

Taxon: <i>Tridax procumbens L.</i>	Family: Asteraceae
Common Name(s): coat buttons tridax daisy	Synonym(s):

Assessor: Chuck Chimera	Status: Assessor Approved	End Date: 19 Dec 2017
WRA Score: 15.0	Designation: H(HPWRA)	Rating: High Risk

Keywords: Perennial Herb, Crop Weed, Allelopathic, Self-Compatible, Wind-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		
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed		
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	y
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans		
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	n

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	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		
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	n
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	y
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)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m ²)	y=1, n=-1	y
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	y
803	Well controlled by herbicides	y=-1, n=1	y
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	y=-1, n=1	n

Supporting Data:

Qsn #	Question	Answer
101	Is the species highly domesticated?	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 of domestication] "Apparently native only from Mexico, Central America, Venezuela, and Colombia to Peru and Bolivia, but now widespread throughout tropical and subtropical regions of the world"

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2017. 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
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 19 Dec 2017]	"Native: Northern America Northern Mexico: Mexico - Coahuila, - Nuevo Leon, - San Luis Potosi, - Sinaloa, - Sonora, - Tamaulipas Southern Mexico: Mexico - Campeche, - Chiapas, - Guerrero, - Hidalgo, - Jalisco, - Michoacan, - Nayarit, - Oaxaca, - Quintana Roo, - Veracruz, - Yucatan Southern America Brazil: Brazil Caribbean: Anguilla; Antigua and Barbuda; Bahamas; Barbados; Cayman Islands; Cuba; Dominica; Grenada; Guadeloupe; Hispaniola; Jamaica; Martinique; Netherlands Antilles - Saba; Puerto Rico; St. Kitts and Nevis; St. Lucia; St. Vincent and Grenadines; Trinidad and Tobago; Virgin Islands (British); Virgin Islands (U.S.) Central America: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Venezuela Southern South America: Argentina - Cordoba, - Formosa, - Jujuy, - Salta, - Tucuman Western South America: Bolivia; Colombia; Ecuador - Galapagos Islands, - Guayas; Peru - Huánuco"

Qsn #	Question	Answer
202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 19 Dec 2017]	

203	Broad climate suitability (environmental versatility)	y
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> occurs in many environments but is particularly well adapted to coarse-textured soils in tropical regions (Holm et al., 1997). It is found at elevations from sea level to over 2000 m, often as a weed of roadsides, waste land, fallow land and crops."

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.	"Apparently native only from Mexico, Central America, Venezuela, and Colombia to Peru and Bolivia, but now widespread throughout tropical and subtropical regions of the world; in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats on Midway Atoll and all of the main islands except not yet documented from Ni'ihau."
		<p>"Native:</p> <p>Northern America Northern Mexico: Mexico - Coahuila, - Nuevo Leon, - San Luis Potosi, - Sinaloa, - Sonora, - Tamaulipas Southern Mexico: Mexico - Campeche, - Chiapas, - Guerrero, - Hidalgo, - Jalisco, - Michoacan, - Nayarit, - Oaxaca, - Quintana Roo, - Veracruz, - Yucatan Southern America Brazil: Brazil Caribbean: Anguilla; Antigua and Barbuda; Bahamas; Barbados; Cayman Islands; Cuba; Dominica; Grenada; Guadeloupe; Hispaniola; Jamaica; Martinique; Netherlands Antilles - Saba; Puerto Rico; St. Kitts and Nevis; St. Lucia; St. Vincent and Grenadines; Trinidad and Tobago; Virgin Islands (British); Virgin Islands (U.S.) Central America: Belize; Costa Rica; El Salvador; Guatemala; Honduras; Nicaragua; Panama Northern South America: French Guiana; Guyana; Venezuela Southern South America: Argentina - Cordoba, - Formosa, - Jujuy, - Salta, - Tucuman Western South America: Bolivia; Colombia; Ecuador - Galapagos Islands, - Guayas; Peru - Huanuco</p> <p>Naturalized:</p> <p>Africa East Tropical Africa: Kenya; Tanzania; Uganda Macaronesia: Cape Verde Northeast Tropical Africa: Chad; Eritrea; Ethiopia; Somalia; Sudan</p>

