

<b>Taxon:</b> <i>Asclepias curassavica</i>	<b>Family:</b> Apocynaceae
<b>Common Name(s):</b> blood flower butterfly weed laulele red milkweed	<b>Synonym(s):</b> <i>Asclepias nivea</i> var. <i>curassavica</i> (L.)

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 19 Mar 2015
<b>WRA Score:</b> 14.0	<b>Designation:</b> H(Hawai'i)	<b>Rating:</b> High Risk

**Keywords:** Naturalized, Agricultural Weed, Toxic, Wind-Dispersed, Monarch Butterfly Host

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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	y
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

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
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	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic	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)		
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m <sup>2</sup> )		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
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)	y=-1, n=1	y

**Supporting Data:**

Qsn #	Question	Answer
101	Is the species highly domesticated?	n
	Source(s)	Notes
	Woodson, R. E. (1954). The North American species of <i>Asclepias</i> L. <i>Annals of the Missouri Botanical Garden</i> , 41 (1): 1-211	No evidence

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2015. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2015. 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
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native from Florida to South America and the West Indies"

202	Quality of climate match data	High
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World weeds: natural histories and distribution</i> . John Wiley and Sons, Inc., New York, NY	" <i>A. curassavica</i> is native to the tropical Americas and occurs most frequently in pastures, wastelands and along roadsides. It grows from sea level to over 1500 m in its region of origin when temperatures average 17° C. While primarily found in tropical and subtropical climates, it can occur in temperate areas."

Qsn #	Question	Answer
204	Native or naturalized in regions with tropical or subtropical climates	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.	"Native from Florida to South America and the West Indies; in Hawai'i naturalized in low elevation, often dry habitats on all of the main islands. On Hawai'i it occurs up to 950 m."

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	Notes
	Woodson, R. E. (1954). The North American species of <i>Asclepias</i> L. <i>Annals of the Missouri Botanical Garden</i> , 41 (1): 1-211	"also widely introduced in the tropics of the Old World"
	Wyatt, R., & Broyles, S. B. (1997). The weedy tropical milkweeds <i>Asclepias curassavica</i> and <i>A. fruticosa</i> are self-compatible. <i>Biotropica</i> , 29(2): 232-234	" <i>Asclepias curassavica</i> L. is very widespread in subtropical and tropical regions of the Americas and has been widely introduced in the tropics of the Old World (Woodson 1954)."

301	Naturalized beyond native range	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.	"in Hawai'i naturalized in low elevation, often dry habitats on all of the main islands. On Hawai'i it occurs up to 950 m."
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 17 Mar 2015]	"Naturalized: AFRICA Africa ASIA-TEMPERATE China: China Eastern Asia: Japan ASIA-TROPICAL Indian Subcontinent: Pakistan North Indian Ocean: Cocos (Keeling) Islands Indo-China: Cambodia; Thailand Malesia: Malaysia; Papua New Guinea; Philippines AUSTRALASIA Australia: Australia NORTHERN AMERICA Southeastern U.S.A.: United States - Florida, Louisiana South-Central U.S.A.: United States - Texas PACIFIC North-Central Pacific: United States - Hawaii Northwestern Pacific: Marshall Islands; Micronesia; Northern Mariana Islands; Palau South-Central Pacific: Cook Islands; French Polynesia Southwestern Pacific: Fiji; New Caledonia; Samoa; Tonga; Vanuatu; Wallis and Futuna Islands SOUTHERN AMERICA Western South America: Ecuador - Galapagos Islands"

302	Garden/amenity/disturbance weed	
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	"Common in dry, sunny areas at lower elevations. A weed in wastelands and along roadsides." [A disturbance-adapted weed with detrimental impacts on agriculture]

