

**Family:** *Zygophyllaceae*

**Taxon:** *Tribulus terrestris*

**Synonym:**

**Common Name:** puncturevine  
caltrop

**Questionnaire :** current 20090513  
**Status:** Assessor Approved

**Assessor:** Patti Clifford  
**Data Entry Person:** Patti Clifford

**Designation:** H(HPWRA)

**WRA Score** 11

101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?	y=1, n=-1	
103	Does the species have weedy races?	y=1, n=-1	
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)	Intermediate
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	n=0, y = 2*multiplier (see Appendix 2)	y
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	
401	Produces spines, thorns or burrs	y=1, n=0	y
402	Allelopathic	y=1, n=0	
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	y
406	Host for recognized pests and pathogens	y=1, n=0	
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	
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	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	
604	Self-compatible or apomictic	y=1, n=-1	
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	1
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	y
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	y
704	Propagules adapted to wind dispersal	y=1, n=-1	n
705	Propagules water dispersed	y=1, n=-1	n
706	Propagules bird dispersed	y=1, n=-1	y
707	Propagules dispersed by other animals (externally)	y=1, n=-1	y
708	Propagules survive passage through the gut	y=1, n=-1	
801	Prolific seed production (>1000/m2)	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	y

Designation: H(HPWRA)

WRA Score **11**

---

**Supporting Data:**

101	2010. WRA Specialist. Personal Communication.	No evidence.
102	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	
201	2010. USDA, ARS, National Genetic Resources Program.. Germplasm Resources Information Network - (GRIN) [Online Database].. National Germplasm Resources Laboratory, Bethesda, Maryland	Tribulus terrestris is native to southern Europe , Africa temperate and tropical Asia (Afghanistan, Armenia, Azerbaijan, China, Cyprus, Sinai, Georgia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, Russian Federation (Ciscaucasia, southeast Western Siberia), Saudi Arabia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan, India, Pakistan, and north Australia.
202	2010. USDA, ARS, National Genetic Resources Program.. Germplasm Resources Information Network - (GRIN) [Online Database].. National Germplasm Resources Laboratory, Bethesda, Maryland	Tribulus terrestris is native to southern Europe , Africa temperate and tropical Asia (Afghanistan, Armenia, Azerbaijan, China, Cyprus, Sinai, Georgia, Iran, Iraq, Israel, Japan, Jordan, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, Russian Federation (Ciscaucasia, southeast Western Siberia), Saudi Arabia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan, India, Pakistan, and north Australia.
203	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Unvers	Within its native range Tribulus terrestris is found from sea-level to over 1000 m. In Arizona it is found up to 2134 m.
204	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Naturalized in Hawaii.
301	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Naturalized in Kauai, Oahu, Maui, Hawaii.
303	2010. Sainty and Associates Pty. Ltd.. Caltrop Tibulus terrestris. Weeds Australia, <a href="http://www.weeds.org.au/cgi-bin/weedident.cgi?tpl=plant.tpl&amp;ibra=all&amp;card=H64">http://www.weeds.org.au/cgi-bin/weedident.cgi?tpl=plant.tpl&amp;ibra=all&amp;card=H64</a>	" Troublesome weed of wasteland, pastoral land, cropping, vineyards and recreation areas. Sharp spines on dry fruit hamper stock handling, are a nuisance in recreation areas and fruit may contaminate drying grapes."
304	2007. Randall, R.. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	No evidence of environmental impacts. The Global Compendium of Weeds mentions T. terrestris as an environmental weed, but no direct resource is given.
305	2007. Randall, R.. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/">http://www.hear.org/gcw/</a>	The Global Compendium lists Tribulus zeyheri as an agricultural weed in South Africa. Couldn't get reference or evidence of impacts.
401	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Fruit 5- 12 mm in diameter, bearing two stout hard spines 2.5-7 mm long.
402	2010. WRA Specialist. Personal Communication.	Unknown
403	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Not parasitic.
404	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Unvers	"There may be several different toxic agents in Tribulus terrestris. The species has been reported to have toxic levels of nitrate in its tissues. Also, Tribulus terrestris foliage is toxic to livestock when consumed in quantity, especially for sheep; this is caused by an unknown toxin which causes liver damage, and photosensitivation along with other symptoms which can likely cause death especially in young animals."