<p>USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 19 Dec 2017]</p>		<p>South Tropical Africa: Malawi; Mozambique; Zambia; Zimbabwe Southern Africa: South Africa - KwaZulu-Natal, - Limpopo, - Mpumalanga West Tropical Africa: Benin; Burkina Faso; Cote D'Ivoire; Ghana; Guinea; Nigeria; Senegal; Sierra Leone; Togo West-Central Tropical Africa: Burundi; Cameroon; Central African Republic; Rwanda; Zaire Western Indian Ocean: British Indian Ocean Terr - Diego Garcia; Madagascar; Mauritius; Mayotte; Reunion; Seychelles Asia-Temperate Arabian Peninsula: Yemen China: China - Fujian, - Hainan Eastern Asia: Japan - Ryukyu Islands; Taiwan Asia-Tropical Indian Subcontinent: Bhutan; India; Nepal; Sri Lanka Indo-China: Cambodia; Thailand; Vietnam Malesia: Indonesia; Malaysia; Philippines Papuasia: Papua New Guinea; Solomon Islands Australasia Australia: Australia Northern America South-Central U.S.A.: United States - Texas Southeastern U.S.A.: United States - Florida Pacific North-Central Pacific: U.S. Outlying Islands - Midway Islands; United States - Hawaii Northwestern Pacific: Guam; Marshall Islands; Micronesia; Northern Mariana Islands; Palau; U.S. Outlying Islands - Wake Island South-Central Pacific: French Polynesia; Kiribati - Line Islands Southwestern Pacific: Fiji; Kiribati - Gilbert Islands, - Phoenix Islands; Nauru; New Caledonia; Vanuatu; Wallis and Futuna Islands"</p>
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<p>205</p>	<p>Does the species have a history of repeated introductions outside its natural range?</p>	<p>y</p>
	<p>Source(s)</p>	<p>Notes</p>
	<p>CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc</p>	<p>"T. procumbens originated in Central America but now occurs throughout the tropics and subtropics. It was reportedly introduced into Nigeria as an ornamental in the early 1900s and later spread from there to many other tropical countries (Holm et al., 1997)."</p>
	<p>Powell, A. (1965). Taxonomy of <i>Tridax</i> (Compositae). <i>Brittonia</i>, 17(1), 47-96</p>	<p>"Widespread throughout the tropical and sub-tropical regions of the world (through repeated introductions) and flowering the year around; apparently occurring naturally only in Mexico, Central America and parts of South America (Venezuela, Colombia, Peru, and Bolivia); Fig. 28. Introduced in the Old World as an ornamental, according to Ridley (1930)."</p>
	<p>Baker, H. G. (1974). The evolution of weeds. <i>Annual Review of Ecology and Systematics</i>, 5(1), 1-24</p>	<p>"With man's help, T. procumbens is now spreading around the tropics of the world, even invading closed grasslands by its rapid autogamous seed production allied with a creeping vegetative habit ..."</p>