303	Agricultural/forestry/horticultural weed	y
	<b>Source(s)</b>	<b>Notes</b>
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	"A. curassaiva is a reported weed of 21 crops in nearly 50 countries ..., principally in the Americas and Asia. Its economic importance is greatest in pastures where it is reported as a serious or principal weed in Brazil, Central America, Ecuador, and Samoa; a common pasture weed in Australia, Dominican Republic, Hawaii, Jamaica, Nicaragua, and Surinam; and as an unranked weed of pastures in Colombia, Mexico, New Caledonia, New Guinea, and the Solomon Islands. It is a common weed of bananas, papaya, pineapple, sesame, sorghum, sugarcane, sweet potatoes, and vegetable in Honduras; cereals and orchards in Turkey; coconut in Trinidad; maize, rice, and sugarcane in Honduras and Mexico; and taro in Samoa."
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	"Declared noxious in Regulation 2. Generally considered poisonous and avoided by livestock. Also grown as an ornamental and is a host of the monarch butterfly."

304	Environmental weed	
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	[Unknown] "Although <i>A. curassavica</i> is reported to invade native ecosystems (e.g. Ward, 2012), the environmental impacts of this species have not been quantified. Milkweeds are poisonous or distasteful to birds and mammals (Spurgeon, 2013)"

305	Congeneric weed	y
	<b>Source(s)</b>	<b>Notes</b>
	Wyatt, R., Stoneburner, A., Broyles, S. B., & Allison, J. R. (1993). Range extension southward in common milkweed, <i>Asclepias syriaca</i> L. Bulletin of the Torrey Botanical Club, 120(2): 177-179	"As noted by Woodson (1954) in his monograph of the 108 North American species of <i>Asclepias</i> , "common milkweed" ( <i>A. syriaca</i> L.) "is the preeminent weedy species of the northeastern United States." Primarily a plant of disturbed sites, it occurs in prairies, alluvial bottoms, pastures, fields, roadsides, and railways."
	Wyatt, R., & Broyles, S. B. (1997). The weedy tropical milkweeds <i>Asclepias curassavica</i> and <i>A. fruticosa</i> are self-compatible. Biotropica, 29(2): 232-234	"Belying their common name, most milkweeds ( <i>Asclepiadaceae</i> ) are, in fact, not weedy. Of the 105 species of <i>Asclepias</i> native to North America, only one, <i>A. syriaca</i> L., is a serious pest that aggressively invades disturbed sites (Wyatt et al. 1993)."

401	Produces spines, thorns or burrs	n
	<b>Source(s)</b>	<b>Notes</b>

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] "Erect perennial herbs 6-8(-20) dm tall; stems unbranched or many-branched, glabrous or puberulent, especially on younger parts. Leaves opposite, lanceolate to linearlanceolate, narrowly oblong-elliptic, or elliptic, 5-16 cm long, 1-3(-4) cm wide, petioles 1-2 cm long."

402	Allelopathic	
	Source(s)	Notes
	Teixeira, R.A. and Poletto, R. 2014. Efeito alelopático de plantas toxicas sobre a germinação e crescimento inicial do pepino. Revista Científica Eletrônica de Agronomia 25 (1): 8-47	[ <i>Asclepias curassavica</i> did not exhibit strong allelopathic properties in this study compared to the two other species evaluated] "ABSTRACT - The objective of this study is to evaluate the allelopathic effect of aqueous extracts of leaves of <i>Dieffenbachia picta</i> (me nobody can), <i>Euphorbia tirucalli</i> (aveloz) and <i>Asclepias curassavica</i> (herb-of-mouse) on germination and initial growth of <i>Cucumis sativus</i> L. (cucumber) the experiments were performed in the laboratory using aqueous extracts at concentrations of 5, 10, 20, 40, 60, 80 and 100% and a control group with distilled water only. For each concentration were done in five replicates autoclaved Petri dish containing 25 cucumber seeds in each. The experiments were evaluated for seven days, and then we counted seedlings with normal and abnormal development. With the use of a ruler graduated in centimeters, measured the length of roots (greater root) and the aerial part of normal seedlings. The data collected were subjected to analysis of variance ( $p \leq 0.05$ ), and Tukey's test ( $p \leq 0.05$ ). The extract can dumb cane had greater inhibitory potential at high concentrations and stimulated germination and growth at low concentrations. The aveloz showed similar behavior but with lower percentages of germination and growth. From the results it is concluded that the species would recommend <i>Dieffenbachia picta</i> Schott (dumb cane can), for future studies as herbicides and / or hormone."

