Taxon: Desmodium intortum (Mill.) Urb. **Family:** Fabaceae

Common Name(s): beggar lice
green-leaf desmodium
greenleaf tick trefoil

Synonym(s): Desmodium hjalmarsonii (Schindl.)
Hedysarum intortum Mill.
Meibomia hjalmarsonii Schindl.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 21 Jan 2022

WRA Score: 18.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Perennial Liana, Weedy, Forage, Self-Fertile, Animal Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	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)	y
303	Agricultural/forestry/horticultural weed		
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	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	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	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	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	y=1, n=-1	y
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	y
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
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	y=1, n=-1	y
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	y
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	y
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**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 18 Jan 2022]	[Not domesticated] "Cultivars 'Greenleaf' (derived from CPI 17916 (El Salvador), CPI 18009 (HES-4331 ex Hawaii), CPI 23189 ex Philippines) Released in Australia (1964); initially released in 1963 as cv. Beerwah. 'Kuiaha' (PI 469242) Released in Hawaii (1969); initially identified as Desmodium intortum (Mill.) Urb. but subsequently as Desmodium aparines (Link) DC. 'Tengeru' Released in Tanzania. Possibly a "re-badging" of 'Greenleaf'."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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). Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Native to Central and South America, recently naturalized in tropical and subtropical Asia; in Hawai'i naturalized along roadsides and in pastures on Hawai'i"

202	**Quality of climate match data**	**High**
	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 to Central and South America"

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

Qsn #	Question	Answer
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 18 Jan 2022]	"D.intortum is found in a range of environments mostly in the upland tropics of Central America and northern South America (to as high as >3,000 m asl at 16° S in Bolivia), and occasionally in the lowland tropics and upland subtropics. It is a warm season plant that has found a place in cultivation in the milder climates of moderate altitudes in the tropics and low altitudes in the subtropics. It has generally not been successful in the humid lowland tropics. It starts growing later in spring than 'Silverleaf', but withstands hot weather better than D. uncinatum. Grows well into the cooler season although frost-susceptible. Optimum growth at 30/25 °C ±3 °C."

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 to Central and South America, recently naturalized in tropical and subtropical Asia; in Hawai'i naturalized along roadsides and in pastures on Hawai'i"
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 18 Jan 2022]	"Native Northern America NORTHERN MEXICO: Mexico [Nuevo León, Sonora] SOUTHERN MEXICO: Mexico [Chiapas, Colima, Guerrero, Hidalgo, Jalisco, México, Michoacán de Ocampo, Morelos, Nayarit, Oaxaca, Puebla, Querétaro, Veracruz de Ignacio de la Llave] Southern America CARIBBEAN: Hispaniola, Jamaica, United States [Puerto Rico] CENTRAL AMERICA: Belize, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador NORTHERN SOUTH AMERICA: Venezuela WESTERN SOUTH AMERICA: Colombia, Ecuador [Azuay, Bolívar, Carchi, Chimborazo, Cotopaxi, Esmeraldas, Guayas, Imbabura, Loja, Los Ríos, Manabí, Morona Santiago, Napo, Pastaza, Pichincha, Tungurahua, Zamora Chinchipe], Peru"

205	Does the species have a history of repeated introductions outside its natural range?	y
	Source(s)	**Notes**
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"Greenleaf desmodium is native to the Americas, from southern Mexico to as far south as southern Brazil. Following widespread testing as a forage legume, it is now naturalized in small areas of the higher rainfall subtropics and elevated tropics. In South-East Asia it occurs most in Papua New Guinea, the Philippines and Thailand."
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 18 Jan 2022]	"Naturalized: Small areas of humid higher altitude tropics and humid subtropics around the world"

