

<b>Taxon:</b> <i>Canavalia gladiata</i> (Jacq.) DC.	<b>Family:</b> Fabaceae
<b>Common Name(s):</b> Japanese jackbean sword bean sword jackbean	<b>Synonym(s):</b> Dolichos gladiatus Jacq.

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 27 Sep 2016
<b>WRA Score:</b> 5.0	<b>Designation:</b> EVALUATE	<b>Rating:</b> Evaluate

**Keywords:** Tropical Vine, Domesticated, Naturalized, Toxic Seeds, Edible

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	y
102	Has the species become naturalized where grown?	y=1, n=-1	y
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		
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	y=1, n=0	n
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	y
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	y
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	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	y
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic	y=1, n=-1	n
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	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	y
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Sword bean is only known cultivated and naturalized. Its origin is in the Old World tropics and it was probably domesticated in eastern Asia. The wide dispersal in historic times is thought to be partly due to carrying the remarkable seeds as curios."

102	Has the species become naturalized where grown?	y
	Source(s)	Notes
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics. It has become naturalised in some areas in the tropics."

103	Does the species have weedy races?	
	Source(s)	Notes
	Randall, R.P. 2012. <i>A Global Compendium of Weeds</i> . 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. Listed as a weed, but unable to confirm

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
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics."

202	Quality of climate match data	High
	Source(s)	Notes
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"C. gladiata thrives best in warm areas with temperatures of 20–30°C and well distributed annual rainfall of 900–1,500 mm from sea level to 1,500 m elevation."

Qsn #	Question	Answer
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Sword bean requires temperatures of 20–30°C and is cultivated from sea-level up to 1000 m altitude. It is tolerant of drought once established and also tolerant of waterlogging, shade and salinity, making it one of the most hardy tropical legumes. It prefers an evenly distributed annual rainfall of 900–1500 mm."

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics. It has become naturalised in some areas in the tropics."

205	<b>Does the species have a history of repeated introductions outside its natural range?</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics."

301	<b>Naturalized beyond native range</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics. It has become naturalised in some areas in the tropics."

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	
	Source(s)	Notes
	Dave's Garden. 2016. Sword Bean - <i>Canavalia gladiata</i> . <a href="http://davesgarden.com/guides/pf/go/77658/">http://davesgarden.com/guides/pf/go/77658/</a> . [Accessed 27 Sep 2016]	[Described as a weed in cultivation] "On Aug 14, 2015, BountifulHealth from San Luis Obispo, CA wrote: ... We grew the Red Sword Bean <i>Canavalia gladiata</i> 4 yrs ago! from Magic Bean from my niece's wedding. They were favors! I helped her order them from ASIA!! how long to produce beans?? They did not grow the 1st 2 yrs then after that they TOOK OFF LIKE A WEED!! NO BEANS THOUGH?!! How many yrs does it take to have beans???? My husband wants to chop it down tomorrow!! "
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. Listed as a weed, but unable to confirm

303	Agricultural/forestry/horticultural weed	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia." ... "It has become naturalized in some areas in the tropics."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

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

305	Congeneric weed	y
	Source(s)	Notes
	Waterhouse, D.F. 1997. The major invertebrate pests and weeds of agriculture and plantation forestry in the Southern and Western Pacific. The Australian Centre for International Agricultural Research (ACIAR), Canberra	<i>Canavalia rosea</i> is considered to be a major weed of sandy and rocky beaches in the Southern and Western Pacific.

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence] "A climbing, twining, woody perennial herb several metres high with a deep root system and runners as long as 10 m. Leaves alternate, compound, ternate with caduceous stipules and on 96 mm long petiole. Leaflets are ovate, 8–20 × 8–12 cm, sparsely whitish or brown pubescent on surfaces, base rounded or cuneate, apex acuminate."