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.	[No evidence] "Erect perennial herbs 6-8(-20) dm tall; stems unbranched or many-branched, glabrous or puberulent, especially on younger parts."

404	Unpalatable to grazing animals	y
	Source(s)	Notes
	Bierzchudek, P. (1981). <i>Asclepias</i> , <i>Lantana</i> , and <i>Epidendrum</i> : A Floral Mimicry Complex?. <i>Biotropica</i> , 13: 54-58	"Alternative hypotheses for the resemblance do exist. It has been suggested by A. Gomez-Pompa (pers. comm.) and M. Rausher (pers. comm.) that <i>Asclepias</i> and <i>Lantana</i> , both unpalatable (and toxic) pasture plants, are recognized by herbivores on the basis of their flowers, and that their resemblance provides each with greater protection from grazing."
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	"Declared noxious in Regulation 2. Generally considered poisonous and avoided by livestock."

Qsn #	Question	Answer
	Gupta, R.C. 2012. Veterinary Toxicology: Basic and Clinical Principles. Academic Press, London, UK	"Generally not palatable; often only grazed during dry seasons when fodder is scarce; may be grazed by animals inexperienced with the plants; potential contaminants of hay."
	Simmonds, H., Holst, P. & Bourke, C. 2000. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"Ruminants, such as the goat, are more tolerant of this type of plant than horses and donkeys. Plants of this genus are generally only eaten during droughts." ... "A weed of pastures and roadsides. It is relatively unpalatable to all livestock."

405	Toxic to animals	y
	Source(s)	Notes
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. Handbook of Hawaiian Weeds. University of Hawaii Press, Honolulu, HI	"Declared noxious in Regulation 2. Generally considered poisonous and avoided by livestock."
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"Furthermore, given the toxicity of <i>A. curassavica</i> , economic impacts are also likely to include illness and death of livestock." ... "The leaves of <i>A. curassavica</i> may be dangerous to pets if eaten due to the high levels of glycosides in the plant (Spurgeon, 2013)."
	Gupta, R.C. 2012. Veterinary Toxicology: Basic and Clinical Principles. Academic Press, London, UK	"Table 79.1" ... "Cardiac glycoside poisoning" ... "Typical cardiac glycoside poisoning; may show signs of GI distress (e.g., scouring) due to other irritants present in the plant."

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	Gilman, E.F. 2007. <i>Asclepias curassavica</i> . Butterflyweed, Milkweed, Silkweed. FPS-49. Revised. Institute of Food & Agricultural Sciences, University of Florida, Gainesville FL. <a href="http://edis.ifas.ufl.edu/fp049">http://edis.ifas.ufl.edu/fp049</a> . [Accessed 18 Mar 2015]	"Aphids may infest Butterfly Weed." ... "Pests and Diseases Leaf spot diseases are seen but not serious. Rusts cause the formation of reddish colored spots. Cucumber mosaic virus causes leaf mottling but no chemical control is available."
	Missouri Botanical Garden. 2015. <i>Asclepias curassavica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=c376">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=c376</a> . [Accessed 18 Mar 2015]	"No serious insect or disease problems. Somewhat weedy and can spread in warm winter locations where it will self-seed. Watch for aphids. Sooty mold may develop if aphid populations are not checked."