<p>301</p>	<p>Naturalized beyond native range</p>	<p>y</p>
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Qsn #	Question	Answer
	Source(s)	Notes
	<p>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.</p>	<p>"Apparently native only from Mexico, Central America, Venezuela, and Colombia to Peru and Bolivia, but now widespread throughout tropical and subtropical regions of the world; in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats on Midway Atoll and all of the main islands except not yet documented from Ni'ihau. First collected on Maui in 1922 (Degener 27276, BISH)."</p>
	<p>USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 19 Dec 2017]</p>	<p>"Naturalized: Africa East Tropical Africa: Kenya; Tanzania; Uganda Macaronesia: Cape Verde Northeast Tropical Africa: Chad; Eritrea; Ethiopia; Somalia; Sudan South Tropical Africa: Malawi; Mozambique; Zambia; Zimbabwe Southern Africa: South Africa - KwaZulu-Natal, - Limpopo, - Mpumalanga West Tropical Africa: Benin; Burkina Faso; Cote D'Ivoire; Ghana; Guinea; Nigeria; Senegal; Sierra Leone; Togo West-Central Tropical Africa: Burundi; Cameroon; Central African Republic; Rwanda; Zaire Western Indian Ocean: British Indian Ocean Terr - Diego Garcia; Madagascar; Mauritius; Mayotte; Reunion; Seychelles Asia-Temperate Arabian Peninsula: Yemen China: China - Fujian, - Hainan Eastern Asia: Japan - Ryukyu Islands; Taiwan Asia-Tropical Indian Subcontinent: Bhutan; India; Nepal; Sri Lanka Indo-China: Cambodia; Thailand; Vietnam Malesia: Indonesia; Malaysia; Philippines Papuaasia: Papua New Guinea; Solomon Islands Australasia Australia: Australia Northern America South-Central U.S.A.: United States - Texas Southeastern U.S.A.: United States - Florida Pacific North-Central Pacific: U.S. Outlying Islands - Midway Islands; United States - Hawaii Northwestern Pacific: Guam; Marshall Islands; Micronesia; Northern Mariana Islands; Palau; U.S. Outlying Islands - Wake Island South-Central Pacific: French Polynesia; Kiribati - Line Islands Southwestern Pacific: Fiji; Kiribati - Gilbert Islands, - Phoenix Islands; Nauru; New Caledonia; Vanuatu; Wallis and Futuna Islands"</p>

Qsn #	Question	Answer
302	Garden/amenity/disturbance weed	
	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 and relatively common primarily in low elevation, dry, disturbed habitats" [A disturbance-adapted weed with negative impacts on agriculture]
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Bananas, Cereals, Cotton, Forestry, Nursery Production, Orchards & Plantations, Pastures, Pome Fruits, Vegetables"

303	Agricultural/forestry/horticultural weed	y
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Holm et al. (1997) cite <i>T. procumbens</i> as a weed of 31 crops, however, this is almost certainly an underestimate. A wide range of crop types are infested, including cereals, fibres, legumes, pastures, tree crops and vegetables. Though not associated with waterlogged soils, it occurs in irrigated crops. Most crops have the potential to be infested with <i>T. procumbens</i> when grown within its habitat and geographical range." ... " <i>T. procumbens</i> has been recorded at densities as high as 340,000 plants/ha in cassava (Doll et al., 1977), and it is as a competitor with crops that this species has its most serious impact. However, though very common as a weed in East Africa, Ivens (1989) does not consider it to be a serious problem. In India, it can interfere with the harvesting of jute (Holm et al., 1997). Das and Pal (1970) have shown that <i>T. procumbens</i> has an allelopathic effect on rice. It is reported as a host to several crop pests, including root knot nematodes in India (Upadhyay et al., 1977), an insect (<i>Phalanta phalantha</i>) which defoliates poplar trees in Nigeria (Akanbi, 1971), red spider mite (<i>Tetranychus telarius</i> [<i>Tetranychus urticae</i>]) in India (Choudhury and Mukherjee, 1971), <i>Macrophomina phaseolina</i> in India (Singh et al., 1990), sunflower yellow blotch umbravirus in Kenya (Theuri et al., 1987) and <i>Aphis citricola</i> , a vector of citrus cistrea closterovirus in India (Naidu, 1980). <i>T. procumbens</i> is also an alternate host to the parasitic weed <i>Orobanche</i> in India (Sen, 1981)."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Bananas, Cereals, Cotton, Forestry, Nursery Production, Orchards & Plantations, Pastures, Pome Fruits, Vegetables"

