Taxon: Clitoria ternatea L. **Family:** Fabaceae

Common Name(s): blue pea
bluebellvine
butterfly pea
cordofan pea

Synonym(s): Clitoria albiflora Mattei
Clitoria bracteata Poir.
Clitoria mearnsii De Wild.
Clitoria tanganicensis Micheli
Clitoria zanzibarensis Vatke

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 24 Aug 2021

WRA Score: 10.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Climbing Herb, Environmental Weed (Australia), Fodder, Self-Seeding, Dehiscent Pods

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	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
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	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
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)	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	y
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
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	y=1, n=-1	y
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	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
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**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	"Origin and geographic distribution. Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia."

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**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	"Origin and geographic distribution: Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia. "

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	

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

Qsn #	Question	Answer
	Lim, T.K. (2014). Edible Medicinal And Non-Medicinal Plants. Volume 7, Flowers. Springer, Dordrecht	"The plant grows wild in wasteland, thickets or disturbed areas and on most soil types at low and medium altitudes. It is adaptable to a wide range of soil types from sandy soils to heavy clays including calcareous soils and with a wide pH range from 4.5 to 8.9. It is moderately tolerant to salinity. It thrives in areas with 700– 1,500 mm mean annual rainfall but will survive in areas with only 400 mm and dry periods. It tolerates short-term flooding but not prolonged waterlogging. It is tolerant to light frost and will tolerate low temperatures down to 15 °C and high temperature to 35 °C. It prefers full sun but will tolerate partial shading and is used as cover crops in rubber and coconut plantations in the tropics."
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	[Elevation range >1000 m] "Its altitudinal range is 0-1600(-1800) m and annual mean temperature range is 19-28 °C. "

204	Native or naturalized in regions with tropical or subtropical climates	y
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	"Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"Native range uncertain, but probably Neotropical, now pantropical, often cultivated as an ornamental; in Hawai'i a popular ornamental, naturalized at least on O'ahu. Naturalized prior to 1871 (Hillebrand, 1888)."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 18 Aug 2021]	"Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai‘i Press and Bishop Museum Press, Honolulu, HI.	"Native range uncertain, but probably Neotropical, now pantropical, often cultivated as an ornamental; in Hawai'i a popular ornamental, naturalized at least on O'ahu."

301	Naturalized beyond native range	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Oppenheimer, H.L. & Bartlett, R.T. (2000). New plant records from Maui, O'ahu, and the Hawai'i Islands. Bishop Museum Occasional Papers 64: 1-10	"Clitoria ternatea L. New island record. Only known to be naturalized on O'ahu (Wagner et al., 1999: 656), we now report a small population from Maui. Material examined: MAUI: West Maui, Lahaina District, 'Alaeloa, southeast of the intersection of HonoaPi'ilani Hwy and Näpilihau Rd, flowers blue, many seedlings, 37 m, 15 Sep 1999, Oppenheimer & Bartlett H99910."
	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 18 Aug 2021]	"Naturalized Africa MACARONESIA: Cabo Verde NORTHEAST TROPICAL AFRICA: Djibouti, Ethiopia, Sudan, Somalia, Chad EAST TROPICAL AFRICA: Kenya, Tanzania, Uganda WEST-CENTRAL TROPICAL AFRICA: Burundi, Cameroon, Democratic Republic of the Congo, Gabon, Sao Tome and Principe WEST TROPICAL AFRICA: Benin, Côte D'Ivoire, Ghana, Guinea, Gambia, Guinea-Bissau, Niger, Nigeria, Senegal, Sierra Leone, Togo SOUTH TROPICAL AFRICA: Angola, Mozambique, Malawi, Zambia, Zimbabwe SOUTHERN AFRICA: South Africa WESTERN INDIAN OCEAN: Madagascar Asia-Temperate ARABIAN PENINSULA: Saudi Arabia, Yemen WESTERN ASIA: Iran, Iraq CHINA: China [Zhejiang Sheng, Fujian Sheng, Guangdong Sheng, Yunnan Sheng, Guangxi Zhuangzu Zizhiqu, Hainan Sheng] EASTERN ASIA: Taiwan Asia-Tropical INDIAN SUBCONTINENT: Bangladesh, Bhutan, India, Sri Lanka, Maldives, Nepal, Pakistan PAPUASIA: Indonesia [Papua], Papua New Guinea, Solomon Islands INDO-CHINA: India [Andaman and Nicobar Islands], Cambodia, Laos, Myanmar, Thailand, Vietnam MALESIA: Christmas Island, Indonesia [Jawa, Sumatera], Malaysia [Sabah], Philippines, Singapore Australasia AUSTRALIA: Australia Northern America NORTH-CENTRAL U.S.A.: United States [Illinois, Missouri] SOUTHEASTERN U.S.A.: United States [Florida, Georgia, Kentucky] SOUTH-CENTRAL U.S.A.: United States [Texas] SOUTHWESTERN U.S.A.: United States [California] NORTHERN MEXICO: Mexico [Sinaloa] SOUTHERN MEXICO: Mexico [Colima, Jalisco, Oaxaca, Veracruz de Ignacio de la Llave, Yucatán] Pacific NORTH-CENTRAL PACIFIC: United States [Hawaii] NORTHWESTERN PACIFIC: Palau, United States [Guam, Northern Mariana Islands] SOUTH-CENTRAL PACIFIC: French Polynesia [Society Islands] SOUTHWESTERN PACIFIC: Fiji, New Caledonia, Samoa Southern America CARIBBEAN: Aruba, Netherlands Antilles, Antigua and Barbuda, Bahamas, Barbados, Cuba, Cayman Islands, Dominica, Dominican