Qsn #	Question	Answer
402	<b>Allelopathic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	"It is occasionally cultivated as a cover crop and green manure." [No evidence]

403	<b>Parasitic</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"A climbing, twining, woody perennial herb several metres high with a deep root system and runners as long as 10 m." [Fabaceae. No evidence]

404	<b>Unpalatable to grazing animals</b>	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants</i> . Volume 2, Fruits. Springer, New York	"It is often grown as a cover crop, green manure and forage crop. Its foliage provides a good leaf meal for use in animal feeds."

405	<b>Toxic to animals</b>	y
	<b>Source(s)</b>	<b>Notes</b>
	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	"Uncooked seed toxic at any stage, may cause poisoning; urease extracted from the seed."
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	[Seeds potentially toxic in large quantities] "In both human and animal nutrition dry seeds have the shortcoming that their proteins have a low digestibility and a low biological value, and raw seeds are poisonous in large quantities."

406	<b>Host for recognized pests and pathogens</b>	
	<b>Source(s)</b>	<b>Notes</b>
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Sword bean is fairly resistant to diseases and pests. The most serious fungal disease is root rot caused by <i>Colletotrichum lindemuthianum</i> . Sword bean is a host of tomato spotted wilt virus (TSWV). <i>Canavalia</i> is known to reduce nematode populations. However, it is susceptible to the soybean cyst nematode ( <i>Heterodera glycines</i> ) that has not yet been recorded in Africa. Major pests are fall army worm ( <i>Spodoptera frugiperda</i> ) and beetle grubs that bore into the stems. Sword bean seeds are fairly resistant to storage pests."

Qsn #	Question	Answer
	Ekanayake, S., Jansz, E. R., Nair, B. M., & Abeysekera, A. M. (1999). A Review of an underutilized legume <i>Canavalia gladiata</i> . <i>Vidyodaya Journal of Science</i> 8: 1-25	"The sword bean is relatively resistant to attack from pests and diseases. It is susceptible to a root rot <i>Colletotrichum lindemuthianum</i> ( Smartt, 1976) and in Asia the crop is reported to suffer from scab, <i>Elsinoe canavaliae</i> ."

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	Notes
	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	"Uncooked seed toxic at any stage, may cause poisoning; urease extracted from the seed."
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits</i> . Springer, New York	[Possibly, if not cooked] "Sword bean is not widely consumed because of prolonged cooking required to remove toxic growth inhibiting proteins in the seed before they are edible."
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	[Uncooked seeds may be toxic] "In Madagascar the young green fruits and immature seeds of sword bean are used as a cooked vegetable. Sword bean is eaten in Tanzania, where the Swahili expression 'eating sword bean' means 'being happy'. Use of the fruits and immature seeds is also reported from Sri Lanka, India, Indonesia, China, Korea and Japan." ... "The ripe seeds can be eaten after cooking, but only after removing the seed-coat and several changes of water." ... "The seeds of <i>Canavalia</i> species contain several growth-inhibiting and toxic storage proteins, e.g. canavalin (vicilin), con-canavalin A and B and canatoxin. The urease contained in the seed is chemically related to canatoxin. It also contains the toxic non-protein amino acid canavanine, a structural analogue of L-arginine. In both human and animal nutrition dry seeds have the shortcoming that their proteins have a low digestibility and a low biological value, and raw seeds are poisonous in large quantities. The digestibility can be improved by treatment such as heating (prolonged cooking, pressure-cooking or roasting) or fermenting."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	Notes
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits</i> . Springer, New York	[No evidence. Could possibly act as a fuel ladder if outside cultivation] "Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	Notes
	Lim, T.K. 2012. <i>Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits</i> . Springer, New York	"It grows well in full sun to light partial shade and is hardy, able to survive drought conditions as it has a deep rooted system and is fairly frost tolerant."
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed ]	"It is tolerant of drought once established and also tolerant of waterlogging, shade and salinity, making it one of the most hardy tropical legumes."