407	Causes allergies or is otherwise toxic to humans	y
	Source(s)	Notes
	Missouri Botanical Garden. 2015. <i>Asclepias curassavica</i> . <a href="http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=c376">http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=c376</a> . [Accessed 18 Mar 2015]	"Consider wearing gloves when working with these plants because the milky sap is poisonous if ingested and can be toxic to human skin."
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"The latex of <i>A. curassavica</i> is toxic and can cause serious reactions if ingested or touched. Globinmed (2013) gives the signs of toxicity as 'vertigo, headache, vomiting, diarrhoea, stomach cramps, pallor, chills and arrhythmia'. The latex is painful if it comes in contact with eyes and can cause hazy vision. It can also produce dermatitis in susceptible individuals (Globinmed, 2013)."

408	Creates a fire hazard in natural ecosystems	n
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	Increased fire risk not listed among the negative impacts

409	Is a shade tolerant plant at some stage of its life cycle	n
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>A. curassavica</i> grows best in full sun and in well-drained, acid or neutral and loam or sand soil (Missouri Botanical Garden, 2013; Royal Horticultural Society, 2013)."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	"It prefers open, sunny environments and is found on a wide range of soils."
	Gilman, E.F. 2007. <i>Asclepias curassavica</i> . Butterflyweed, Milkweed, Silkweed. FPS-49. Revised. Institute of Food & Agricultural Sciences, University of Florida, Gainesville FL. <a href="http://edis.ifas.ufl.edu/fp049">http://edis.ifas.ufl.edu/fp049</a> . [Accessed 18 Mar 2015]	"Light requirement: plant grows in full sun" ... "The best sites have exposure to sun or partial shade and almost any soil."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	<b>Source(s)</b>	<b>Notes</b>
	Gilman, E.F. 2007. <i>Asclepias curassavica</i> . Butterflyweed, Milkweed, Silkweed. FPS-49. Revised. Institute of Food & Agricultural Sciences, University of Florida, Gainesville FL. <a href="http://edis.ifas.ufl.edu/fp049">http://edis.ifas.ufl.edu/fp049</a> . [Accessed 18 Mar 2015]	"The best sites have exposure to sun or partial shade and almost any soil."
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. World weeds: natural histories and distribution. John Wiley and Sons, Inc., New York, NY	"It prefers open, sunny environments and is found on a wide range of soils."

411	Climbing or smothering growth habit	n
	<b>Source(s)</b>	<b>Notes</b>
	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.	"Erect perennial herbs 6-8(-20) dm tall; stems unbranched or many-branched, glabrous or puberulent, especially on younger parts."

412	Forms dense thickets	
	<b>Source(s)</b>	<b>Notes</b>
	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.	"...in Hawai'i naturalized in low elevation, often dry habitats on all of the main islands."
	Oakes, A.J. & Butcher, J.O. 1962. Poisonous and injurious plants of the U.S. Virgin Islands.	"a common weed on all the Virgin Islands, usually grows singly or in small patches."



Qsn #	Question	Answer
	Anonymous. 1993. Common weeds in Vanuatu. In: B.F. Mullen, D.C. Macfarlane, T. R. Evans (eds) Weed Identification and Management in Vanuatu Pastures. Vanuatu Pasture Improvement Project, Technical Bulletin No.2. www.fao.org/ag/AGP/AGPC/doc/Publicat/FAOBUL2/B201.htm.	"Where dense infestations occur Grazon DS spot spraying @ 0.5% or Butoxone at 1.0% is recommended."
	Schreiner, I. H., & Nafus, D. M. (1997). Butterflies of Micronesia. Agricultural Experiment Station, College of Agriculture and Life Sciences, University of Guam, Mangilao, Guam	[No longer forms dense stands] "In 1936, Swezey noted that the weed <i>A. curassavica</i> was very abundant on Guam, forming dense stands almost acres in extent, and the butterfly was also very abundant. Possibly the butterflies provided some control of the weed, as it now never forms dense stands."

501	Aquatic	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.	[Terrestrial] "Erect perennial herbs 6-8(-20) dm tall; stems unbranched or many-branched, glabrous or puberulent, especially on younger parts."