		Republic, Guadeloupe, Haiti, Jamaica, St. Kitts and Nevis, Montserrat, Martinique, United States [Puerto Rico, Virgin Islands, U.S.], St. Vincent and Grenadines, Virgin Islands (British) CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador NORTHERN SOUTH AMERICA: French Guiana, Suriname, Venezuela BRAZIL: Brazil WESTERN SOUTH AMERICA: Bolivia, Colombia, Ecuador [Galápagos], Peru SOUTHERN SOUTH AMERICA: Paraguay, Uruguay Other (exact native range obscure)"
	Starr, F., Starr, K.& Loope, L.L. (2010). New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 107: 61-68	[Lanai] "Clitoria ternatea L. New island record. Clitoria ternatea (butterfly pea) is documented as naturalized from Oʻahu and Maui (Wagner et al. 1999; oppenheimer & Bartlett 2000). This collection represents a new island record for Lānaʻi. Material examined. LĀNAʻI: Hulopoʻe Rd, in coastal dry scrub along with Coccinia grandis, Cenchrus ciliaris, Prosopis pallida, and Leucaena leucocephala, 93 m (304 ft), 2 Apr 2007, Starr & Starr 070402-02."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawaiʻi Press and Bishop Museum Press, Honolulu, HI.	[Oahu] "Native range uncertain, but probably Neotropical, now pantropical, often cultivated as an ornamental; in Hawai'i a popular ornamental, naturalized at least on O'ahu. Naturalized prior to 1871 (Hillebrand, 1888)."

302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	CABI. (2021). Clitoria ternatea (butterfly-pea). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[A weed of disturbed sites that impacts the environment in Australia and perhaps other locations. In the Hawaiian Islands, not presently documented as a weed of natural areas] "C. ternatea is a pasture legume also commercialized as a garden ornamental that has been widely introduced in agroforestry systems in tropical and subtropical regions of the world. Traits such as its high growth-rates, drought tolerance and adaptation to heavy clay soils suggest that this species could be used to improve natural grasslands (Staples, 1992). However, these traits have also helped this species to escape from cultivation and become an invasive species in river banks, creek lines, the margins of waterholes, irrigation channels, disturbed sites, roadsides and disturbed open woodlands and grasslands in Australia, Hawaii, the Galapagos Islands, Fiji, and on many islands in the Pacific region (Smith, 1985; Wagner et al., 1999; PIER, 2016; Weeds of Australia, 2016). C. ternatea is an aggressive colonizer of disturbed sites and open areas with the capability to displace and completely outcompete native vegetation (Weeds of Australia, 2016)."