301	Naturalized beyond native range	y

Qsn #	Question	Answer
	Source(s)	**Notes**
	Pedley, L. (1999). Desmodium Desv. (Fabaceae) and related genera in Australia: a taxonomic revision. Austrobaileya, 5(2), 209–261	"Distribution and habitat: Like D. uncinatum, D. intortum ('green-leaf Desmodium") was introduced into Australia as a forage plant and has become naturalised, though not as frequently as D. uncinatum."
	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 to Central and South America, recently naturalized in tropical and subtropical Asia; in Hawai'i naturalized along roadsides and in pastures on Hawai'i, so far only known from Kona, Ka'u, Hilo, and perhaps Puna districts. First collected in 1975 (Herbst & Ishikawa 5159, BISH)."
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 18 Jan 2022]	"Naturalized: Small areas of humid higher altitude tropics and humid subtropics around the world"
	Staples, G. W., Imada, C.T. & Herbst, D. R. (2003). New Hawaiian plant records for 2001. Bishop Museum Occasional Papers. 74: 7-21	[Kauai] "Desmodium intortum (Mill.) Urb. New island record. Previously known to be naturalized on O'ahu (Herbarium Pacificum Staff, 1998: 9; Imada et al., 2000: 12) and Hawai'i (Wagner et al., 1999: 667), this is the first record of this weedy legume on Kaua'i. Material examined. KAUA'I: Hanalei Distr., Princeville, old nursery area between hwy and Hanalei Valley, abundant, growing between overgrown nursery plantings, 23 Aug 2000, W. Char s. n. (BISH 669055)."
	Starr, F. & Starr, K. (2020). New Plant Records from Maui Nui. Bishop Museum Occasional Papers 129: 27–29	[Maui] "Desmodium intortum (Mill.) Urb. New island record Desmodium intortum, tick clover, is previously known in Hawai'i from the islands of Kaua'i, O'ahu, and Hawai'i (Wagner et al. 1999; Herbarium Pacificum Staff 1998; Imada et al. 2000; Staples et al. 2003). tick clover was first introduced to the state of Hawai'i by the Hawai'i Agriculture Experiment Station in 1947 (USDA-NRCS 2012). Several cultivars were considered outstanding in the field and were further developed and increased. Most are adapted to areas in Hawai'i with rainfall greater than 60 inches (152 cm), ranging from sea level to 2,500 ft (762 m) (USDA-NRCS 2012). on Maui, this robust sprawling vine is dominant in pastures and found in nearby areas, such as parks, gulches, and house lots. In addition to the collections below, it grows vigorously at the author's house in Olinda, elevation 2,700 ft (823 m). Material examined. MAUI: East Maui, Makawao, Kahakapao Rd. near Makawao Forest Reserve, scrub pasture/roadside, in association with gorse (Ulex europaeus), Guinea grass (Megathyrsus maximus), and guava (Psidium guajava), 2,500 ft [762 m], 20.8372°N, 156.2797°W, 30 oct 2001, Starr & Martz 011030 -02; East Maui, Pukalani, Pukalani Community Center crawling aggressively on vegetation and in lawn, urban landscaping, in association with Kikuyu grass (Cenchrus clandestinus) and Formosan koa (Acacia confusa), 1,375 ft [419 m], 20.8383°N 156.3427° W, 15 Feb 2002, Starr & Martz 020215-01; East Maui, Makawao, Eddie tam Park, growing on fence and in abandoned pasture, urban scrub and pasture, in association with Kikuyu grass and glycine (Neonotonia wightii), 1,600 ft [488 m], 20.8508°N, 156.3161°W, 15 Feb 2002, Starr & Martz 020215-02."

Qsn #	Question	Answer
	Herbarium Pacificum Staff. (1998). New Hawaiian plant records for 1997. Bishop Museum Occasional Papers. 56:8 -14	[Oahu] "Desmodium intortum (Mill.) Urban New island record This sterile collection represents a new O'ahu island record for this species. It was previously known to be naturalized only on the Big Island (Wagner et al., 1990). Material examined: O'AHU: Ha'ikü Valley, locally dominant along H-3 access road fronting foot access path to Ha'ikü Stairs, 19 May 1997, C. Imada, W. Char & T. Motley 97 001."
	Imada, C. T., Staples, G. W. & Herbst, D. R. (2000). New Hawaiian plant records for 1999. Bishop Museum Occasional Papers 63: 9-16	[Oahu] "Fabaceae. Desmodium intortum (Mill.) Urb. Range extension Previously documented from O'ahu and Hawai'i (Wagner et al., 1990: 667; Herbarium Pacificum Staff, 1998: 9), on O'ahu D. intortum has only been documented from Ha'ikü Valley in the windward Ko'olau Mountains. This collection from the Wai'anae Range extends its O'ahu range. Material examined: O'AHU: Wai'anae Range, N rim of Mäkua Valley, trailside in open sunny flat area, with Melinis, Bidens alba, planted Pinus, Pteridium, ca 1800 ft, 28 Feb 1999, C. Imada 99-3."

