

Taxon: Gynostemma pentaphyllum (Thunb.) Makino	Family: Cucurbitaceae
Common Name(s): gynostemma jiao gu lan jiaogulan sweet tea vine	Synonym(s): Gynostemma pedatum Blume Vitis pentaphylla Thunb.

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 9 Feb 2016
WRA Score: 8.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Tropical Vine, Weedy, Annual, Dioecious, Spreads Vegetatively

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		
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	y
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems		

Qsn #	Question	Answer Option	Answer
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)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	y
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	y=1, n=-1	n
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
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	n
705	Propagules water dispersed		
706	Propagules bird dispersed		
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/m ²)		
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., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. 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
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[Occurs in temperate & tropical climates] "Forests, thickets or roadsides on mountain slopes; 300–3200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, S Japan, S Korea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Sri Lanka, Thailand, Vietnam]."

202	Quality of climate match data	High
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Schafer, P. 2011. The Chinese Medicinal Herb Farm: A Cultivator's Guide to Small-scale Organic Herb. Chelsea Green Publishing, White River Junction, VT	"Forests, thickets or roadsides on mountain slopes; 300–3200 m." [Elevation range exceeds 2000 m, demonstrating environmental versatility]

204	Native or naturalized in regions with tropical or subtropical climates	y
-----	--	---

Qsn #	Question	Answer
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Forests, thickets or roadsides on mountain slopes; 300–3200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, S Japan, S Korea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Sri Lanka, Thailand, Vietnam]."

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	Notes
	Hawaiian Tropical Plant Nursery. 2016. Medicinal and Ethnobotanical Plants. http://www.hawaiiantropicalplants.com/medicinal.html . [Accessed 8 Feb 2016]	"Seems to be easy to grow in Hawaii. Vines a bit slow when young but grow fast once established. Grow in partial shade."
	Dave's Garden. 2016. Jiao-gu-lan, Sweet Tea Vine - <i>Gynostemma pentaphyllum</i> . http://davesgarden.com/guides/pf/go/180263/ . [Accessed 6 Feb 2016]	"This plant has been said to grow in the following regions: Birmingham, Alabama Ceres, California Orange Springs, Florida"
	WRA Specialist. 2016. Personal Communication	Available for sale on commercial websites, & cultivated for medicinal purposes, but distribution outside native range unclear

301	Naturalized beyond native range	
	Source(s)	Notes
	Shoot Gardening. 2016. <i>Gynostemma pentaphyllum</i> (Sweet tea vine). https://www.shootgardening.co.uk/plant/gynostemma-pentaphyllum . [Accessed 8 Feb 2016]	"Considered an invasive weed in many non-native areas." [Although records of naturalization not found]
	Renner, S., & Pandey, A. (2013). The Cucurbitaceae of India: Accepted names, synonyms, geographic distribution, and information on images and DNA sequences. <i>PhytoKeys</i> , 20, 53–118	[Natural range unclear] "Distribution in India: Cultivated in Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal. Distribution outside India: Bangladesh, Bhutan, China, Myanmar, Sri Lanka." ... "Its natural range is currently unclear."
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 Feb 2016]	No evidence
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence, although listed as a weed in Japan. Details unspecified

302	Garden/amenity/disturbance weed	y
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	"A troublesome weed in fields of northern China, thence southward to southeastern Asia."

Qsn #	Question	Answer
	Dave's Garden. 2016. Jiao-gu-lan, Sweet Tea Vine - <i>Gynostemma pentaphyllum</i> . http://davesgarden.com/guides/pf/go/180263/ . [Accessed 8 Feb 2016]	"it can be invasive in a greenhouse environment, as the vine will root easily on wet soil."
	Chestnut School of Herbal Medicine. 2016. The Top Ten Medicinal Herbs for the Garden. http://chestnutherbs.com/the-top-ten-medicinal-herbs-for-the-garden/ . [Accessed 8 Feb 2016]	"Jiaogulan will locally spread vigorously by runners and can become a troublesome weed if consumption does not outpace proliferation."