303	**Agricultural/forestry/horticultural weed**	
	Source(s)	**Notes**
	Gaddeyya, G., & Kumar, P. R. (2014). Studies on weed infestation of some agricultural fields at Visakhapatnam district, Andhra Pradesh. Journal of Crop and Weed, 10(2), 419-429	"Table 3: The list of weed flora and their status in agricultural crops of study area" [Includes Clitoria ternatea among a list of broad leaved weeds of agricultural fields. Impacts to crops have not been specified in this publication]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Cereals, Orchards & Plantations"

Qsn #	Question	Answer
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 23 Aug 2021]	[Valued as a fodder plant and cover crop. Other references cite it as a weed of agriculture] "Butterfly pea has a reputation as a potential fodder plant, hay or cover crop. It has been extensively tested as such, especially in the subhumid to semi-arid tropics. It has never been used in extensive areas, although it is used by smallholders. It is used as a cover crop in coconut in southern India and in rubber in Malaysia. It is widely grown as an ornamental on fences and trellises because of its showy blue or white flowers, and is grown for dye production and medicinal purposes in India. In the Philippines young pods are eaten as a vegetable."
	WRA Specialist. (2021). Personal Communication	Included in a number of references listing agricultural weeds, but impacts to crop yields have generally not been specified or quantified

304	Environmental weed	y
	Source(s)	**Notes**
	Central QLD Coast Landcare Network. (2021). Butterfly Pea (Weed) Clitoria ternatea. https://cqclandcarenetwork.org.au/plants/butterfly-pea/. [Accessed 24 Aug 2021]	"Notes: Garden escapee; now widely naturalised in Queensland. Palatable and nutritious to stock; pods eaten by humans in Philippines. Environmental weed."
	Queensland Government. (2021). Weeds of Australia. Clitoria ternatea. https://keyserver.lucidcentral.org. [Accessed 23 Aug 2021]	[Environmental weed in Australia] "This pasture legume (and occasional garden ornamental) has escaped cultivation and invades river banks, creek lines, the margins of waterholes, irrigation channels, disturbed sites, waste areas, roadsides and disturbed natural vegetation (i.e. open woodlands and grasslands). Butterfly pea (Clitoria ternatea) is regarded as an environmental weed in Western Australia and the Northern Territory, and is also seen as a potential environmental weed in northern Queensland. It is actively managed by community groups in the Northern Territory, and is of most concern where it has invaded riparian zones within conservation areas near Darwin. It has also been listed as a priority environmental weed in one Natural Resource Management region in northern Australia."

305	Congeneric weed	
	Source(s)	**Notes**
	Department of Natural Resources & Mines. (2001). Weed Pocket Guide: Agricultural & Environmental Weeds - Far North Queensland. Queensland Government. https://www.wettropics.gov.au. [Accessed 24 Aug 2021]	[Clitoria laurifolia] "In north Queensland, Clitoria has aggressively invaded paperbark swampland, displacing the natural ground cover. Hard seeds could remain viable in the soil for around 10 years, germinating after fire."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Clitoria fairchildiana, Clitoria falcata, Clitoria guianensis, Clitoria heterophylla, Clitoria laurifolia, and Clitoria racemosa listed as naturalized and/or weeds in a number of locations.

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Climbing or sprawling perennial herbs from a woody rootstock; stems up to 3 m long. Leaflets 5 or 7(9), elliptic to suborbicular, 1-6.7 cm long, 0.5-4 cm wide, lower surface pubescent, stipules persistent, lanceolate, (2-)4-10 mm long. Flowers axillary, solitary or paired, bracteoles ovate to orbicular, 0.5-1.7 cm long; calyx 1.5-2.2 cm long, distinctly veined, pubescent; corolla blue or white with blue margins, or occasionally entirely white, the inner area at base pale or greenish yellow, standard 3-5 cm long. Pods linear-oblong, (4-)6-12 cm long, 0.7-1.2 cm wide, with a longitudinal ridge on both valves. Seeds 8-10, reddish brown to dark brown, with darker mottling, ellipsoid to reniform, 4-8 mm long, 3-5 mm in diameter, slightly laterally flattened."