502	Grass	n
	Source(s)	Notes
	USDA, ARS, National Genetic Resources Program. 2015. Germplasm Resources Information Network - (GRIN) [Online Database]. National Germplasm Resources Laboratory, Beltsville, Maryland. URL: <a href="http://www.ars-grin.gov/">http://www.ars-grin.gov/</a> . [Accessed 16 Mar 2015]	"Family: Apocynaceae subfamily: Asclepiadoideae tribe: Asclepiadeae subtribe: Asclepiadinae. Also placed in: Asclepiadaceae"

503	Nitrogen fixing woody plant	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.	"Erect perennial herbs 6-8(-20) dm tall; stems unbranched or many-branched, glabrous or puberulent, especially on younger parts." [Apocynaceae / Asclepiadaceae]

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	Notes
	Woodson, R. E. (1954). The North American species of <i>Asclepias</i> L. <i>Annals of the Missouri Botanical Garden</i> , 41 (1): 1-211	"Herbaceous annuals. Stems 3-12 dm. tall, frequently rather woody toward the base, simple or branched."

Qsn #	Question	Answer
601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	Woodson, R. E. (1954). The North American species of <i>Asclepias</i> L. <i>Annals of the Missouri Botanical Garden</i> , 41 (1): 1-211	[No evidence] "Almost ubiquitous waifs of the tropics and subtropics of the Americas, frequenting chiefly rather moist places at elevations from near sea-level to about 2000 m.; also widely introduced in the tropics of the Old World. Blooming sporadically throughout the year"

602	Produces viable seed	y
	Source(s)	Notes
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"Seed propagated" ... " <i>A. curassavica</i> is well-known as a garden plant and is particularly popular for use as a host plant of the monarch butterfly ( <i>Danaus plexippus</i> ). As such, seeds of this species are readily available for purchase, thereby posing a risk of introduction to new or restricted areas."
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. <i>Handbook of Hawaiian Weeds</i> . University of Hawaii Press, Honolulu, HI	"Seeds many, flat, each with a ring of silky hairs at the top"

603	Hybridizes naturally	
	Source(s)	Notes
	Woodson, R. E. (1954). The North American species of <i>Asclepias</i> L. <i>Annals of the Missouri Botanical Garden</i> , 41 (1): 1-211	"Putative hybrids of <i>A. curassavica</i> X <i>nivea</i> from Jamaica have been described by Urban ( <i>Symb. Ant.</i> 1:388. 1899)."
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	"The potential for hybridization between <i>A. curassavica</i> and other weedy milkweeds in Australia was investigated by Ward et al. (2012), who found that <i>A. curassavica</i> could not readily hybridize with <i>Gomphocarpus fruticosus</i> or <i>G. physocarpus</i> ."

604	Self-compatible or apomictic	y
	Source(s)	Notes
	Wyatt, R., & Broyles, S. B. (1997). The weedy tropical milkweeds <i>Asclepias curassavica</i> and <i>A. fruticosa</i> are self-compatible. <i>Biotropica</i> , 29(2): 232-234	"Both <i>A. curassavica</i> and <i>A. fruticosa</i> matured fruits from self-pollinations (Table 1). These species appear to be entirely self-compatible, as the fruit-set percentages following self pollination were nearly as high as for cross-pollination. Moreover, the viabilities of seeds from self- and cross pollinations were uniformly and equally high. In all cases, we observed 100 percent germination within three weeks." ... "One of our most surprising observations from this work is the discovery of spontaneous self-pollination in <i>A. curassavica</i> . In addition to the one plant involved in our crossing experiments that set fruit spontaneously, we observed spontaneous self-pollination on a second plant that was not included in our crossing experiments."