302	Garden/amenity/disturbance weed	y
	Source(s)	**Notes**
	Plants for a Future. (2022). Desmodium intortum. https://pfaf.org/user/Plant.aspx?LatinName=Desmodium+intortum. [Accessed 20 Jan 2022]	"A weed of riparian vegetation, forest margins, open wooodlands, roadsides, disturbed sites and waste areas."
	Queensland Government. (2022). Weeds of Australia. Desmodium intortum. https://keyserver.lucidcentral.org/weeds. [Accessed 20 Jan 2022]	"Greenleaf desmodium (Desmodium intortum) is regarded as an environmental weed in Queensland and northern New South Wales. It was recently listed among the top 200 most invasive plants in south-eastern Queensland and is mainly a concern in riparian vegetation, due to its shade tolerance and its ability to climb over other plants."
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Possible weed of riparian vegetation due to its ability to climb and its shade tolerance. It has not shown the propensity to spread beyond the sown area that has been noted with species such as Macroptilium atropurpureum and Neonotonia wightii."

303	Agricultural/forestry/horticultural weed	
	Source(s)	**Notes**
	Duke, J. A. (1981). Handbook of Legumes of World Economic Importance. Plenum Press, New York	"Often a weed in coffee plantations." [Impacts on yields unspecified]
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 20 Jan 2022]	"Possible weed of riparian vegetation due to its ability to climb and its shade tolerance. It has not shown the propensity to spread beyond the sown area that has been noted with species such as Macroptilium atropurpureum and Neonotonia wightii."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Cereals"

304	Environmental weed	
	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.	"naturalized along roadsides and in pastures on Hawai'i" [Not documented to be a serious environmental weed in the Hawaiian Islands]
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 20 Jan 2022]	"Possible weed of riparian vegetation due to its ability to climb and its shade tolerance. It has not shown the propensity to spread beyond the sown area that has been noted with species such as Macroptilium atropurpureum and Neonotonia wightii."
	Queensland Government. (2022). Weeds of Australia. Desmodium intortum. https://keyserver.lucidcentral.org/weeds. [Accessed 20 Jan 2022]	[Potentially, although no other sources were found that described negative impacts of this species] "Greenleaf desmodium (Desmodium intortum) is regarded as an environmental weed in Queensland and northern New South Wales. It was recently listed among the top 200 most invasive plants in south-eastern Queensland and is mainly a concern in riparian vegetation, due to its shade tolerance and its ability to climb over other plants."

305	Congeneric weed	y
	Source(s)	**Notes**
	CABI. (2022). Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"A congener Desmodium tortuosum is viewed as a more significant (and already widespread) problem in Hawaii (J. Beachy and S. Kaye, Big Island Invasive Species Committee, Hawaii USA, personal communication, 2013)."
	Ricketts, G. & Marble, C. (2020). Biology and Management of Creeping Beggarweed (Desmodium incanum) in Warm-Season Turf. ENH1327. UF/IFAS Extension, Gainesville, FL. https://edis.ifas.ufl.edu. [Accessed 18 Jan 2022]	"Creeping beggarweed is a common perennial broadleaf weed in Florida landscapes, home gardens, pastures, and other agricultural production systems."
	Queensland Government. (2022). Weeds of Australia. Desmodium uncinatum. https://keyserver.lucidcentral.org/weeds. [Accessed 18 Jan 2022]	"Silverleaf desmodium (Desmodium uncinatum) was introduced as a fodder crop and has now become a weed of creekbanks (i.e. riparian areas), roadsides, fencelines, forest margins, disturbed sites, waste areas and plantation crops (e.g. sugarcane). It is regarded as an environmental weed in south-eastern Queensland, where it is listed among the top 100 most invasive plants species, and on the New South Wales North Coast. Silverleaf desmodium (Desmodium uncinatum) spreads into forest margins and along creeks where it trails over shrubs and groundcovers, but it does not climb into trees. It has also been reported to ensnare and kill native wildlife (e.g. frogs, birds, lizards and microbats) that easily become stuck to its stems and fruit."