402	Allelopathic	
	Source(s)	**Notes**
	Poonpaiboonpipattana, T., Suwunnamek, U., & Laosinwattana, C. (2015). Screening on allelopathic potential of 12 leguminous plants on germination and growth of barnyardgrass. Journal of Agricultural Technology, 11(8), 2167-2175	[Possibly. Powdered extract exhibits allelopathic effects] "A preparatory study of leguminous plants on allelopathic potential was completed from January to June 2015. In laboratory conditions, entire plants of 12 leguminous plants at the blossoming stage were collected and ground into residue powder. The powders were measured by phytotoxicity on germination and development of barnyard grass (Echinochloa crus-galli (L.) Beauv.) by direct application in a Petri dish at the rate of 250 and 500 mg/Petri dish. Centrosema pascuorum cv. Cavalcade, Clitoria ternatea and Stylosanthes guianensis demonstrated the most phytotoxic impact on germination and seedling development of barnyard grass. The level of hindrance on germination at 500 mg/Petri dish was 86%, 98% and 98% respectfully. Macroptillium atropurpureum and Phaseolus lathyroides powders demonstrated the slightest phytotoxicity. Another trial was directed to test the powders on weed control in pot scale. Directed wet seeds were sowed in the pot for 10 days. Utilization of powder integrated with a water irrigation was included into the pot at the proportion of 250 and 500 kg./ha. The outcome interestingly demonstrated all powders could smother weed density and weed biomass when compared with the control pot. Canavalia ensiformis, Crotalaria pallida, C. pascuorum cv. Cavalcade, C. ternatea and S. guianensis indicated totally diminishing weed density at the rate of 500 kg./ha, while the rice seedlings had no-harmful impact. Then again, mechanisms on restraining weeds were not understanding. The future works were centered on segregation and the distinguishing proof of dynamic mixes of chosen species, and the possibility of use in the field."

403	Parasitic	n
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Climbing or sprawling perennial herbs from a woody rootstock; stems up to 3 m long." [No evidence]

Qsn #	Question	Answer
404	**Unpalatable to grazing animals**	**n**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Because butterfly pea is very palatable it must be carefully managed to avoid overgrazing and loss of the stand."
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Palatability/acceptability - Very palatable thus requiring grazing management to persist."

405	**Toxic to animals**	**n**
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"While seeds and roots contain chemically active substances, there have been no reports of toxicity to animals grazing top material of C. ternatea."

406	**Host for recognized pests and pathogens**	**n**
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Pests and diseases - Fungal leaf diseases (Cercospora, Colletotrichum, Oidium and Rhizoctonia) have been recorded in cool wet weather but rarely as a serious problem. Minor susceptibility to various leaf-eating caterpillars and grasshoppers. Most lines (variably) susceptible to root nematode Meloidogyne incognita, but not a serious problem."
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Various fungi (e.g. Cercospora, Colletotrichum, Oidium and Rhizoctonia) and nematodes (Meloidogyne and Pratylenchus) have been recorded on butterfly pea but damage is rarely bad and control measures are unpractical or uneconomic in pastures. Fungicides such as benomyl may be useful in seed crops if diseases break out. Grass hoppers and leaf-eating caterpillars have caused damage in Australia. "

407	**Causes allergies or is otherwise toxic to humans**	**n**
	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	No evidence