304	Environmental weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Weed of: Bananas, Cereals, Cotton, Forestry, Nursery Production, Orchards & Plantations, Pastures, Pome Fruits, Vegetables" [Also cited as an environmental weed, but primarily impacts agriculture]

305	Congeneric weed	
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	<i>Tridax coronopifolia</i> , <i>Tridax palmeri</i> , <i>Tridax rosea</i> , & <i>Tridax trilobata</i> cited as weeds. Impacts need to be verified

Qsn #	Question	Answer
401	Produces spines, thorns or burrs	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] "Taprooted perennial herbs; stems ascending to procumbent, often rooting at the nodes, 1.5-4 dm long, sparsely to densely hirsute. Leaves ovate to lanceolate, 2-7 (-12) cm long, 1-4(-6) cm wide, both surfaces sparsely to densely hirsute and often rough to the touch, 3-lobed, margins undulate, petioles 0.4-3 cm long."

402	Allelopathic	y
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Das and Pal (1970) have shown that <i>T. procumbens</i> has an allelopathic effect on rice."
	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	"Das and Pal (1970) in India studied the allelopathic effects of <i>T. procumbens</i> to rice. Vapors emitted from leaves did not affect rice seed germination but reduced root and coleoptile length 30%, coleoptile dry weight 31%, and root dry weight 15%. When exposed to <i>T. procumbens</i> leaves, rice roots exhibited a proliferation of secondary root growth. The volatile substances of <i>T. procumbens</i> were more inhibitory to rice than those from <i>Cyperus rotundus</i> ."

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.	"Taprooted perennial herbs; stems ascending to procumbent, often rooting at the nodes, 1.5-4 dm long, sparsely to densely hirsute." [Asteraceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Fodder/animal feed"
	Osuhor, C. U., Alawa, J. P., & Akpa, G. N. (2002). Research note: Manure production by goats grazing native pasture in Nigeria. <i>Tropical Grasslands</i> , 36(2), 123-125	"Table 3. Seasonal botanical composition of the pasture in the grazing area." [Tridax procumbens - Forage Value Rating = Good, accepted by stock]
	Das, N.R. (2011). Introduction to Crops Of India. Scientific Publishers, Jodhpur	"Tridax procumbens ... Used As - Fodder, but grows as weed"

405	Toxic to animals	n
	Source(s)	Notes
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"eaten by cattle, feed for rabbits"
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Fodder/animal feed" [No evidence]

Qsn #	Question	Answer
406	Host for recognized pests and pathogens	y
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"It is reported as a host to several crop pests, including root-knot nematodes in India (Upadhyay et al., 1977), an insect (Phalanta phalantha) which defoliates poplar trees in Nigeria (Akanbi, 1971), red spider mite (Tetranychus telarius [Tetranychus urticae]) in India (Choudhury and Mukherjee, 1971), Macrophomina phaseolina in India (Singh et al., 1990), sunflower yellow blotch umbravirus in Kenya (Theuri et al., 1987) and Aphis citricola, a vector of citrus cistreza closterovirus in India (Naidu, 1980). T. procumbens is also an alternate host to the parasitic weed Orobanche in India (Sen, 1981)."

407	Causes allergies or is otherwise toxic to humans	
	Source(s)	Notes
	CSIRO. 2010. Australian Tropical Rainforest Plants Edition 6 - Tridax procumbens. http://keys.trin.org.au/. [Accessed 19 Dec 2017]	"Contact with this plant can sometimes cause skin irritation"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Used medicinally] "Used in Ayurveda and Sidha. Astringent, antitrypanosomal, antibacterial, antimicrobial, antimycobacterial, antifungal, insecticidal, insect repellent, diuretic, hyglycemic, antiinflammatory, wound healing. Paste of the plant used as ointment antiseptic on wounds, whitlow; whole plant laxative and astringent, used internally in the treatment of jaundice, spermatorrhea, fevers, coughs, general weakness; a paste taken in diarrhea; plant extract applied on cuts, piles and wounds; Kleinia grandiflora leaf juice mixed with Tridax procumbens plant juice applied for insect bite, itching. Crushed roots given in fever and skin diseases. Crushed leaves applied on scorpion sting, fresh cuts to check bleeding, wounds, piles; leaf paste applied to open sores; leaf extract aphrodisiac for male; fresh juice of leaves insecticide, stops bleeding, antiseptic in wounds, blisters and cuts, dropped in eye for conjunctivitis; fresh leaves chewed for toothache and dyspepsia. Veterinary medicine, leaf paste applied on the wounds as a styptic; leaf juice applied on fresh cuts and wounds."

