underneath this species is considered the key factor that allows it to persist in regions with droughts lasting several weeks, such as in the northeastern Australia [23]."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence of reproductive failure] "On rocks or tree trunks in forests; 600–1600 m. Fujian, ?Hunan, Taiwan [Japan, Korea]."

Qsn #	Question	Answer
602	Produces viable seed	y
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	"Fern spores were collected at three elevations and germinated in a greenhouse. The sporelings (juvenile ferns) were reciprocally transplanted to each collection site."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Frons leathery, after drying brownish green or brownish. Sori linear, 3–4 cm, on acroscopic veins, occupying 2/3–3/4 of subtending vein, lower parts of lamina usually sterile; indusia brownish or grayish brown, linear, thickly membranous, entire, persistent. Spores with lophate perispore."

603	Hybridizes naturally	
	Source(s)	Notes
	Murakami, N., Nogami, S., Watanabe, M., & Iwatsuki, K. (1999). Phylogeny of Aspleniaceae inferred from rbcL nucleotide sequences. <i>American Fern Journal</i> , 89(4): 232-243	"our allozyme analysis of <i>A. x kenzoii</i> showed that it is a hybrid between <i>A. antiquum</i> and <i>A. prolongatum</i> , whose close relationship was first suggested by our rbcL tree. Thus, <i>A. x kenzoii</i> appears to be a hybrid between two closely related species with very different morphologies." ... "These results support the hypothesis that in Aspleniaceae only closely related species hybridize naturally. Moreover, two species that hybridize often may be closely related even if they are very different in morphology."
	Yatabe, Y., Shinohara, W., Matsumoto, S., & Murakami, N. (2009). Patterns of hybrid formation among cryptic species of bird-nest fern, <i>Asplenium nidus</i> complex (Aspleniaceae), in West Malesia. <i>Botanical Journal of the Linnean Society</i> , 160(1), 42-63	[Possibly Yes] "Although no putative natural hybrids have been reported within the <i>A. nidus</i> complex, sterile hybrids of <i>A. antiquum</i> , which has been assigned to <i>Asplenium</i> section <i>Thamnopteris</i> , and <i>A. prolongatum</i> Hook. were found in Japan, for which K2P is 0.031 (Murakami et al., 1999a)."
	WRA Specialist. 2018. Personal Communication	Unknown. Hybridization documented in genus

604	Self-compatible or apomictic	
	Source(s)	Notes
	Niranjan, A. R. S., Singh, I. P. & Roy, S. (1983). Mating Systems and Distribution of Some Ferns of Central Himalayas. <i>Proceedings of the Indian National Science Academy</i> B49(6), 722-728	[Unknown. Other <i>Asplenium</i> species capable of selfing] " <i>Asplenium dalhousiae</i> ... This indicated that the species had the capacity of reproducing by intra- and inter-gametophytic selfing."
	Wubs, E. J., de Groot, G. A., During, H. J., Vogel, J. C., Grundmann, M., Bremer, P., & Schneider, H. (2010). Mixed mating system in the fern <i>Asplenium scolopendrium</i> : implications for colonization potential. <i>Annals of Botany</i> , 106, 583–590	[Unknown. Related taxon capable of selfing] "Conclusions The results imply a mixed mating system in <i>A. scolopendrium</i> , with outcrossing when possible and occasional selfing when needed."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Mehltreter, K., Walker, L.R. & Sharpe, J.M. 2010. <i>Fern Ecology</i> . Cambridge University Press, Cambridge, UK	[General description] "Ferns and lycophytes ... Fertilization: On gametophyte, sperm cell swims through water"

606	Reproduction by vegetative fragmentation	

Qsn #	Question	Answer
	Source(s)	Notes
	De Winter, W.P. and Amoroso, V.B. (eds.). (2003). Plant Resources of South-East Asia No 15(2). Cryptogams: Ferns and fern allies. Backhuys Publishers, Leiden, The Netherlands	[A. nidus, with a similar morphology & habit, can be propagated vegetatively. Unknown if natural vegetative spread occurs] "Asplenium normally propagates by spores. Many species, however, produce side crowns which can be separated. Separation of new plants is easiest in species with a creeping rhizome. Although A. nidus grows naturally as an epiphyte, it can thrive terrestrially. In addition to spore propagation, A. nidus can also be propagated through in-vitro culture of rhizome segments and through planting out dissected leaf-bases (up to 13 per leaf) in vermiculite, each with a small portion of the rhizome attached."