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.	"Prostrate or climbing herbs 3-10 dm tall; stems with white, spongy pith, densely hooked pubescent and often also pilose. Leaves trifoliolate, leaflets broadly ovate to rhombic, terminal one 6-10 cm long, 4-6 cm wide, both surfaces appressed pilose, sometimes upper surface with a pale whitish mark along midrib, petioles 6-9 cm long. Flowers numerous in racemose inflorescences 5-12 cm long, these often grouped into open paniculate inflorescences up to 40 cm or more long, rachis pubescent with minute hooked hairs, pedicels 5-7 mm long, deciduous with articles, pubescence same as rachis; corolla purplish red to violet, ca. 10 mm long. Pods short-stipitate, 5-10-jointed, 2-4.5 cm long, densely pubescent with hooked hairs, articles nearly semicircular, 4-5 mm long, ca. 3 mm wide"

402	Allelopathic	n
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Combines well with tussock and stoloniferous, grasses and will climb over small scrubs. Because it is adapted to cooler climates, it is often grown with subtropical grasses, e.g. Setaria. Companion species - Grasses: Cenchrus clandestinus, Digitaria eriantha (pangola), Setaria sphacelata. It will also combine with Megathyrsus maximus and Cenchrus purpureus. Legumes: Macroptilium atropurpureum, Neonotonia wightii."

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.	"Prostrate or climbing herbs 3-10 dm tall; stems with white, spongy pith, densely hooked pubescent and often also pilose." [No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"'Greenleaf is usually grazed by cattle, although it can be used in a cut-and-carry system."
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Not particularly palatable because of high tannins, but enough that it requires careful grazing management to persist. There is less need for accustomisation than with Macrotyloma axillare."

405	Toxic to animals	n
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"No toxicity recorded and no bloat."

Qsn #	Question	Answer
406	**Host for recognized pests and pathogens**	
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Stands in Australia have been severely attacked by the root-eating Amnemus weevil (Amnemus quadrituberculatus Coleoptera: Curculionidae), that will also eat the leaves. Leaf fungus can affect stands under high rainfall conditions, especially in Central America. D. intortum largely resists legume little-leaf disease except under very wet conditions. Meloid beetles (Coleoptera: Meloidae) eat the flowers."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 20 Jan 2022]	"No toxicity recorded and no bloat." [No evidence for animals, and not consumed by humans]

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"It does not like fire but will sprout again from the rootstock." [Not reported to increase fuel load or fire risk relative to other flammable fine fuels]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"D. intortum has good shade tolerance, and will grow under a moderate tree canopy as well as in open situations."
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"It is tolerant of shade, but not adapted to the lowland tropics where the major plantation crops are grown."

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. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"D. intortum has been collected growing on loams, sandy loams and clay loam soils, and has been successfully cultivated on a wide range of soil textures from sands and light loams to medium clays, a wider range of soils than for D. uncinatum. It prefers at least moderate fertility and appears to grow best at pH between 5.0 and 7.0. It is not tolerant of salinity or high Al and Mn, and is very responsive to Mo."

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	**y**
	Source(s)	**Notes**
	Gardener, C.J., McIvor, J.G. & Jansen, A. (1993). Survival of Seeds of Tropical Grassland Species Subjected to Bovine Digestion. Journal of Applied Ecology 30(1): 75-85	"Plants often form a dense mass of flowers and foliage over other plants."
	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.	"Prostrate or climbing herbs 3-10 dm tall; stems with white, spongy pith, densely hooked pubescent and often also pilose."

412	**Forms dense thickets**	**n**
	Source(s)	**Notes**
	Queensland Government. (2022). Weeds of Australia. Desmodium intortum. https://keyserver.lucidcentral.org/weeds. [Accessed 20 Jan 2022]	"It was recently listed among the top 200 most invasive plants in south-eastern Queensland and is mainly a concern in riparian vegetation, due to its shade tolerance and its ability to climb over other plants."

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] "in Hawai'i naturalized along roadsides and in pastures"

502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 18 Jan 2022]	"Family: Fabaceae (alt. Leguminosae) Subfamily: Faboideae Tribe: Desmodieae Subtribe: Desmodiinae"

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.	[Herbaceous legume] "Prostrate or climbing herbs 3-10 dm tall; stems with white, spongy pith, densely hooked pubescent and often also pilose."