303	Agricultural/forestry/horticultural weed	
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	"A troublesome weed in fields of northern China, thence southward to southeastern Asia" [Potentially. Impacts on yields unspecified]

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

305	Congeneric 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

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Stem and branches slender, angular-sulcate, glabrous or sparsely pubescent. Leaves pedately 3–9-foliolate, usually 5–7-foliolate, membranous or papery, pubescent or glabrous; leaflets ovate-oblong or lanceolate, median leaflets 3–12 × 1.5–4 cm, lateral leaflets smaller, both surfaces sometimes hispid, lateral veins 6–8 pairs, base attenuate, margin crenate, apex acute or shortly acuminate; petiolule 1–5 mm. Tendrils filiform, 2-fid."

402	Allelopathic	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

Qsn #	Question	Answer
403	Parasitic	n
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	"Herbaceous perennial climbers" [Cucurbitaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	Nakagawa, N., Nakamichi, M. & Sugiura, H. (eds.). 2010. The Japanese Macaques. Springer, Tokyo	"Table 15.3 Antiparasitic plant items in the diet of Japanese macaques from ten populations" [<i>Gynostemma pentaphyllum</i> leaves are consumed]
	Wang, W., Zhou, R., He, L., Liu, S., Zhou, J., Qi, L., Li, L. & Hu, D. (2015). The progress in nutrition research of musk deer: Implication for conservation. Applied Animal Behaviour Science, 172, 1-8	"Table 3 The forage species and parts of musk deer." [Leaves and twigs of <i>Gynostemma pentaphyllum</i> are consumed]

405	Toxic to animals	n
	Source(s)	Notes
	Shoot Gardening. 2016. <i>Gynostemma pentaphyllum</i> (Sweet tea vine). https://www.shootgardening.co.uk/plant/gynostemma-pentaphyllum . [Accessed]	"The effect of water extract of <i>Gynostemma pentaphyllum</i> was evaluated on 6-month chronic toxicity in Wi star rats." ... "Therefore, it is concluded that the extract of <i>G. pentaphyllum</i> at the given doses did not produce any significant toxic effect in rats during 6-month period of the treatment."
	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
	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
	Cho, S. E., Park, M. J., Han, K. S., Choi, I. Y., & Shin, H. D. (2015). First report of powdery mildew caused by <i>Podosphaera xanthii</i> on <i>Gynostemma pentaphyllum</i> in Korea. Plant Disease, 99(9), 1273-1274	" <i>Gynostemma pentaphyllum</i> (Thunb.) Makino is an herbaceous vine of the Cucurbitaceae indigenous to the southern China, northern Vietnam, southern Korea, and Japan. The whole plant is known as an herbal medicine reputed to have powerful antioxidant and anxiety-reducing effect on humans (Jeong et al. 2011). In October 2002, a powdery mildew disease on leaves of <i>G. pentaphyllum</i> growing wild was found in the Jeju Islands of Korea. Additional findings of the powdery mildew between 2002 and 2014 in several locations of southern Korea showed that the disease commonly occurs in Korea." ... "Powdery mildews of <i>G. pentaphyllum</i> caused by <i>Podosphaera</i> species have been recorded in Japan (Farr and Rossman 2014). To our knowledge, this is the first report of powdery mildew caused by <i>P. xanthii</i> on <i>G. pentaphyllum</i> in Korea. The powdery mildew from <i>G. pentaphyllum</i> could potentially pose a threat to cucurbitaceous crops."