Qsn #	Question	Answer
	Dave's Garden. 2016. Sword Bean - <i>Canavalia gladiata</i> . <a href="http://davesgarden.com/guides/pf/go/77658/">http://davesgarden.com/guides/pf/go/77658/</a> . [Accessed 27 Sep 2016]	"Sun Exposure: Full Sun Sun to Partial Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"It grows well even on nutrient depleted soils and on acid soils, even with a pH as low as 4.5."
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"It tolerates a wide array of soil types from pH 4.3–6.8. It will grow even on highly leached nutrient poor soils."

411	Climbing or smothering growth habit	y
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"A climbing, twining, woody perennial herb several metres high with a deep root system and runners as long as 10 m. Leaves alternate, compound, ternate with caduceous stipules and on 96 mm long petiole. Leaflets are ovate, 8–20 × 8–12 cm, sparsely whitish or brown pubescent on surfaces, base rounded or cuneate, apex acuminate."

412	Forms dense thickets	n
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	"Sword bean is only known cultivated and naturalized. Its origin is in the Old World tropics and it was probably domesticated in eastern Asia." ... "Perennial trailing or climbing herb up to 10 m long, often grown as an annual; root system deep."

501	Aquatic	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Terrestrial Vine] " <i>C. gladiata</i> thrives best in warm areas with temperatures of 20–30°C and well distributed annual rainfall of 900–1,500 mm from sea level to 1,500 m elevation."



Qsn #	Question	Answer
502	Grass	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 26 Sep 2016]	Family: Fabaceae (alt.Leguminosae) Subfamily: Faboideae Tribe: Phaseoleae Subtribe: Diocleinae

503	Nitrogen fixing woody plant	y
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"A climbing, twining, woody perennial herb several metres high with a deep root system and runners as long as 10 m." [Fabaceae]

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"A climbing, twining, woody perennial herb several metres high with a deep root system and runners as long as 10 m." [No bulbs, corms, or tubers]

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence. Native range unknown, but widespread in cultivation & naturalized] "Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics. It has become naturalized in some areas in the tropics."

602	Produces viable seed	y
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Sword bean seed germinates readily and the plant is relatively fast growing. Flowers are pollinated by insects and 20% or more cross-pollination occurs."

603	Hybridizes naturally	y
	Source(s)	Notes

Qsn #	Question	Answer
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Hybrids of <i>Canavalia gladiata</i> with both <i>Canavalia africana</i> and <i>Canavalia ensiformis</i> have occurred from natural crosses. Breeding programmes should use this wide base of germplasm. "
	Cunha, M.D. & Sridhar, K.R. (2010). Micropropagation of <i>Canavalia cathartica</i> of coastal sand dunes. <i>Journal of Agricultural Technology</i> , 7, 85-96	"Sastrapradja et al. (1981) reported a natural hybrid of <i>C. cathartica</i> × <i>C. gladiata</i> "

604	Self-compatible or apomictic	n
	Source(s)	Notes
	Sahai, K. (2009). Reproductive biology of two species of <i>Canavalia</i> DC.(Fabaceae)—A non-conventional wild legume. <i>Flora</i> , 204(10), 762-768	"Both the species flower and set their seed primarily from August to December. The study of pollen—pistil interaction indicated the existence of morphological protandry in both species, and pollen germination occurred only after rupture of the stigmatic surface. This suggests that some form of self incompatibility operates in these species."

605	Requires specialist pollinators	n
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Flowers are pollinated by insects and 20% or more cross-pollination occurs." ...
	Sahai, K. (2009). Reproductive biology of two species of <i>Canavalia</i> DC.(Fabaceae)—A non-conventional wild legume. <i>Flora</i> , 204(10), 762-768	"Honeybees ( <i>Apis mellifera</i> ) occasionally visited flowers, but small black ants ( <i>Monomorium minimum</i> ) and big black ants ( <i>Campylomma verbasci</i> ) were the frequent visitors for <i>C. gladiata</i> and <i>C. virosa</i> , respectively, and mainly behaved as primary nectar robbers."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	[Propagated from seeds] "Sword bean is usually grown by smallholder farmers near houses and allowed to climb on walls, fences and trees. Seeds are sown at a depth of 5–7.5 cm. As a field crop, it is usually sown at a spacing of 75–90 cm between rows and 45–60 cm within the row, at a seed rate of 25–40 kg/ha. "