605	Requires specialist pollinators	n
	Source(s)	Notes

Qsn #	Question	Answer
	Ward, M., & Johnson, S. D. (2013). Generalised pollination systems for three invasive milkweeds in Australia. <i>Plant Biology</i> , 15(3), 566 -572	"...pollinators of <i>A. curassavica</i> were primarily Lepidoptera (particularly nymphalid butterflies). Pollinators of all three species are rewarded with copious amounts of highly concentrated nectar."
	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.	"Flowers in axillary umbellate cymes, pedicels 1-2 cm long; corolla red to reddish orange, the lobes ovate to oblong, 4-7 mm long, reflexed at anthesis, glabrous; corona bright yellow, the segments erect, 4-5 mm long, exceeded by the conspicuous inner horn."
	Wyatt, R., & Broyles, S. B. (1994). Ecology and evolution of reproduction in milkweeds. <i>Annual Review of Ecology and Systematics</i> , 25: 423-441	"Milkweeds are pollinated by a diverse array of large bees, wasps, and butterflies, and these generalist pollinators effect extensive gene flow within and between populations, augmented by wind dispersal of comose seeds." ... "Our recent work has uncovered two additional species that appear to be fully self-compatible: <i>A. curassavica</i> , in which 23.3% of self pollinations were successful versus 25.9% of cross-pollinations; and <i>A. fruticosa</i> , in which 12.7% of self-pollinations set fruit versus 17.5% of cross-pollinations (R Wyatt, SB Broyles, un- published data)."

606	Reproduction by vegetative fragmentation	n
	Source(s)	Notes
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>A. curassavica</i> is dependent on seeds for dispersal, and seeds are easily germinated."
	New Zealand Plant Conservation Network. 2013. Flora Details - <i>Asclepias curassavica</i> . <a href="http://www.nzpcn.org.nz/flora_details.aspx?ID=4351">http://www.nzpcn.org.nz/flora_details.aspx?ID=4351</a> . [Accessed 19 Mar 2015]	"Reproduction - Exclusively by seed"

607	Minimum generative time (years)	1
	Source(s)	Notes
	Holm, L.G., Doll, J., Holm, E., Pancho, J.V. & Herberger, J.P. 1997. <i>World weeds: natural histories and distribution</i> . John Wiley and Sons, Inc., New York, NY	"In lowland cultivated soils of Brazil, it behaves as an annual plant (Aranha et al. 1980)." ... "In Guyana South America, <i>A. curassavica</i> was sown at densities of 40 and 425 seeds m <sup>-2</sup> . Viable colonies formed in 32 and 55% of the low and high density plantings, respectively (Thomson 1988). Heavy predation by monarch butterfly larva delayed plant development and maturity. Nevertheless, seed dispersal occurred 18 wk after colony establishment."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	Notes
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>A. curassavica</i> is dependent on seeds for dispersal, and seeds are easily germinated. Natural dispersal at the local scale is by wind, and seeds are each topped with a fluffy white coma to assist in wind dispersal." [Unknown. Hairs may aid in external attachment and inadvertent dispersal]

702	Propagules dispersed intentionally by people	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>A. curassavica</i> is well-known as a garden plant and is particularly popular for use as a host plant of the monarch butterfly ( <i>Danaus plexippus</i> ). As such, seeds of this species are readily available for purchase, thereby posing a risk of introduction to new or restricted areas."

703	Propagules likely to disperse as a produce contaminant	
	<b>Source(s)</b>	<b>Notes</b>
	Gupta, R.C. 2012. <i>Veterinary Toxicology: Basic and Clinical Principles</i> . Academic Press, London, UK	"potential contaminants of hay."
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	[Possibly] "However, it is also possible that accidental introductions have occurred, and GRIN (USDA-ARS, 2013) lists <i>A. curassavica</i> as a potential seed contaminant."