408	Creates a fire hazard in natural ecosystems	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.	'in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats" [Occurs in fire prone habitats, & probably contributes to fuel load, but no evidence of increased fire risk compared to non-native flammable grasses]
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	No description of increased fire risk included with impacts of this species

409	Is a shade tolerant plant at some stage of its life cycle	n
	Source(s)	Notes

Qsn #	Question	Answer
	NParks Flora&FaunaWeb. 2017. <i>Tridax procumbens</i> . https://florafauanaweb.nparks.gov.sg/ . [Accessed 19 Dec 2017]	"Light Preference: Full Sun"
	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>T. procumbens</i> is sensitive to shade, as plant height, dry weight and leaf area index decline as the level of shade increases. However, this species is less affected by shade than many others and thus crop competition may not effectively suppress its growth (Shetty et al. 1982)."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes
	Backyard Gardener. (2017). <i>Tridax procumbens</i> (Coat Buttons). https://www.backyardgardener.com/plantname/tridax-procumbens-coat-buttons/ . [Accessed 19 Dec 2017]	"Soil Range: Any"
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> occurs in many environments but is particularly well adapted to coarse-textured soils in tropical regions (Holm et al., 1997). It is found at elevations from sea level to over 2000 m, often as a weed of roadsides, waste land, fallow land and crops."

411	Climbing or smothering growth habit	n
	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.	"Taprooted perennial herbs; stems ascending to procumbent, often rooting at the nodes, 1.5-4 dm long, sparsely to densely hirsute."

412	Forms dense thickets	
	Source(s)	Notes
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> has been recorded at densities as high as 340,000 plants/ha in cassava (Doll et al., 1977), and it is as a competitor with crops that this species has its most serious impact."
	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.	"[May achieve high densities in cultivated settings, but no evidence from wild, or unmanaged lands] "in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats on Midway Atoll and all of the main islands"

501	Aquatic	n
	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.	"[Terrestrial herb] "in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats"

502	Grass	n
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Qsn #	Question	Answer
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 19 Dec 2017]	Asteraceae (alt.Compositae)

503	Nitrogen fixing woody plant	n
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html . [Accessed 19 Dec 2017]	Asteraceae (alt.Compositae)

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	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.	"Taprooted perennial herbs; stems ascending to procumbent, often rooting at the nodes, 1.5-4 dm long, sparsely to densely hirsute."

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	Notes
	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	"T. procumbens occurs throughout the tropical and subtropical belt of the world (Figure 98-1) and is frequently found in annual crops, roadsides, pastures, fallow land and waste areas, and occasionally in lawns, perennial crops and nurseries." [No evidence]
	Powell, A. (1965). Taxonomy of <i>Tridax</i> (Compositae). <i>Brittonia</i> , 17(1), 47-96	" <i>Tridax procumbens</i> ... This pantropical weedy species is the most widely distributed in the genus."

602	Produces viable seed	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.	"Achenes black, cylindrical to narrowly obconical, 2-2.5 mm long, densely pilose."

