

Taxon: *Phyllanthus flexuosus* (Siebold & Zucc.) Müll.Arg.

Family: Phyllanthaceae

Common Name(s): luo e ye xia zhu

Synonym(s): *Cicca flexuosa* Siebold & Zucc.
Diasperus flexuosus (Siebold & Zucc.)
Glochidion flexuosum (Siebold & Zucc.)
Hemicicca flexuosa (Siebold & Zucc.)
Hemicicca japonica Baill.
Phyllanthus japonicus (Baill.)

Assessor: Chuck Chimera

Status: Assessor Approved

End Date: 8 Sep 2021

WRA Score: 2.0

Designation: EVALUATE

Rating: Evaluate

Keywords: Shrub, Unarmed, Monoecious, Fleshy-fruited, Frugivore-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	n
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)	y
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		

Qsn #	Question	Answer Option	Answer
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans		
408	Creates a fire hazard in natural ecosystems		
409	Is a shade tolerant plant at some stage of its life cycle		
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)		
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
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		
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)		
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
	Xu Zeng Lai, Yu Bo Yang, & Xu Luo Shan. (2004). The Investigation of Euphorbiaceous Medicinal Plants in Southern China. Economic Botany, 58, S307-S320	[Used medicinally. No evidence of domestication] "Appendix. List of Medicinal Euphorbiaceous Plants" [Phyllanthus flexuosus - Part used and main usage - Whole Plant: dermatitis, allergic dermatitis, snake bites]

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. (2021). 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
	Xu Zeng Lai, Yu Bo Yang, & Xu Luo Shan. (2004). The Investigation of Euphorbiaceous Medicinal Plants in Southern China. Economic Botany, 58, S307-S320	"Southern Guangdong and Guangxi.-The overall physiognomy of this area is hilly, and the western portion of this region is at a higher altitude, where one of the most typical karst rock formations in China is located. The climate of this region is a transition area consisting of subtropical to tropical zones with fairly high levels of heat and light (solar radiation is 418-563 kj/ cm2/yr; amount of sunshine is 1700-2000 hr/yr; active accumulated temperature higher than 10°C is 6000-8000°C-days), high precipitation (1200-2000 mm/yr) and pronounced dry and wet seasons (April/May to September is the wet season during which 70-80% of the entire year's precipitation occurs)."
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Occurs in temperate to tropical climates] "Open forests or scrub; 700-1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Sichuan, Yunnan, Zhejiang [Japan]"

202	Quality of climate match data	High
	Source(s)	Notes
	Wu, Z.Y., Raven,P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	

203	Broad climate suitability (environmental versatility)	y
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Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Open forests or scrub; 700–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Sichuan, Yunnan, Zhejiang [Japan]."
	Fang, J., Wang, Z., & Tang, Z. (Eds.). (2011). Atlas of Woody Plants in China: Distribution and Climate, Volume 1. Higher Education Press, Beijing and Springer-Verlag Berlin Heidelberg	Much of distribution occurs in Subtropical broadleaf evergreen forest region. Also occurs in regions categorized as Tropical monsoon rain forest and rain forest region, Warm temperate deciduous broadleaf forest region, Warm temperate deciduous broadleaf forest region and Qinghai-Xizang Plateau alpine vegetation region.