408	**Creates a fire hazard in natural ecosystems**	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"In the seasonally dry tropics and in cool regions, growth is limited by lack of moisture or low temperatures. Leaves are shed in response to these stresses and top growth may be killed by frost or fire. However, recovery during the following growing season is usually good, provided grazing is not heavy and continuous." [Fast growing vine that dries out during dry periods. May contribute to fuel load and increased fire risk, although direct evidence is lacking]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Butterfly pea grows best in full sun."
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Normally grown in full sunlight but moderately shade-tolerant, being used as a cover crop in coconut plantations and under rubber."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Adapted to a wide range of soil types (from sands to heavy clays) of at least moderate fertility but is extremely well adapted to heavy clay alkaline soils, and suited to those clay soils which are too shallow for leucaena (Leucaena leucocephala). Can be grown in soils with pH from 5.5 to 8.9 but is best adapted in the pH range of 6.5–8.0. Some tolerance of salinity, but lower than that of siratro (Macroptilium atropurpureum)."
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"It has wide soil adaptation (pH 5.5-8.9), but prefers fertile friable soils and grows poorly on infertile sandy soils if not fertilized. It is one of the few herbaceous legumes well adapted to heavy clay soils in the subhumid to semi-arid tropics and the only one with potential in irrigated pasture mixtures on these soils. It will not tolerate flooding or waterlogging."

411	Climbing or smothering growth habit	y
	Source(s)	**Notes**
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Climbing or sprawling perennial herbs from a woody rootstock; stems up to 3 m long."

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

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Climbing or sprawling perennial herbs from a woody rootstock; stems up to 3 m long."

501	Aquatic	n
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	[Terrestrial] " It occurs in grassland, open woodland, bush, riverine vegetation, and disturbed places throughout its natural range."

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 24 Aug 2021]	"Family: Fabaceae (alt. Leguminosae) Subfamily: Faboideae Tribe: Phaseoleae Subtribe: Clitoriinae"

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Perennial climbing, scrambling or trailing herb with a strong woody rootstock." [Nitrogen fixing, non-woody herb]

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Perennial climbing, scrambling or trailing herb with a strong woody rootstock."

Qsn #	Question	Answer
601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	[No evidence] "Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia."

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods. Seed is also spread in cattle dung."
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Seed should be inoculated with a broad spectrum cowpea strain rhizobium such as Tropical Group M (CB 756). Mechanically scarify seed with a high hard seed content (>30%) when soil conditions favour immediate germination, or use unscarified seed with a high hard seed percentage when staggered germination is desired, eg. planting behind a blade plough or when using a crocodile planter."

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	Kalamani, A., & Gomez, S. M. (2001). Genetic variability in Clitoria spp. Annals of Agricultural Research, 22(2), 243-245	"C. purpurea and C. ternatea were crossed and their F1 and F2 progenies were raised in Madurai, Tamil Nadu, India during 1999." [Unknown. Artificial hybrids possible]

604	**Self-compatible or apomictic**	**y**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Flowers are cleistogamous but a small level of outcrossing occurs."

605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Flowers are cleistogamous but a small level of outcrossing occurs."

Qsn #	Question	Answer
	Solomon Raju AJ, Venkata Ramana k.(2021). A study on pollination ecology of butterfly pea, Clitoria ternatea L. (Fabaceae). Species, 22(69), 29-35	"Prafulkumar (2011) reported that C. ternatea is facultative autogamous and insect pollinators are not compulsory for effective pollination. He also mentioned that this species is either facultative xenogamous or has a system having an indication of different pollination behavior. In this study, it is found that C. ternatea is facultative xenogamous because the stigma is placed beyond the height of stamens and the hairy brush part of the style and stigma contacts the probing insect first followed by anthers. The floral sex organs return back to the keel to enable the stigma and style to come out and brush the dorsal side of the insect in successive visits to the same flowers to maximize cross-pollination while keeping the option open for self-pollination."

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"C. ternatea does not spread in grazed pastures due to limited seed set. However, there is some potential for spread in that pods shatter flinging seed, and seed is spread in the dung of grazing animals." [Not reported to spread vegetatively]
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Stems do not root at the nodes" ... "It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods."