Qsn #	Question	Answer
	Chauhan, B. S., & Johnson, D. E. (2008). Germination ecology of two troublesome Asteraceae species of rainfed rice: Siam weed (<i>Chromolaena odorata</i>) and coat buttons (<i>Tridax procumbens</i>). <i>Weed Science</i> , 56(4), 567-573	"Siam weed and coat buttons are among the most troublesome Asteraceae weed species of rainfed rice. The influence of various environmental factors on seed germination and seedling emergence of these weeds was determined. Germination response of both species was greater at the warmer fluctuating temperatures (30/20 and 35/25 C) than at the colder temperatures (25/15 C). Light stimulated germination in both species; however, some seeds still germinated in the dark. Both species were moderately tolerant of salt and water stress, but Siam weed tolerated more stresses than coat buttons. At the soil surface, Siam weed and coat buttons emergence was 75 and 76%, respectively, but this declined rapidly with increasing soil depths. Neither species emerged from depths exceeding 3 cm. Seedling emergence and seedling dry matter of both species were greatly reduced with the addition of crop residue to the soil surface at rates equivalent to 4 to 6 t ha ⁻¹ . The information gained in this study will be used to facilitate development of effective weed control programs."
	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>T. procumbens</i> seeds germinate over a prolonged period and in a variable pattern. Only 44% of freshly harvested seed in Nigeria was viable and seed germination in response to light was cyclic (Marks and Nwachuku 1986). Freshly harvested seed required light to germinate (100%), but after 2 mo of burial in soil, half germinated in darkness."

603	Hybridizes naturally	
	Source(s)	Notes
	WRA Specialist. 2017. Personal Communication	Unknown

604	Self-compatible or apomictic	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	"Detailed cytological studies of <i>T. procumbens</i> reproduction discovered that it is not apomictic and can be either cross- or self-pollinated (Rogers 1969). Florets reach the same stage of development via either form of pollination at equivalent times."
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> is not apomictic and can be either cross- or self-pollinated (Holm et al., 1997)."

605	Requires specialist pollinators	n
	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 India, thrips pollinate <i>T. procumbens</i> flowers (Ananthakrishnan et al. 1981). As the florets open, thrips begin to inhabit the capitula and the population peaks when the stigmatic lobes are exposed. Each thrip carries 40 to 200 pollen grains on its body and both adults and larvae move frequently. Butterflies, beetles and bees are also found on the inflorescences of this plant."
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	"Insect pollinators include thrips, beetles, bees (Ananthakrishnan et al., 1981) and butterflies (Balasubramanian, 1989)."

Qsn #	Question	Answer
606	Reproduction by vegetative fragmentation	
	Source(s)	Notes
	Powell, A. (1965). Taxonomy of <i>Tridax</i> (Compositae). <i>Brittonia</i> , 17(1), 47-96	"Plants perennial, 15-40 cm high, slightly to densely hirsute, often with adventitious roots arising at the nodes; stems procumbent, arising from a woody base"
	Baker, H. G. (1974). The evolution of weeds. <i>Annual Review of Ecology and Systematics</i> , 5(1), 1-24	"With man's help, <i>T. procumbens</i> is now spreading around the tropics of the world, even invading closed grasslands by its rapid autogamous seed production allied with a creeping vegetative habit"
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	[Reproduces primarily by seeds] "Perennial herb with a firm taproot. Branches ascending from a creeping base, brittle, 20-75 cm long." ... "Germination of <i>T. procumbens</i> occurs over a prolonged period and in a variable pattern."

607	Minimum generative time (years)	1
	Source(s)	Notes
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	"Flowering plants of <i>T. procumbens</i> are found year-round in Sri Lanka (Pemadasa, 1976) but shorter flowering periods are reported for West Africa (Le Bourgeois and Merlier, 1995). In East Africa, flowering occurs 35 to 55 days after emergence, and seeds ripen within 3 weeks of flowering (Popay and Ivens, 1982)."