Qsn #	Question	Answer
	Dave's Garden. 2016. Jiao-gu-lan, Sweet Tea Vine - <i>Gynostemma pentaphyllum</i> . http://davesgarden.com/guides/pf/go/180263/ . [Accessed 9 Feb 2016]	"i never had any problem with pests but scales seem to only attack this plant when it's grown in direct sunlight (weakens the plant) . Thrips will only infect this plant if another plant is infected. this plant itself doesn't cause thrips infestations but once another nearby plant does have a infestation this vine will be a thrips magnet. maybe hanging baskets are a better option because this way most insects can't reach it."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	Attawish, A., Chivapat, S., Phadungpat, S., Bansiddhi, J., Techadamrongsin, Y., Mitrijit, O., Chaorai, B. & Chavalittumrong, P. (2004). Chronic toxicity of <i>Gynostemma pentaphyllum</i> . <i>Fitoterapia</i> , 75(6), 539-551	"The effect of water extract of <i>Gynostemma pentaphyllum</i> was evaluated on 6-month chronic toxicity in Wi star rats." ... "Therefore, it is concluded that the extract of <i>G. pentaphyllum</i> at the given doses did not produce any significant toxic effect in rats during 6-month period of the treatment."
	Shoot Gardening. 2016. <i>Gynostemma pentaphyllum</i> (Sweet tea vine). https://www.shootgardening.co.uk/plant/gynostemma-pentaphyllum . [Accessed 8 Feb 2016]	"Toxicity: Non-toxic. Traditionally used in Chinese herbal medicine."
	Quattrocchi, U. 2012. <i>CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology</i> . CRC Press, Boca Raton, FL	[Medicinal uses] "Whole plant demulcent, for swollen joints, sprain, sores, muscles. Leaves and stems sedative."
	Wagstaff, D.J. 2008. <i>International poisonous plants checklist: an evidence-based reference</i> . CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Useful Tropical Plants Database. 2016. <i>Gynostemma pentaphyllum</i> . http://tropical.theferns.info/viewtropical.php?id=Gynostemma+pentaphyllum . [Accessed 9 Feb 2016]	[No evidence, but might act as a fuel ladder for fires into trees] "Sweet tea vine is an annual to perennial climbing plant, sending out stems that scramble over the ground and into the surrounding vegetation, attaching themselves by means of tendrils." ... "Thickets in open forests in lowland all over Japan[58, 275]. Forest, thickets or road sides on mountain slopes at elevations of 300 - 3,200 metres in China[266]."

Qsn #	Question	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Schafer, P. 2011. The Chinese Medicinal Herb Farm: A Cultivator's Guide to Small-scale Organic Herb. Chelsea Green Publishing, White River Junction, VT	"Gynostemma pentaphyllum is an undersory riparian plant growing as a mounding and climbing vine to twelve feet or more." ... "Grow with other shade and water-loving plants."
	Plants for a Future. 2016. Gynostemma pentaphyllum. http://www.pfaf.org/ . [Accessed 6 Feb 2016]	"Requires a rich well-drained but moisture-retentive soil in a warm sheltered position in partial shade [238]."
	Dave's Garden. 2016. Jiao-gu-lan, Sweet Tea Vine - Gynostemma pentaphyllum. http://davesgarden.com/guides/pf/go/180263/ . [Accessed 6 Feb 2016]	"Sun Exposure: Sun to Partial Shade Light Shade Partial to Full Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Shoot Gardening. 2016. Gynostemma pentaphyllum (Sweet tea vine). https://www.shootgardening.co.uk/plant/gynostemma-pentaphyllum . [Accessed 8 Feb 2016]	"Soil type: Chalky, Loamy, Sandy Soil drainage: Well-drained Soil pH: Acid, Alkaline, Neutral"
	Plants for a Future. 2016. Gynostemma pentaphyllum. http://www.pfaf.org/ . [Accessed 8 Feb 2016]	"Suitable for: light (sandy), medium (loamy) and heavy (clay) soils and prefers well-drained soil. Suitable pH: acid, neutral and basic (alkaline) soils."

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	"Herbaceous perennial climbers, branchlets tender, striate-sulcate, slightly hairy, tendrils 2-branched; leaves palmately compound, leaflets variable in number, (3-) -7 (-9),"

412	Forms dense thickets	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Forests, thickets or roadsides on mountain slopes" [A vine that occurs in thicket vegetation]

501	Aquatic	n
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	[Terrestrial] "Herbaceous perennial climbers"

502	Grass	n
	Source(s)	Notes

Qsn #	Question	Answer
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 6 Feb 2016]	"Family: Cucurbitaceae Tribe: Gomphogyneae"