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.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Guangdong and Guangxi have a climate that is a transition area consisting of subtropical to tropical zones] "Open forests or scrub; 700-1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Sichuan, Yunnan, Zhejiang [Japan]"
	Xu Zeng Lai, Yu Bo Yang, & Xu Luo Shan. (2004). The Investigation of Euphorbiaceous Medicinal Plants in Southern China. Economic Botany, 58, S307-S320	[Phyllanthus flexuosus occurs in regions with tropical to subtropical climates] "Southern Guangdong and Guangxi.-The overall physiognomy of this area is hilly, and the western portion of this region is at a higher altitude, where one of the most typical karst rock formations in China is located. The climate of this region is a transition area consisting of subtropical to tropical zones with fairly high levels of heat and light"
	Fang, J., Wang, Z., & Tang, Z. (Eds.). (2011). Atlas of Woody Plants in China: Distribution and Climate, Volume 1. Higher Education Press, Beijing and Springer-Verlag Berlin Heidelberg	Much of distribution occurs in Subtropical broadleaf evergreen forest region. Also occurs in regions categorized as Tropical monsoon rain forest and rain forest region, Warm temperate deciduous broadleaf forest region, Warm temperate deciduous broadleaf forest region and Qinghai-Xizang Plateau alpine vegetation region.
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands as of 2019

205	Does the species have a history of repeated introductions outside its natural range?	n
	Source(s)	Notes
	POWO (2021). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. http://plantsoftheworldonline.org/ . [Accessed 7 Sep 2021]	[No evidence] "Native to: China South-Central, China Southeast, Japan"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

301	Naturalized beyond native range	n
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Qsn #	Question	Answer
	Source(s)	Notes
	POWO (2021). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. http://plantsoftheworldonline.org/ . [Accessed 7 Sep 2021]	[No evidence] "Native to: China South-Central, China Southeast, Japan"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence in the Hawaiian Islands as of 2019

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

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

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

Qsn #	Question	Answer
305	Congeneric weed	y
	Source(s)	Notes
	Norcini, J. G., Stamps, R. H., & Aldrich, J. H. (1995). Preemergent control of long-stalked phyllanthus (<i>Phyllanthus tenellus</i>) and leafflower (<i>Phyllanthus urinaria</i>). <i>Weed Technology</i> , 9(4): 783-788	"Leafflower (also known as chamberbitter or gripeweed) and longstalked phyllanthus, members of the Euphorbiaceae, are becoming major problems in nurseries, landscape plantings, and turf in some areas of the southeastern U.S. (4). <i>Phyllanthus tenellus</i> is a naturalized perennial that reportedly occurs as far north as Sumter, SC (13). It can become invasive due to its rapid flowering and explosively dehiscent fruit. <i>Phyllanthus urinaria</i> , an annual primarily found in the Gulf coast states to the Carolinas, spreads less rapidly (4, 13). Both species are considered warm season weed problems. These species have the potential to spread throughout USDA hardiness zones 8a and higher."
	Oudhia, P., (2008). <i>Phyllanthus amarus</i> Schumach. & Thonn. In: Schmelzer, G.H. & Gurib-Fakim, A. (Editors). <i>Prota 11(1): Medicinal plants/Plantes médicinales 1</i> . [CD-Rom]. PROTA, Wageningen, Netherlands	[<i>Phyllanthus amarus</i>] "It is reported as a troublesome weed in pulses, soya bean, groundnut, cereals, sugar cane, cassava, taro, sesame, sunflower and cotton."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[<i>Phyllanthus amarus</i>] "pantropical weed possibly originating in the Americas"

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). <i>Flora of China</i> . Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[No evidence] "Shrubs up to 3 m tall, monoecious, glabrous throughout; main branches slightly zigzag, with distinct short shoots; leafy branchlets 8-15 cm, brownish. Leaves progressively larger along shoot, distichous; stipules ovate-triangular, caducous; petioles 2-3 mm, rugulose when dried; leaf blade elliptic to ovate, 2-4.5 × 1-2.5 cm, papery, slightly white-green abaxially, base obtuse to rounded, apex acuminate or obtuse; lateral veins 5-7 pairs. Inflorescence an axillary fascicle with up to 5 male and 1 female flowers. Male flowers: pedicels short; sepals 5, broadly ovate or rounded, ca. 1 mm, dark purple; disk glands 5; stamens 5; filaments free; anthers 0.3-0.4 mm, longitudinally dehiscent. Female flowers ca. 3 mm in diam.; pedicels ca. 1 cm; sepals 6, ovate or elliptic, ca. 1 mm, caducous; disk glands 6; ovary ovoid, 3-celled; styles 3, bifid at apex, exerted from calyx. Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. Allelopathy documented in genus (e.g. Fujii, Y., Parvez, S. S., Parvez, M., Ohmae, Y., & Iida, O. (2003). Screening of 239 medicinal plant species for allelopathic activity using the sandwich method. <i>Weed Biology and Management</i> , 3(4), 233-241)