607	Minimum generative time (years)	
	Source(s)	Notes
	Plant This. (2018). <i>Asplenium antiquum</i> 'Victoria'. http://plantthis.com . [Accessed]	"Growth rate: average" [Time to maturity unknown]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Jian, P. Y., Hu, F. S., Wang, C. P., Chiang, J. M., & Lin, T. C. (2013). Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. <i>PloS One</i> , 8(5), e64599	[Epiphytic. Small spores most probably dispersed by wind into appropriate sites on trees] "A. antiquum is a litter-basket epiphyte with a bowl-shaped crown that can effectively intercept canopy litter to form humus-rich substrate. The size of A. antiquum reaches up to 2 m in crown diameter, but individuals of various sizes are common at our study site [26]. A. antiquum exists at all locations on the host trees, from less than 1 m above ground to near the top of the tree canopies and from the trunk to small branches."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Missouri Botanical Garden. (2018). <i>Asplenium nidus</i> 'Antiquum'. http://www.missouribotanicalgarden.org . [Accessed 27 Aug 2018]	"Noted for its shape and distinctive glossy bright green leaves. A single fern has good specimen value. Where winter hardy, it may be grown outdoors in the ground or as an epiphyte on tree trunks. Excellent houseplant for indoor areas with good indirect light and respectable humidity."
	Jones, D. L. 1987. <i>Encyclopedia of Ferns</i> . Timber Press, Portland, OR	[Cultivated as an ornamental] "Plants grow readily in a pot of coarse, fibrous mixture and could perhaps be grown on rocks in a garden."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. Production of numerous wind-dispersed spores could result in contamination of other plants grown or sold together in nurseries.

704	Propagules adapted to wind dispersal	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Hsu, R., Oostermeijer, J., & Wolf, J. (2014). Adaptation of a widespread epiphytic fern to simulated climate change conditions. <i>Plant Ecology</i> , 215(8), 889-897	"most epiphytes have numerous dust-like seeds/diaspores that are wind-dispersed"
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Spores are wind dispersed] "Frons leathery, after drying brownish green or brownish. Sori linear, 3–4 cm, on acroscopic veins, occupying 2/3–3/4 of subtending vein, lower parts of lamina usually sterile; indusia brownish or grayish brown, linear, thickly membranous, entire, persistent. Spores with lophate perispore."

705	Propagules water dispersed	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"On rocks or tree trunks in forests" [Epiphytic. Spores may be moved by water, but unlikely to establish in a suitable epiphytic site]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Sori linear, 3–4 cm, on acroscopic veins, occupying 2/3–3/4 of subtending vein, lower parts of lamina usually sterile; indusia brownish or grayish brown, linear, thickly membranous, entire, persistent. Spores with lophate perispore." [An epiphyte, so potentially dispersed externally by adhering to birds, but most likely primarily wind-dispersed]
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"This group includes tumbling plants and fern spores."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"On rocks or tree trunks in forests" [Epiphytic. Arboreal animals may disperse spores through external attachment, but probably an unlikely or unimportant vector relative to wind]

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"Answer 'no' where the taxon is unlikely to be eaten by animals or if seeds are not viable following passage through the gut." [No evidence that ferns are consumed or that spores would survive gut passage]

Qsn #	Question	Answer
801	Prolific seed production (>1000/m²)	y
	Source(s)	Notes
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"Assume 'yes' for fern taxa unless contradictory evidence exists."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). 2013. <i>Flora of China</i> . Vol. 2-3 (Lycopodiaceae through Polypodiaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Presumably Yes] "Fronds leathery, after drying brownish green or brownish. Sori linear, 3–4 cm, on acroscopic veins, occupying 2/3–3/4 of subtending vein, lower parts of lamina usually sterile; indusia brownish or grayish brown, linear, thickly membranous, entire, persistent. Spores with lophate perispore."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Mehltreter, K., Walker, L.R. & Sharpe, J.M. 2010. <i>Fern Ecology</i> . Cambridge University Press, Cambridge, UK	[Unknown for <i>A. antiquum</i>] "Spores, the haploid propagules dispersed by fern sporophytes, are well known for drifting long distances through air currents (see Chapter 2), and may germinate immediately after landing in a favorable microhabitat. They can also build up soil spore banks that are important sources of recruitment of new plants, because they can remain viable for years or decades (Dyer and Lindsay, 1992)."

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species. No evidence that this species has become invasive and has been targeted for control

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. 2018. Personal Communication	Unknown

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 2000 m, demonstrating environmental versatility
- Grows in tropical climates (could establish in Hawaiian Islands)
- Shade tolerant
- Reproduces by spores (could naturalize)
- Possibly hybridizes with other *Asplenium* species (could possibly cross with native species)
- Spores wind-dispersed
- Prolific spore production
- Gaps in biological & ecological information reduce accuracy of risk assessment

Low Risk Traits

- No reports of invasiveness or naturalization, but limited evidence of widespread introduction outside native range
- Unarmed (no spines, thorns, or burrs)
- Non-toxic
- Ornamental

Second Screening Results for Herbs or Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivated lands? No

Outcome = Accept (Low Risk)