Qsn #	Question	Answer
504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 18 Jan 2022]	"Trailing, scrambling perennial herb or subshrub with strong taproot."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"Silverleaf desmodium is indigenous to the Americas, from northern Argentina to Mexico. Since first released as a pasture plant in 1962, it now occurs in isolated localities in the more humid regions of the subtropics and elevated tropics, including South-East Asia."
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 20 Jan 2022]	No evidence. Widespread native and naturalized distribution

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Greenleaf desmodium has small seed resulting in slow seedling growth. It is usually established into a prepared seedbed, but it can be planted vegetatively from rooted cuttings."

603	**Hybridizes naturally**	**y**
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"D. intortum, D. sandwicense, and D. uncinatum are part of a species complex, in which interspecific hybrids can be produced, but may be sterile."
	Rotar, P. P., & Chow, K. H. (1971). Morphological variation and interspecific hybridization among Desmodium intortum, Desmodium sandwicense, and Desmodium uncinatum. Technical Bulletin No. 82. Hawaii Agricultural Experiment Station, University of Hawaii, Honolulu	"Desmodium intortum (Mill.) Urb. 'Greenleaf' and D. uncinatum. (Jacq.) DC. 'Silver leaf' are important pasture legumes in Hawaii , the wetter coastal areas of northeastern Australia, and elsewhere in the tropics. D. sandwicense E. Mey. has also been tried with varying degrees of success. D. intortum X D. sandwicense hybrids have been obtained in Hawaii when the two species have been grown side by side."
	McWhirter, K. S. (1969). Cytoplasmic male sterility in Desmodium. Australian Journal of Agricultural Research, 20(2), 227-241	"Natural hybrids between D. intortum and D. sandwicense were abundant in the field."

604	**Self-compatible or apomictic**	**y**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"D. intortum is self-fertile with an estimated 8–30% outcrossing. Flowers may require tripping by bees or other insects for pollination and good seed set. 2n = 22 (24)."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	[Pollinator-faciliated outcrossing improves seed set, but is not required] "D. intortum is self-fertile with an estimated 8–30% outcrossing. Flowers may require tripping by bees or other insects for pollination and good seed set. 2n = 22 (24)."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"It will spread into ungrazed shady areas through the rooting stolons."
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"Stems form roots if in contact with moist soil and may scramble, but not twine, over the surrounding vegetation" ... "It does not spread readily from seed but individual plants can spread quite a long distance by means of stolons."

607	Minimum generative time (years)	2
	Source(s)	**Notes**
	Duke, J. A. (1981). Handbook of Legumes of World Economic Importance. Plenum Press, New York	"Most cvs do not flower the first year, but all flower the second season and set some seed before frost. In warmer climates, they flower over a longer season."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	**Notes**
	Weed Futures. (2022). Desmodium intortum. http://www.weedfutures.net/species.php?id=98. [Accessed 19 Jan 2022]	"Seed dispersal morphology: Unassisted"
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

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

Qsn #	Question	Answer
	't Mannetje, L. & Jones, R.M. (Eds.). (1992). Plant Resources of South-East Asia. No. 4. Forages. Pudoc Scientific Publishers, Wageningen, Netherlands	"Greenleaf desmodium is native to the Americas, from southern Mexico to as far south as southern Brazil. Following widespread testing as a forage legume, it is now naturalized in small areas of the higher rainfall subtropics and elevated tropics. In South-East Asia it occurs most in Papua New Guinea, the Philippines and Thailand."

703	Propagules likely to disperse as a produce contaminant	y
	Source(s)	**Notes**
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed 20 Jan 2022]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

704	Propagules adapted to wind dispersal	n
	Source(s)	**Notes**
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed 20 Jan 2022]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

705	Propagules water dispersed	y
	Source(s)	**Notes**
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed 20 Jan 2022]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed 20 Jan 2022]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

Qsn #	Question	Answer
707	**Propagules dispersed by other animals (externally)**	**y**
	Source(s)	**Notes**
	Brisbane City Council. (2022). Weed identification Tool - Desmodium intortum. hhttps://weeds.brisbane.qld.gov.au/weeds/greenleaf-desmodium. [Accessed 20 Jan 2022]	"This species reproduces mainly by seed, but its creeping stems may produce roots when they come into contact with moist soil. The fruit separate into one-seeded segments, that readily become attached to animals, clothing and vehicles. Seeds may also be dispersed by water and in contaminated agricultural produce."