607	Minimum generative time (years)	1
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Time to flowering in a collection of 58 lines (sown in January at 19°40'S) ranged from 7-11 weeks, with most lines flowering 8-9 weeks after sowing."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Central QLD Coast Landcare Network. (2021). Butterfly Pea (Weed) Clitoria ternatea. https://cqclandcarenetwork.org.au/plants/butterfly-pea/. [Accessed 24 Aug 2021]	"Spread by: Seeds in garden waste, possibly also spread by seeds in animal manure. Invades: Roadsides, canefields, natural areas, especially near human habitation."

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Clitoria ternatea is pantropical (20°N-24°S). Its true origin is obscured by extensive cultivation or naturalization in the humid lowland tropics of Asia, Africa, the Pacific Islands, and the Americas. It is widespread throughout South-East Asia."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. (1999). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"now pantropical, often cultivated as an ornamental; in Hawai'i a popular ornamental"
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"There are many minor variants of butterfly pea, including plants that are more or less erect, have narrower leaves, or have flowers that are unusually large or small, white, or partly or fully doubled.Some of these have been cultivated in Hawai'i."

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Major Pathway/s: Contaminant, Crop, Herbal, Ornamental, Pasture"
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	[Cultivated intentionally as a fodder crop. Probably may be dispersed as a contaminant of other pasture crops] "It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods. Seed is also spread in cattle dung. "

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Staples, G.W. & Herbst, D.R. (2005). A Tropical Garden Flora - Plants Cultivated in the Hawaiian Islands and Other Tropical Places. Bishop Museum Press, Honolulu, HI	"It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods. Seed is also spread in cattle dung."
	Solomon Raju AJ, Venkata Ramana k.(2021). A study on pollination ecology of butterfly pea, Clitoria ternatea L. (Fabaceae). Species, 22(69), 29-35	"Seed dispersal modes include autochory and hydrochory; the former enables population build up in parental sites while the latter to occupy new habitats and expand their distribution sites."

705	Propagules water dispersed	y
	Source(s)	**Notes**
	Solomon Raju AJ, Venkata Ramana k.(2021). A study on pollination ecology of butterfly pea, Clitoria ternatea L. (Fabaceae). Species, 22(69), 29-35	"Seed dispersal modes include autochory and hydrochory; the former enables population build up in parental sites while the latter to occupy new habitats and expand their distribution sites."
	Queensland Government. (2021). Weeds of Australia. Clitoria ternatea. https://keyserver.lucidcentral.org. [Accessed 23 Aug 2021]	[Likely Yes. Common in riparian habitats] "This pasture legume (and occasional garden ornamental) has escaped cultivation and invades river banks, creek lines, the margins of waterholes, irrigation channels, disturbed sites, waste areas, roadsides and disturbed natural vegetation (i.e. open woodlands and grasslands)."

706	Propagules bird dispersed	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Solomon Raju AJ, Venkata Ramana k.(2021). A study on pollination ecology of butterfly pea, Clitoria ternatea L. (Fabaceae). Species, 22(69), 29-35	"Seed dispersal modes include autochory and hydrochory; the former enables population build up in parental sites while the latter to occupy new habitats and expand their distribution sites."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods. Seed is also spread in cattle dung."
	Solomon Raju AJ, Venkata Ramana k.(2021). A study on pollination ecology of butterfly pea, Clitoria ternatea L. (Fabaceae). Species, 22(69), 29-35	"Seed dispersal modes include autochory and hydrochory; the former enables population build up in parental sites while the latter to occupy new habitats and expand their distribution sites."

708	Propagules survive passage through the gut	y
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 23 Aug 2021]	"C. ternatea does not spread in grazed pastures due to limited seed set. However, there is some potential for spread in that pods shatter flinging seed, and seed is spread in the dung of grazing animals."
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 23 Aug 2021]	"It is propagated by seed and readily self-propagates and spreads under favourable conditions by seed thrown vigorously from the dehiscing dry pods. Seed is also spread in cattle dung."