704	Propagules adapted to wind dispersal	y
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	"Seeds are ovate and flattened, brown, 6 to 7 mm long, and have a narrow wing completely encircling the margin. Each seed is topped with a coma comprised of silky white hairs, 2 to 3 cm long, that assist in dispersal by wind."
	Haselwood, E.L., Motter, G.G., & Hirano, R.T. (eds.). 1983. <i>Handbook of Hawaiian Weeds</i> . University of Hawaii Press, Honolulu, HI	"Seeds many, flat, each with a ring of silky hairs at the top"

705	Propagules water dispersed	
	<b>Source(s)</b>	<b>Notes</b>
	Traveset A., Heleno R., & Nogales M. 2013. The ecology of seed dispersal. Pp. 62–93 In R.S. Gallager (ed.), <i>Seeds. The Ecology of Regeneration in Plant Communities</i> , 3rd Edition. CAB International, Oxfordshire, UK	"The anemochorous seeds of <i>Asclepias curassavica</i> ready for being dispersed by wind." [Buoyancy of seeds in water unknown, but related taxa may also be dispersed by water]
	Parsons, W.T. & Cuthbertson, E.G. 2001. <i>Noxious Weeds of Australia</i> . Second Edition. CSIRO Publishing, Collingwood, Australia	[Related taxa may be water dispersed] " <i>Gomphocarpus fruticosus</i> " ... "Major spread, however, is by seed, which is well adapted to dispersal by wind and water; and the fruit also floats on water."

706	Propagules bird dispersed	n
	<b>Source(s)</b>	<b>Notes</b>
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>A. curassavica</i> is dependent on seeds for dispersal, and seeds are easily germinated. Natural dispersal at the local scale is by wind, and seeds are each topped with a fluffy white coma to assist in wind dispersal."

707	Propagules dispersed by other animals (externally)	

Qsn #	Question	Answer
	Source(s)	Notes
	Parsons, W.T. & Cuthbertson, E.G. 2001. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	[Related taxa may be dispersed externally. Unknown if <i>A. curassavica</i> may be dispersed in a similar manner] " <i>Gomphocarpus fruticosus</i> ..." "Further spread occurs when seeds, in mud, adhere to animal pelts, machinery and other vehicles."

708	Propagules survive passage through the gut	n
	Source(s)	Notes
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"Answer 'no' where the taxon is unlikely to be eaten by animals or if seeds are not viable following passage through the gut."
	Simmonds, H., Holst, P. & Bourke, C. 2000. The palatability, and potential toxicity of Australian weeds to goats. <i>Rural Industries Research and Development Corporation, Barton, Australia</i>	"Reproduces by wind blown seed."

801	Prolific seed production (>1000/m2)	
	Source(s)	Notes
	Wijdeven, S. M., & Kuzee, M. E. (2000). Seed availability as a limiting factor in forest recovery processes in Costa Rica. <i>Restoration Ecology</i> , 8(4): 414-424	"Appendix 1. Species list and seed densities for plants from the pasture and forest seed bank." [ <i>Asclepias curassavica</i> - Density (m2) Pasture = 231.9]
	Wyatt, R., & Broyles, S. B. (1997). The weedy tropical milkweeds <i>Asclepias curassavica</i> and <i>A. fruticosa</i> are self-compatible. <i>Biotropica</i> , 29(2): 232-234	"Both <i>A. curassavica</i> and <i>A. fruticosa</i> matured fruits from self-pollinations (Table 1)." ... "For <i>A. curassavica</i> , seed numbers were significantly higher for cross-pollinations (84.9 + 29.3) than for self-pollinations (60.4 + 25.0; t = 3.074, P < 0.01)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	New Zealand Plant Conservation Network. 2013. Flora Details - <i>Asclepias curassavica</i> . <a href="http://www.nzpcn.org.nz/flora_details.aspx?ID=4351">http://www.nzpcn.org.nz/flora_details.aspx?ID=4351</a> . [Accessed 19 Mar 2015]	[Longevity in soil unknown] "Seed - Long-lived forms a large seed bank"