708	**Propagules survive passage through the gut**	**y**
	Source(s)	**Notes**
	Gardener, C.J., McIvor, J.G. & Jansen, A. (1993). Survival of Seeds of Tropical Grassland Species Subjected to Bovine Digestion. Journal of Applied Ecology 30(1): 75-85	[A small percentage of viable seeds survive consumption and digestion by cattle] "Table 1. Fraction of germinable, hard and rotten seed before and after digestion for 44 tropical and temperate legumes" [After digestion, a small percentage of Desmodium intortum cv. Greenleaf seeds remain intact: % germinable = 1.1%; % hard = 5.9%; % rotten = 93.0%] ... "The seedpods of other species either shatter (Macroptilium atropurpureum and Centrosema pubescens) or break into sections (Desmodium intortum and Desmodium uncinatum) so the seed drops to the ground, preventing any further consumption."

801	**Prolific seed production (>1000/m2)**	
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	[May depend on presence of pollinators] "D. intortum is self-fertile with an estimated 8–30% outcrossing. Flowers may require tripping by bees or other insects for pollination and good seed set. 2n = 22 (24). Seed production. 'Greenleaf' flowers later than D. uncinatum cv. Silverleaf, and is thus a less reliable seed producer in areas where early frosts may occur during flowering or seed maturation. Mechanical harvest is made difficult by uneven ripening of the seed and the sticking nature of the seed pods which can 'ball-up'. Stands are windrowed and left to dry for 2 weeks before being threshed by a pick-up harvester using the highest possible drum speed and close concave settings. While presentation yields of up to 300 kg/ha are achievable, machine-harvested yields of 80–100 kg/ha seed are more common. Bees are important for pollination."

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Rice, K. J. (1989). Impacts of seedbanks on grassland community structure and population dynamics. Pp. 211-230 in M. A. Leek et al. (eds.). Ecology of Soil Seed Banks. Academic Press, Inc., San Diego, California	[Suggests seed bank may be dependent on replenishment from living plants, rather than persistence of long-lived seeds] "Differences among legumes in seed bank longevity can often be related to variation in seed dormancy. High persistence of Lotononis bainesii and Trifolium repens in subtropical pastures corresponded with high percentages of hard seed, 97% and 70%, respectively (Jones and Evans, 1977). In contrast, Desmodium intortum had a low percentage of hard seed, 9%, and was absent from heavily grazed areas where replenishment of seed reserves by seed production was severely reduced."

803	**Well controlled by herbicides**	**y**
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"Herbicide effects - Seedlings show good tolerance to 2, 4-D at 500g/ha and at 1600g/ha; they are sensitive to acifluorfen at 450 g/ha, but tolerant of bentazone at 1,440 g/ha, fluazifop-butyl at 210 g/ha and sethoxydim at 370 g/ha. Mature plants are reasonably tolerant of the desiccant, diquat."

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Cook, B.G., et al. (2022). Tropical Forages: an interactive selection tool – Digital ISBN 978958694234-8. https://www.tropicalforages.info/text/intro/index.html. [Accessed 19 Jan 2022]	"It does not like fire but will sprout again from the rootstock."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability and elevation range
• Thrives and spreads in regions with tropical climates
• Naturalized on Kauai, Oahu, Maui, and Hawaii (Hawaiian Islands) and widely naturalized elsewhere
• A weed of riparian vegetation, forest margins, open wooodlands, roadsides, disturbed sites and waste areas
• Reported to be a crop weed in other regions of the world and an environmental weed in Australia
• Other Desmodium species are invasive weeds
• Shade tolerant
• Tolerates many soil types
• Climbing and potentially smothering habit
• Reproduces by seeds and vegetatively by stolons
• Hybridizes with other Desmodium species
• Self-fertile
• Reaches maturity in second year of growth
• Seeds dispersed by attaching to animals, clothing and vehicles
• Seeds may also be dispersed by water, in contaminated agricultural produce and internally by grazing animals
• Resprouts from the rootstock after fires

Low Risk Traits
• Valued as a palatable pasture species in the Hawaiian Islands, and generally not regarded as a serious or detrimental weed
• Unarmed (no spines, thorns, or burrs)
• Non-toxic
• Self-fertile, but may depend on pollinators for good seed set
• Some herbicides may provide effective control