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	Kubitzki, K. (ed.). 2011. The Families and Genera of Vascular Plants. Vol. X. Flowering Plants. Eudicots: Sapindales, Cucurbitales, Myrtaceae. Springer, New York	Cucurbitaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Stem and branches slender, angular-sulcate, glabrous or sparsely pubescent. Leaves pedately 3–9-foliolate, usually 5–7- foliolate, membranous or papery, pubescent or glabrous; leaflets ovate-oblong or lanceolate, median leaflets 3–12 × 1.5–4 cm, lateral leaflets smaller, both surfaces sometimes hispid, lateral veins 6–8 pairs, base attenuate, margin crenate, apex acute or shortly acuminate; petiolule 1–5 mm. Tendrils filiform, 2-fid."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Jiang, L. Y., Qian, Z. Q., Guo, Z. G., Wang, C., & Zhao, G. F. (2009). Polyploid origins in <i>Gynostemma pentaphyllum</i> (Cucurbitaceae) inferred from multiple gene sequences. <i>Molecular Phylogenetics and Evolution</i> , 52(1), 183-191	"With the largest variety of cytotypes (2n = 22, 44, 66 and 88) in <i>Gynostemma</i> , <i>G. pentaphyllum</i> is also the most widespread species in this genus, and is commonly observed in the whole distribution range of the genus"
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence. Widely distributed] "Forests, thickets or roadsides on mountain slopes; 300–3200 m. Anhui, Fujian, Guangdong, Guangxi, Guizhou, Hainan, S Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shandong, Sichuan, Taiwan, Yunnan, Zhejiang [Bangladesh, Bhutan, India, Indonesia, S Japan, S Korea, Laos, Malaysia, Myanmar, Nepal, New Guinea, Sri Lanka, Thailand, Vietnam]."

602	Produces viable seed	y
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Fruit indehiscent, black when mature, globose, 5–6 mm in diam., 2-seeded, glabrous or densely hispid and pubescent. Seeds brown, ovate-cordate, ca. 4 mm in diam., compressed, both surfaces papillose, base cordate, apex obtuse."
	Plants for a Future. 2016. <i>Gynostemma pentaphyllum</i> . http://www.pfaf.org/ . [Accessed 6 Feb 2016]	"Pre-soak the seed for 24 hours in warm water and then sow it in spring in a rich compost in a greenhouse, placing 2 - 3 seeds per pot. Thin the seedlings to the strongest in each pot and grow the plants on fast. Plant them out after the last expected frosts and protect them with a frame or cloche until they are growing away well."

Qsn #	Question	Answer
	Schafer, P. 2011. The Chinese Medicinal Herb Farm: A Cultivator's Guide to Small-scale Organic Herb. Chelsea Green Publishing, White River Junction, VT	"The plants produce tiny, whitish-green, unisexual flowers; if seed is desired a male and female must be present. Seed sown in spring with heated soil germinates in two to five weeks."

603	Hybridizes naturally	
	Source(s)	Notes
	Jiang, L. Y., Qian, Z. Q., Guo, Z. G., Wang, C., & Zhao, G. F. (2009). Polyploid origins in <i>Gynostemma pentaphyllum</i> (Cucurbitaceae) inferred from multiple gene sequences. <i>Molecular Phylogenetics and Evolution</i> , 52(1), 183-191	[Possible interspecific hybridization has occurred] "Yunnan Province harbors the largest variety of <i>Gynostemma</i> species, including <i>G. simplicifolium</i> , <i>G. laxum</i> , <i>G. dasycarpum</i> , <i>G. longipes</i> and so on. It is probable that the diploid progenitor populations of the octoploid DL 8x or DL 8x itself captured the chloroplast genome of another <i>Gynostemma</i> species when hybridization occurred where the ranges of the species overlap. However, to address this issue, further field surveys and molecular studies remain to be performed."