Qsn #	Question	Answer
803	Well controlled by herbicides	y
	Source(s)	Notes
	Simmonds, H., Holst, P. & Bourke, C. 2000. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"Weed out into disposable bags, especially the pods. Spot spray the area with herbicide. Glyphosate, or "Group I" type."
	Anonymous. 1993. Common weeds in Vanuatu. In: B.F. Mullen, D.C. Macfarlane, T. R. Evans (eds) Weed Identification and Management in Vanuatu Pastures. Vanuatu Pasture Improvement Project, Technical Bulletin No. 2. www.fao.org/ag/AGP/AGPC/doc/Publicat/FAOBUL2/B201.htm.	"Where dense infestations occur Grazon DS spot spraying @ 0.5% or Butoxone at 1.0% is recommended."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	Gilman, E.F. 2007. <i>Asclepias curassavica</i> . Butterflyweed, Milkweed, Silkweed. FPS-49. Revised. Institute of Food & Agricultural Sciences, University of Florida, Gainesville FL. <a href="http://edis.ifas.ufl.edu/fp049">http://edis.ifas.ufl.edu/fp049</a> . [Accessed 18 Mar 2015]	"As plants age and become somewhat woody near the base of the plant, cut them back to stimulate new growth near the bottom. This will help them look good for many years."
	New Zealand Plant Conservation Network. 2013. Flora Details - <i>Asclepias curassavica</i> . <a href="http://www.nzpcn.org.nz/flora_details.aspx?ID=4351">http://www.nzpcn.org.nz/flora_details.aspx?ID=4351</a> . [Accessed 19 Mar 2015]	"Reproduction - Exclusively by seed"

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y
	Source(s)	Notes
	CABI, 2015. <i>Asclepias curassavica</i> [original text by Megan Ward]. In: Invasive Species Compendium. Wallingford, UK: CAB International. <a href="http://www.cabi.org/isc">www.cabi.org/isc</a>	" <i>A. curassavica</i> , together with other milkweed species, is well known as the larval host plant of the monarch butterfly ( <i>Danaus plexippus</i> ), as well as other related butterflies such as the lesser wanderer ( <i>D. petilia</i> ) and queen butterfly ( <i>D. gilippus</i> ). Other natural enemies of <i>A. curassavica</i> include lygaeid bugs ( <i>Oncopeltus cingulifer</i> , <i>O. fasciatus</i> , <i>O. unifasciatellus</i> ) that feed on milkweed seeds and, to a lesser degree, vegetative material. Yellow aphids ( <i>Aphis nerii</i> ) are also commonly observed on <i>A. curassavica</i> . Natural pests appear to be ineffective as biocontrol agents for <i>A. curassavica</i> (M Ward, unpublished data)."
	Schreiner, I. H., & Nafus, D. M. (1997). Butterflies of Micronesia. Agricultural Experiment Station, College of Agriculture and Life Sciences, University of Guam, Mangilao, Guam	[Probably Yes. Monarch butterfly also present in the Hawaiian Islands] " <i>Danaus plexippus</i> " ... "In Micronesia it feeds on <i>Asclepias curassavica</i> and crown flower, <i>Caltropis gigantea</i> . On Pacific islands this butterfly shows up soon after host plants arrive. In 1936, Swezey noted that the weed <i>A. curassavica</i> was very abundant on Guam, forming dense stands almost acres in extent, and the butterfly was also very abundant. Possibly the butterflies provided some control of the weed, as it now never forms dense stands. This butterfly is well known as a migratory species, capable of making flights of several thousand miles."

**Summary of Risk Traits:**

## High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized, including all of the main Hawaiian islands
- An agricultural weed, & reduces forage for livestock
- Other *Asclepias* species have become invasive
- Unpalatable to grazing animals
- Toxic to animals if ingested, and sap toxic & allergenic to people
- Tolerates many soil types
- Reproduces by seed
- Self-compatible
- Able to reach maturity in 1 growing season
- Seeds dispersed by wind, & intentionally by people

## Low Risk Traits

- Unarmed (no spines, thorns or burrs)
- Ornamental
- Host plant for Monarch butterfly caterpillars
- Requires full sun
- Not reported to spread vegetatively
- Herbicides may provide effective control
- Monarch butterfly larvae may provide control