607	Minimum generative time (years)	1
	Source(s)	Notes

Qsn #	Question	Answer
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 26 Sep 2016]	"Perennial trailing or climbing herb up to 10 m long, often grown as an annual; root system deep."
	Food Plant Solutions. (2014). Potentially Important Food Plants of North East India. FPS, Devonport, Tasmania	"They are grown from seeds. Seeds germinate readily and the plant is relatively fast growing." ... "Green seeds/pods are produced in 3 - 4 months and mature seeds in 5 - 10 months."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	n
	Source(s)	Notes
	Bosch, C.H., 2004. <i>Canavalia gladiata</i> (Jacq.) DC. [Internet] Record from PROTA4U. Grubben, G.J.H. & Denton, O.A. (Editors). PROTA (Plant Resources of Tropical Africa), Wageningen, Netherlands. <a href="http://www.prota4u.org/search.asp">http://www.prota4u.org/search.asp</a> . [Accessed 27 Sep 2016]	[Fruit & seeds lack means of external attachment] "Fruit a linear-oblong pod, slightly compressed, sometimes curved, 20–40(–60) cm × 3.5–5 cm, widest near the apex, 8–16-seeded, spirally dehiscent; each valve with ventral rib and extra rib spaced c. 4 mm. Seeds 2–3.5 cm × 1.5–2 cm, red or red-brown, rarely black, pink or white; hilum 1.5–2.0 cm long."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	"Sword bean is known only in cultivation and is widely distributed in the old world probably domesticated in Eastern Asia. It is mainly cultivated in South, Southeast and East Asia, less so in Saudi Arabia, East and South Africa and Madagascar, more rarely grown in West Africa and the American tropics."

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	Notes
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence. Unlikely given large fruit & seed size] "Fruit large, linear-oblong legume, straight or slightly curved (sabre-shaped), 20–35 cm long by 3.5–6 cm wide, thickly leathery (Plates 1 and 2 ). Seeds 10–14, ellipsoid-oblong, 3.5 × 2 cm, white, mauve, mauve-brown –mottled, reddish pink to reddish-brown, with large hilum, 1.5 cm"

704	Propagules adapted to wind dispersal	n
	Source(s)	Notes
	Russell, P. G., & Musil, A. F. (1961) Plants must disperse their seeds. Pp. 80-88 In: Seeds: The Yearbook of Agriculture. USDA, Washington DC	[Not wind-dispersed, but wind may facilitate further dispersal of seeds] "Seed pods of many leguminous species open explosively when ripe. The large, thick pods of the West Indian swordbean { <i>Canavalia gladiata</i> ) snap open, and the seeds are thrown 10 to 20 feet."

705	Propagules water dispersed	

Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Unknown. Pods or seeds may be buoyant, as they are some other <i>Canavalia</i> species] "Fruit large, linear-oblong legume, straight or slightly curved (sabre-shaped), 20–35 cm long by 3.5–6 cm wide, thickly leathery (Plates 1 and 2 ). Seeds 10–14, ellipsoid-oblong, 3.5 × 2 cm, white, mauve, mauve-brown –mottled, reddish pink to reddish-brown, with large hilum, 1.5 cm"

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	Russell, P. G., & Musil, A. F. (1961) Plants must disperse their seeds. Pp. 80-88 In: Seeds: The Yearbook of Agriculture. USDA, Washington DC	"Seed pods of many leguminous species open explosively when ripe. The large, thick pods of the West Indian swordbean ( <i>Canavalia gladiata</i> ) snap open, and the seeds are thrown 10 to 20 feet."
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[No evidence] "Fruit large, linear-oblong legume, straight or slightly curved (sabre-shaped), 20–35 cm long by 3.5–6 cm wide, thickly leathery (Plates 1 and 2 ). Seeds 10–14, ellipsoid-oblong, 3.5 × 2 cm, white, mauve, mauve-brown –mottled, reddish pink to reddish-brown, with large hilum, 1.5 cm"