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes
	Clifford, H. (1959). Seed Dispersal by Motor Vehicles. <i>Journal of Ecology</i> , 47(2), 311-315	"Table 3. Species which germinated from samples of mud collected from cars at Ibadan in June and December 1957" [Includes <i>Tridax procumbens</i>]

702	Propagules dispersed intentionally by people	n
	Source(s)	Notes
	CABI, 2017. <i>Invasive Species Compendium</i> . Wallingford, UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> originated in Central America but now occurs throughout the tropics and subtropics. It was reportedly introduced into Nigeria as an ornamental in the early 1900s and later spread from there to many other tropical countries (Holm et al., 1997)."
	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.	[No evidence of current cultivation or intentional introduction] "in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats on Midway Atoll and all of the main islands"

703	Propagules likely to disperse as a produce contaminant	y
	Source(s)	Notes

Qsn #	Question	Answer
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"T. procumbens has been recorded at densities as high as 340,000 plants/ha in cassava (Doll et al., 1977), and it is as a competitor with crops that this species has its most serious impact. However, though very common as a weed in East Africa, Ivens (1989) does not consider it to be a serious problem. In India, it can interfere with the harvesting of jute (Holm et al., 1997). Das and Pal (1970) have shown that T. procumbens has an allelopathic effect on rice." [Crop weed. Potential for crop contamination]
	USDA, ARS, Germplasm Resources Information Network. 2017. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 19 Dec 2017]	"Weed: potential seed contaminant"

704	Propagules adapted to wind dispersal	y
	Source(s)	Notes
	Walia, U.S. & Walia, S.S. (2015). Crop Management. Scientific Publishers, Jodhpur	"Many seeds are well adapted to wind travel. Cottony coverings and parachute-like structures allow seeds to float with the wind. ... Weed seeds and fruits that disseminate through wind possess special organs to keep them afloat. Such organs are I. Pappus - It is a parachute like modification of persistent calyx into hairs. e.g. Asteraceae family weeds - <i>Tridax procumbens</i> "
	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	"The pappus is relatively small in comparison to the seed weight and is not likely to aid in widespread seed dispersal (Baker 1965)." [Pappus probably aids in short distance dispersal by wind]

705	Propagules water dispersed	
	Source(s)	Notes
	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	"The pappus is relatively small in comparison to the seed weight and is not likely to aid in widespread seed dispersal" [Pappus may aid in buoyancy, but water probably not an important dispersal vector]

706	Propagules bird dispersed	n
	Source(s)	Notes
	Walia, U.S. & Walia, S.S. (2015). Crop Management. Scientific Publishers, Jodhpur	"Many seeds are well adapted to wind travel. Cottony coverings and parachute-like structures allow seeds to float with the wind. ... Weed seeds and fruits that disseminate through wind possess special organs to keep them afloat. Such organs are I. Pappus - It is a parachute like modification of persistent calyx into hairs. e.g. Asteraceae family weeds - <i>Tridax procumbens</i> "

707	Propagules dispersed by other animals (externally)	n
	Source(s)	Notes
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	"Dispersed by: Humans, Cattle, Livestock, Vehicles"

Qsn #	Question	Answer
	Walia, U.S. & Walia, S.S. (2015). Crop Management. Scientific Publishers, Jodhpur	"Many seeds are well adapted to wind travel. Cottony coverings and parachute-like structures allow seeds to float with the wind. ... Weed seeds and fruits that disseminate through wind possess special organs to keep them afloat. Such organs are I. Pappus - It is a parachute like modification of persistent calyx into hairs. e.g. Asteraceae family weeds - <i>Tridax procumbens</i> "
	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.	"pappus of 20 plumose bristles unequal in length, that of ray florets reduced. Achenes black, cylindrical to narrowly obconical, 2-2.5 mm long, densely pilose." [Pappus may aid in external attachment, but primarily dispersed by wind]

708	Propagules survive passage through the gut	y
	Source(s)	Notes
	Jolaosho, A. O., Olanite, J. A., Onifade, O. S., & Oke, A. O. (2006). Seed in the faeces of ruminant animals grazing native pastures under semi-intensive management in Nigeria. <i>Tropical Grasslands</i> , 40(2), 79–83	"Table 3. Plant species identified each year from germinated seeds in the faeces of cattle, sheep and goats." [<i>Tridax procumbens</i> germinated from cattle droppings]

801	Prolific seed production (>1000/m2)	y
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Single plants can produce 500 to 2500 seeds (Pancho, 1964)."