403	Parasitic	n
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Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Shrubs up to 3 m tall, monoecious, glabrous throughout; main branches slightly zigzag, with distinct short shoots; leafy branchlets 8-15 cm, brownish." [Phyllanthaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. Some <i>Phyllanthus</i> species are palatable, whereas others are toxic and may be unpalatable.

405	Toxic to animals	
	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	Unknown. Several other <i>Phyllanthus</i> species are reported to be toxic

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	Xu Zeng Lai, Yu Bo Yang, & Xu Luo Shan. (2004). The Investigation of Euphorbiaceous Medicinal Plants in Southern China. <i>Economic Botany</i> , 58, S307-S320	[Unknown. Used medicinally] "Appendix. List of Medicinal Euphorbiaceous Plants" [<i>Phyllanthus flexuosus</i> - Part used and main usage - Whole Plant: dermatitis, allergic dermatitis, snake bites]
	Quattrocchi, U. (2012). CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	Unknown. Several other <i>Phyllanthus</i> species are reported to be toxic

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown, but unlikely. No information on flammability or fire ecology found, but not known to occur in fire-prone ecosystems.

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Open forests or scrub; 700–1500 m." [Shade tolerance unknown. Habitat suggests high light environments]
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	
	Source(s)	Notes
	Xu Zeng Lai, Yu Bo Yang, & Xu Luo Shan. (2004). The Investigation of Euphorbiaceous Medicinal Plants in Southern China. Economic Botany, 58, S307-S320	"The main soil present is crimson earth, the secondary soil being yellow or red earth (Guangdong), or red, brown, or black limestone soil (Guangxi)."
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Soil requirements unknown] "Open forests or scrub; 700–1500 m."
411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Shrubs up to 3 m tall, monoecious, glabrous throughout; main branches slightly zigzag, with distinct short shoots; leafy branchlets 8-15 cm, brownish."
412	Forms dense thickets	
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Open forests or scrub; 700–1500 m." [Unknown. No evidence found]
501	Aquatic	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Terrestrial] "Shrubs up to 3 m tall ... Open forests or scrub; 700-1500 m."

Qsn #	Question	Answer
502	Grass	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 7 Sep 2021]	Genus: Phyllanthus Family: Phyllanthaceae Subfamily: Phyllanthoideae Tribe: Phyllantheae

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/ . [Accessed 7 Sep 2021]	Genus: Phyllanthus Family: Phyllanthaceae Subfamily: Phyllanthoideae Tribe: Phyllantheae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Shrubs up to 3 m tall, monoecious, glabrous throughout; main branches slightly zigzag, with distinct short shoots; leafy branchlets 8-15 cm, brownish."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	POWO (2021). Plants of the World Online. Facilitated by the Royal Botanic Gardens, Kew. http://plantsoftheworldonline.org/ . [Accessed]	[No evidence] "Native to: China South-Central, China Southeast, Japan"
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[No evidence] "Open forests or scrub; 700–1500 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hubei, Hunan, Jiangsu, Sichuan, Yunnan, Zhejiang [Japan]."