707	Propagules dispersed by other animals (externally)	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Fruit & seeds lack means of external attachment] "Fruit large, linear-oblong legume, straight or slightly curved (sabre-shaped), 20–35 cm long by 3.5–6 cm wide, thickly leathery (Plates 1 and 2 ). Seeds 10–14, ellipsoid-oblong, 3.5 × 2 cm, white, mauve, mauve-brown –mottled, reddish pink to reddish-brown, with large hilum, 1.5 cm."

708	Propagules survive passage through the gut	n
	<b>Source(s)</b>	<b>Notes</b>
	Lim, T.K. 2012. Edible Medicinal and Non-Medicinal Plants. Volume 2, Fruits. Springer, New York	[Seeds unlikely to be consumed] "Seeds 2–3.5 cm × 1.5–2 cm, red or red-brown, rarely black, pink or white; hilum 1.5–2.0 cm long." ... "Sword bean is not widely consumed because of prolonged cooking required to remove toxic growth inhibiting proteins in the seed before they are edible."

801	Prolific seed production (>1000/m2)	n
	<b>Source(s)</b>	<b>Notes</b>
	Sahai, K. (2009). Reproductive biology of two species of <i>Canavalia</i> DC.(Fabaceae)—A non-conventional wild legume. <i>Flora</i> , 204(10), 762-768	"Inadequacy of reliable pollinators and high rate of bud/flower drop may be the main factors for low fruit and seed set in both the species."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 27 Sep 2016]	"Storage Behaviour: Orthodox Storage Conditions: 100% germination following 10 years open storage at room temperature (Ewart, 1908); long-term storage at IITA Genebank (Ng et al., 1993)"
	Horticultural Impex. 2016. <i>Canavalia gladiata</i> . <a href="http://www.ehorticulture.com/grass-fodder/canavalia-gladiata-detail.html">http://www.ehorticulture.com/grass-fodder/canavalia-gladiata-detail.html</a> . [Accessed 27 Sep 2016]	Seed Longevity - 1-2 year"

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

<b>804</b>	<b>Tolerates, or benefits from, mutilation, cultivation, or fire</b>	
	<b>Source(s)</b>	<b>Notes</b>
	WRA Specialist. 2016. Personal Communication	Unknown

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

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized
- Other *Canavalia* species have become invasive
- Seeds are toxic unless cooked
- Shade tolerant
- Tolerates many soil types
- Climbing & smothering growth habit
- N-Fixing
- Reproduces by seeds
- Hybridizes with other *Canavalia* species
- Reaches maturity in <1 year
- Seeds dispersed by pods which snap open & forcefully eject seeds
- Seeds able to be stored for extended periods & likely for form a persistent seed bank

## Low Risk Traits

- Despite naturalization, no confirmed reports of negative impacts were found
- Unarmed (no spines, thorns or burrs)
- Provides fodder for livestock
- Seeds edible if cooked
- Self-incompatible
- Not reported to spread vegetatively
- Relatively large seeds unlikely to be inadvertently dispersed
- Pollinator limitations may result in reduced seed set

## Second Screening Results for Vines

(A) Reported as a weed of cultivated lands? Unknown. Unable to confirm

(B) Shade tolerant or known to form dense stands?> Yes. Shade-tolerant

(C) Bird or clearly wind-dispersed?> No. Seeds ejected from pods

(D) Life cycle <4 years?

Outcome = Evaluate Further

**TAXON:** *Canavalia gladiata* (Jacq.)  
DC.

**SCORE:** 5.0

**RATING:** Evaluate