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Hu, Shiu-ying. 2005. Food Plants of China. Chinese University Press, Hong Kong	"flowers small, dioecious, greenish-yellow, in axillary panicles"
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Plants dioecious, rarely monoecious"
	Plants for a Future. 2016. <i>Gynostemma pentaphyllum</i> . http://www.pfaf.org/ . [Accessed 6 Feb 2016]	"The flowers are dioecious (individual flowers are either male or female, but only one sex is to be found on any one plant so both male and female plants must be grown if seed is required) and are pollinated by Insects. The plant is not self-fertile."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Male flowers in panicle; peduncle filiform, 10–15(–30) cm, many branched; pedicels filiform, 1–4 mm; bracteole subulate; calyx tube very short; segments triangular, ca. 0.7 mm, apex acute; corolla pale green or white; segments ovate-lanceolate, 2.5–3 × ca. 1 cm, 1-veined, apex long acuminate. Female flowers: panicle shorter than that of male flowers; calyx and corolla as in male flowers; ovary globose, 2- or 3-loculed; styles 3; stigmas 2-lobed; staminodes 5, short."
	Liao, H., Zhao, Y., Zhou, Y., Wang, Y., Wang, X., Lu, F., & Song, Z. (2011). Microsatellite markers in the traditional Chinese medicinal herb <i>Gynostemma pentaphyllum</i> (Cucurbitaceae). <i>American Journal of Botany</i> , 98(3), e61-e63	[Wind-pollinated] " <i>Gynostemma pentaphyllum</i> is an anemophilous dioecious plant. It exhibits both sexual reproduction and clonal growth by rhizomes or bulbils (Gao et al., 1995)."

606	Reproduction by vegetative fragmentation	y
-----	--	---

Qsn #	Question	Answer
	Source(s)	Notes
	Jiang, L. Y., Qian, Z. Q., Guo, Z. G., Wang, C., & Zhao, G. F. (2009). Polyploid origins in <i>Gynostemma pentaphyllum</i> (Cucurbitaceae) inferred from multiple gene sequences. <i>Molecular Phylogenetics and Evolution</i> , 52(1), 183-191	" <i>G. pentaphyllum</i> exhibits both sexual reproduction and clonal growth by rhizomes and bulbils (Gao et al., 1995; Razmovski-Naumovski et al., 2005), with clonal growth as the dominant reproductive type."
	Liao, H., Zhao, Y., Zhou, Y., Wang, Y., Wang, X., Lu, F., & Song, Z. (2011). Microsatellite markers in the traditional Chinese medicinal herb <i>Gynostemma pentaphyllum</i> (Cucurbitaceae). <i>American Journal of Botany</i> , 98(3), e61-e63	"It exhibits both sexual reproduction and clonal growth by rhizomes or bulbils (Gao et al., 1995)."

607	Minimum generative time (years)	1
	Source(s)	Notes
	Plants for a Future. 2016. <i>Gynostemma pentaphyllum</i> . http://www.pfaf.org/ . [Accessed 6 Feb 2016]	"Plants tend to be annuals or short-lived perennials[238]."
	Maxwell, J. F. 2007. Vegetation of Doi Tung, Chiang Rai Province, Northern Thailand. <i>Maejo International Journal of Science and Technology</i> 01: 10-63	"Table 1. List of plant species under phylum angiospermae surveyed at Doi Tung, Chiang Rai Province" [<i>Gynostemma pentaphyllum</i> - a = annual]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. <i>Flora of China</i> . Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	"Seeds brown, ovate-cordate, ca. 4 mm in diam." ... "Forests, thickets or roadsides on mountain slopes" [Unknown. Seeds lack means of attachment, but are small & may be inadvertently dispersed when plants are growing along roads & other heavily trafficked areas]

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Amazon.com. 2016. <i>Gynostemma Pentaphyllum Jiaogulan</i> 25 Seeds. http://www.amazon.com/Gynostemma-Pentaphyllum-Jiaogulan-25-Seeds/dp/B00H9EX6EC . [Accessed 8 Feb 2016]	Seeds available for purchase on this and a number of other commercial websites

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No evidence, but sometimes considered a garden or nursery weed. Could potentially become a seed contaminant in these situations

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

Qsn #	Question	Answer
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No adaptations for wind dispersal] "Fruit indehiscent, black when mature, globose, 5-6 mm in diam., 2-seeded, glabrous or densely hispid and pubescent. Seeds brown, ovate-cordate, ca. 4 mm in diam., compressed, both surfaces papillose, base cordate, apex obtuse."