602	Produces viable seed	y
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm." [Presumably yes]
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. <i>Journal of Forest Research</i> , 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Includes <i>Phyllanthus flexuosus</i>]

Qsn #	Question	Answer
603	Hybridizes naturally	
	Source(s)	Notes
	Pope, G.V. (ed.). (1996). Flora Zambesiaca Vol 9 (4). Euphorbiaceae (excluding Euphorbieae). Kew Publishing and Flora Zambesiaca Managing Committee, Richmond, Surrey, UK	[Unknown. Hybridization documented in genus] "Phyllanthus reticulatus var. glaber hybridizes with P. ovalifolius to produce the hybrid P. × collium-misuku"
604	Self-compatible or apomictic	
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Unknown, but possible] "Shrubs up to 3 m tall, monoecious"
605	Requires specialist pollinators	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Inflorescence an axillary fascicle with up to 5 male and 1 female flowers. Male flowers: pedicels short; sepals 5, broadly ovate or rounded, ca. 1 mm, dark purple; disk glands 5; stamens 5; filaments free; anthers 0.3–0.4 mm, longitudinally dehiscent. Female flowers ca. 3 mm in diam.; pedicels ca. 1 cm; sepals 6, ovate or elliptic, ca. 1 mm, caducous; disk glands 6; ovary ovoid, 3-celled; styles 3, bifid at apex, exerted from calyx."
	Okamoto, T. (2017). Species-specific floral scents as olfactory cues in pollinator moths. In Obligate Pollination Mutualism (pp. 169-179). Springer, Tokyo	[Generalist-pollinated] "Among the bee/fly-pollinated plant species, <i>Phyllanthus roseus</i> and <i>Antidesma japonicum</i> have unique floral scents clearly distinguished from those of other Phyllanthaceae species. Another two species, <i>Phyllanthus flexuosus</i> and <i>Flueggea suffruticosa</i> , have similar scent profiles that overlap on NMDS plots, and the intraspecific variation in the floral scent profiles is greater than those of other Phyllanthaceae plants (Fig. 8.7), suggesting that natural selection for floral scent specialization has weakened in these generalist-pollinated plants."
606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown
607	Minimum generative time (years)	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n

Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm." [Unlikely. No means of external attachment]
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

702	Propagules dispersed intentionally by people	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. Possibly no. No information on cultivation outside native range

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm."
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

705	Propagules water dispersed	n
	Source(s)	Notes
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

706	Propagules bird dispersed	y
	Source(s)	Notes

Qsn #	Question	Answer
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm."
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm." [No means of external attachment. Presumably adapted for internal dispersal]
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	"Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm." [Presumably yes]
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus - Dispersal type = F, frugivore dispersal]

801	Prolific seed production (>1000/m ²)	
	Source(s)	Notes
	Wu, Z.Y., Raven, P.H. & Hong, D.Y. (eds.). (2008). Flora of China. Vol. 11 (Oxalidaceae through Aceraceae). Science Press & Missouri Botanical Garden Press, Beijing & St. Louis	[Unknown] "Fruit a berry, oblate, ca. 6 mm wide, 3-celled. Seeds subtriangular, ca. 3 mm."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Sakai, A., Sato, S., Sakai, T., Kuramoto, S., & Tabuchi, R. (2005). A soil seed bank in a mature conifer plantation and establishment of seedlings after clear-cutting in southwest Japan. Journal of Forest Research, 10(4), 295-304	"Table 1. Compositions of buried viable seeds estimated in a mature conifer plantation in southwest Japan" [Phyllanthus flexuosus present in soil seed bank. Longevity unknown]

Qsn #	Question	Answer
803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown. No information on herbicide efficacy or evidence of chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. (2021). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability
- Able to grow in temperate to tropical climates
- Other *Phyllanthus* species are invasive
- Reproduces by seeds
- Fleshy-fruited, and presumably dispersed by birds and other frugivorous animals
- Gaps in biological and ecological information reduce confidence in 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)
- Valued for medicinal uses within native range

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Unknown

(B) Bird or clearly wind-dispersed?> Yes. Fleshy-fruited, and presumably dispersed by birds or other frugivores.

(C) Life cycle <4 years? Unknown

Outcome = Evaluate Further