801	Prolific seed production (>1000/m2)	n
	Source(s)	**Notes**
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"C. ternatea does not spread in grazed pastures due to limited seed set. However, there is some potential for spread in that pods shatter flinging seed, and seed is spread in the dung of grazing animals. Commonly C. ternatea pastures are sown as pure legume pastures and are progressively invaded by vigorous pasture grasses as soil-N levels build up."
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Pod linear-oblong, flattened, 6-12.5 cm x 7-12 mm, margined, apiculate, glabrous or with a mixture of sparse adpressed long hairs and very short hairs. Seeds 8-10, ellipsoid, oblong or oblong-reniform, sometimes truncate at one end, 4.5-7 mm x 3-4 mm, 2-2.5 mm, olive, pale brown or deep reddish-brown with dark mottling, or almost black, minutely pitted." [Relatively large seeds]

802	Evidence that a persistent propagule bank is formed (>1 yr)	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"Hand-harvested seed often remains hard-seeded for a long time and requires scarification prior to sowing. Mechanical abrasion, hot water or sulphuric acid can be used to break this dormancy. Mechanically harvested or threshed seed is usually satisfactory for sowing the following wet season without further treatment."

803	Well controlled by herbicides	y
	Source(s)	**Notes**
	CABI. (2021). Clitoria ternatea (butterfly-pea). In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"In Australia, the herbicides imazethapyr and bentazone have been used to control this species (Cook et al., 2005; McCosker and Osten, 1999)."
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	[Some herbicides effective at certain stages of growth] "In screening trials, seedlings were shown to be susceptible to 2,4-D and 2,4-DB, moderately susceptible to acifluorfen, and tolerant of bentazone, fluazifop-butyl and sethoxydim. Bentazone (post-emergence) and imazethapyr (post-planting) are commonly used to control weeds during early establishment in northern Australia. Invading grasses may also be controlled using selective grass killers such as fluazifop or sethoxydim."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	**Notes**
	Staples, I.B. (1992). Clitoria ternatea L.[Internet] Record from Proseabase. Mannetje, L.'t and Jones, R.M. (Editors). PROSEA (Plant Resources of South-East Asia) Foundation, Bogor, Indonesia. http://www.proseanet.org. [Accessed 24 Aug 2021]	"In the seasonally dry tropics and in cool regions, growth is limited by lack of moisture or low temperatures. Leaves are shed in response to these stresses and top growth may be killed by frost or fire. However, recovery during the following growing season is usually good, provided grazing is not heavy and continuous."
	Cook, B.G. et al. (2005). Tropical Forages: an interactive selection tool., SIRO, DPI&F(Qld), CIAT and ILRI. http://www.tropicalforages.info/index.htm. [Accessed 24 Aug 2021]	"Tolerant of heavy rotational grazing, but not constant heavy defoliation. Frequent trampling by cattle will damage the stems. Growing tips and axils of stems must be left to develop new leaves. Because of its high palatability it is better managed as short-term pasture under rotational grazing."
	WRA Specialist. (2021). Personal Communication	Recovers from fire but not tolerant of constant heavy defoliation.

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability and elevation range
• Thrives in tropical climates
• Naturalized on Oahu, Lanai, and Maui (Hawaiian Islands) and widely naturalized elsewhere
• A weed of disturbed sites that may impact some crops
• Considered an environmental weed in riparian areas of the Northern Territory, Australia
• Tolerates many soil types
• Climbing and smothering habit
• Reproduces by seeds
• Cleistogamous (self-pollinating), but a small level of outcrossing occurs
• Reaches maturity quickly (as early as 8-9 weeks after sowing)
• Seeds dispersed by dehiscent pods, water, garden waste, as a crop contaminant, in animal dung, and intentionally by people
• Hard-coated seeds may form a persistent seed bank
• Tolerates and resprouts after fire

Low Risk Traits
• In the Hawaiian Islands, valued as a fodder crop or ornamental plant with no reports of detrimental impacts to natural areas or agriculture
• Unarmed (no spines, thorns, or burrs)
• Provides fodder for livestock
• Thrives in full sun (dense shade may limit spread)
• Stems do not root at the nodes (not reported to spread by vegetative fragmentation)
• Herbicides may provide effective control