802	Evidence that a persistent propagule bank is formed (>1 yr)	y
	Source(s)	Notes
	Guimarães, S. C., Souza, I. F., & Pinho, E. V. R. V. (2004). Seed viability of coat button under different storage conditions. <i>Planta Daninha</i> , 22(2), 231-238	[Some seeds able to persist beyond one year] "Seed viability is strongly influenced by storage conditions. In weeds, this information may serve as support for other research works and help to understand infestation dynamics as well. This work, conducted at Universidade Federal de Lavras, was carried out to evaluate the viability of coat button (<i>Tridax procumbens</i>) seeds stored in cold chamber (temperature of 10 °C and relative humidity of 50%), in freezer (-18 °C), conventional warehouse (uncontrolled conditions) and soil, over 2 years. Seed lot with 70.5% initial viability, maintained this condition over the experimental period (730 days) when stored in cold chamber (in paper bags) and in freezer (in airtight plastic tubes). Under soil conditions, viability loss occurred with time, at a constant rate of 8.2% at every 100 days. In a conventional warehouse, seed lot viability (in paper bag) was maintained for 200 days but there was a fast reduction between 300 and 500 days, and at the 730 days end only 2.8% of the seeds were viable. In none of the storage forms, there was induction of secondary dormancy in seeds."

803	Well controlled by herbicides	y
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Qsn #	Question	Answer
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Herbicides reported to give control of <i>T. procumbens</i> include ametryne, atrazine, 2,4-D and diuron (Terry, 1983), Avirosan (dimethametryn + piperophos) and oxadiazon in rice (Vernier, 1985), bromacil (Jayachandra and Menon, 1972), metobromuron + metolachlor in cowpea (Olifintoye and Adesiyun, 1989), MCPA and 2,4-D in sisal (Ivens, 1989) and oxyfluorfen in groundnut (Prasad et al., 1987)."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	" <i>T. procumbens</i> does not have the great powers of regeneration possessed by some other perennial Compositae and can be easily controlled by cultivation and hand pulling (Adams and Baker, 1962; Ivens, 1989)."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	n
	Source(s)	Notes
	CABI, 2017. Invasive Species Compendium. Wallingford , UK: CAB International. www.cabi.org/isc	"Symptoms, host range and methods of transmission of <i>Tridax</i> mosaic virus, a mosaic virus disease of <i>T. procumbens</i> in India are described by Shamsheer Singh and Verma (1979)."
	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, and distribution apparently not limited by natural enemies] "in Hawai'i naturalized and relatively common primarily in low elevation, dry, disturbed habitats on Midway Atoll and all of the main islands except not yet documented from Ni'ihau. First collected on Maui in 1922 (Degener 27276, BISH)."

Summary of Risk Traits:

High Risk / Undesirable Traits

- Broad climate suitability, & elevation range exceeds 1000 m, demonstrating environmental versatility
- Thrives in tropical climates
- Widely naturalized in Hawaiian Islands & worldwide in regions with tropical & subtropical climates
- Disturbance-adapted weed of numerous agricultural crops
- Allelopathic
- Host of several important crop pathogens
- Tolerates many soil types
- Reproduces by seeds
- Self-fertile
- Able to reach maturity in <1 year
- Seeds dispersed by wind, internally by animals, attached to vehicles, & as a crop contaminant
- Prolific seed production
- Some seeds may persist in seed bank beyond 1 year

Low Risk Traits

- Unarmed (no spines, thorns, or burrs)
- Provides fodder for livestock
- Herbicides may provide effective control