705	Propagules water dispersed	
	Source(s)	Notes
	Schafer, P. 2011. The Chinese Medicinal Herb Farm: A Cultivator's Guide to Small-scale Organic Herb. Chelsea Green Publishing, White River Junction, VT	"Gynostemma pentaphyllum is an understory riparian plant growing as a mounding and climbing vine to twelve feet or more." [Unknown. It may be possible that this plant is dispersed by water when growing in riparian areas]

706	Propagules bird dispersed	
	Source(s)	Notes
	Flora Malesiana. 2016. Cucurbitaceae. http://portal.cybertaxonomy.org/flora-malesiana/ . [Accessed 8 Feb 2016]	[Possibly able to be dispersed by birds. With berry-like fruit] "The conspicuously coloured, berry-like, pulpy fruits of most Cucurbitaceae suggest that seed dispersal is by animals eating the fruit." ... "Gynostemma pentaphylla fruit is small, berry-like, green-yellow or purple, containing 1 or 2 seeds only."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Wu, Z. Y., P. H. Raven & D. Y. Hong, (eds). 2011. Flora of China. Vol. 19 (Cucurbitaceae through Valerianaceae, with Annonaceae and Berberidaceae). Science Press, Beijing, and Missouri Botanical Garden Press, St. Louis	[No evidence. Fruit & seeds lack means of external attachment, although small size may allow for some adherence to animals] "Fruit indehiscent, black when mature, globose, 5–6 mm in diam., 2-seeded, glabrous or densely hispid and pubescent. Seeds brown, ovate-cordate, ca. 4 mm in diam., compressed, both surfaces papillose, base cordate, apex obtuse."

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Flora Malesiana. 2016. Cucurbitaceae. http://portal.cybertaxonomy.org/flora-malesiana/ . [Accessed 8 Feb 2016]	[Presumably yes] "The conspicuously coloured, berry-like, pulpy fruits of most Cucurbitaceae suggest that seed dispersal is by animals eating the fruit." ... "Gynostemma pentaphylla fruit is small, berry-like, green-yellow or purple, containing 1 or 2 seeds only."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Wang, C., Zhang, H., Qian, Z. Q., & Zhao, G. F. (2008). Genetic differentiation in endangered <i>Gynostemma pentaphyllum</i> (Thunb.) Makino based on ISSR polymorphism and its implications for conservation. <i>Biochemical Systematics and Ecology</i> , 36(9), 699-705	"In this study, the effective gene flow for <i>G. pentaphyllum</i> ($Nm \frac{1}{4} 0.0622$) was extremely lower than one successful migrant per generation, which might partly result from low seed production and the large geographic distances among populations."

Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Pan, C., Deng, Z.;Huang, Y.;Huang, X.;Zhang, Z.;Miao, J. & Yu, L. 2013. Study on Seed Dormancy Mechanism and Breaking Technique of <i>Gynostemma pentaphyllum</i> (Thunb.) Makino. <i>Acta Botanica Boreali-Occidentalia Sinica</i>	" <i>G. pentaphyllum</i> seeds possess non-deep physiological dormancy"
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/ . [Accessed 9 Feb 2016]	"Storage Behaviour: Orthodox"

803	Well controlled by herbicides	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Schafer, P. 2011. <i>The Chinese Medicinal Herb Farm: A Cultivator's Guide to Small-scale Organic Herb</i> . Chelsea Green Publishing, White River Junction, VT	"For a mounding plant that will grow several feet tall, prune to keep the vigorous running stems in check."
	WRA Specialist. 2016. Personal Communication	May tolerate frequent pruning & have the ability to resprout

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits

- Elevation range exceeds 2000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Regarded as a troublesome weed in cultivated settings, fields and greenhouse settings
- Shade tolerant
- Tolerates many soil types
- Smothering habit
- Reproduces by seeds & vegetatively by rhizomes and bulbils
- Able to reach maturity in one growing season
- Seeds possibly dispersed by birds or other fruit-eating animals
- Limited ecological information reduces accuracy of risk prediction

Low Risk Traits

- No reports of naturalization despite anecdotal reports of weediness
- Unarmed (no spines, thorns or burrs)
- Palatable to animals
- Non-toxic
- Used medicinally & as a tea
- Dioecious; requires male & female plants for seed production