405	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for <i>Tribulus terrestris</i> L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Unvers	"There may be several different toxic agents in <i>Tribulus terrestris</i> . The species has been reported to have toxic levels of nitrate in its tissues. Also, <i>Tribulus terrestris</i> foliage is toxic to livestock when consumed in quantity, especially for sheep; this is caused by an unknown toxin which causes liver damage, and photosensitivation along with other symptoms which can likely cause death especially in young animals."
405	2010. Invasive.org: Center for Invasive Species and Ecosystem Health. Puncturevine <i>Tribulus terrestris</i> L.. Invasive.org: Center for Invasive Species and Ecosystem Health Universtiy of Georgia, <a href="http://www.invasive.org/species/subject.cfm?sub=3937">http://www.invasive.org/species/subject.cfm?sub=3937</a>	Toxic to sheep and other grazers.
406	2010. WRA Specialist. Personal Communication.	Unknown.
407	2010. Specialized Information Services, U.S. National Library of Medicine. TOXNET Toxicology Data Network [Online Database]. National Institutes of Health, <a href="http://toxnet.nlm.nih.gov/">http://toxnet.nlm.nih.gov/</a>	No evidence of toxicity in ToxNet
408	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Prostrate annual herbs; stems up to ca. 10 dm long." [Unlikely]
409	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for <i>Tribulus terrestris</i> L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Unvers	" <i>Tribulus terrestris</i> seedling establishment was observed to be poor on sites that were shaded."
410	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for <i>Tribulus terrestris</i> L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Unvers	" <i>Tribulus terrestris</i> grows best on dry, sandy soils, but can tolerate most soil types. In Australia, <i>Tribulus terrestris</i> is found on sandy and silty, and on saline soils. In India, <i>Tribulus terrestris</i> is found primarily on loose and compact sandy loam soils, and reportedly grows on sand dunes in the desert regions. It also thrives on loose, blown soil by field margins. Plants are typically more robust on sites without compacted soils, yet can grow on compacted soils, such as those found alongside unsurfaced roads and in playgrounds. It also can grow in heavier soils, especially when fertile and moist."
411	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Prostrate annual herb.
412	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Prostrate annual herb; stems up to ca. 10 dm long.
501	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Terrestrial
502	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Zygophyllaceae
503	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Zygophyllaceae
504	1999. Wagner, W. L./Herbst, D. R./Sohmer, S. H.. Manual of the flowering plants of Hawaii. Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	Not a geophyte.

601	2010. WRA Specialist. Personal Communication.	No evidence.
602	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	Reproduces by seed.
605	1971. Porter, D.M.. Notes on the floral glands in Tribulus (Zygophyllaceae). Annals of the Missouri Botanical Garden. 58: 1-5.	In the Galapagos, Tribulus terrestris is pollinated by a carpenter bee, Xylocopa darwini
606	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	Reproduces by seed.
607	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Seedlings develop a deep root system in a few weeks; flowers may be produced within 2 weeks, fruits/burrs within 6 weeks."
701	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Each fruit section (coccus) has 2 sharp divergent spines and several other spines and warty protuberances enabling the Tribulus terrestris fruits to easily attach to animals and humans and to stick onto vehicle tires (cars, farm, airplane), subsequently facilitating long distance dispersion and spread. Due to the architecture of the schizocarp/fruit, the large and small spines are arranged at different angles with at least one of the spines always pointing upward no matter how the fruits/burrs fall from the plant, and can easily imbed into feet, hooves, or tires. After getting caught or imbedded into the hooves, feet, and wool of livestock and other animals, the fruits/burrs are subsequently broken off as the animals try to rid themselves of the irritation . Furthermore, they can stick to the shoes and clothing of people, and the fur and feathers of animals."
702	2010. Dave's Garden. DG Marketplace: Puncture Vine - Tribulus terrestris. <a href="http://davesgarden.com/products/market/view/10833/">http://davesgarden.com/products/market/view/10833/</a>	Seeds are available through Dave's Garden.
702	2010. www.seedvendor.com. 100 Seeds Tribulus terrestris Puncturevine fresh Seeds. <a href="http://www.seedvendor.com/100-seeds-tribulus-terrestris-puncturevine-fresh-se100.html">http://www.seedvendor.com/100-seeds-tribulus-terrestris-puncturevine-fresh-se100.html</a>	Seeds are available through seedvendor.com. They ship seeds worldwide.
703	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Each fruit section (coccus) has 2 sharp divergent spines and several other spines and warty protuberances enabling the Tribulus terrestris fruits to easily attach to animals and humans and to stick onto vehicle tires (cars, farm, airplane), subsequently facilitating long distance dispersion and spread. Due to the architecture of the schizocarp/fruit, the large and small spines are arranged at different angles with at least one of the spines always pointing upward no matter how the fruits/burrs fall from the plant, and can easily imbed into feet, hooves, or tires. After getting caught or imbedded into the hooves, feet, and wool of livestock and other animals, the fruits/burrs are subsequently broken off as the animals try to rid themselves of the irritation . Furthermore, they can stick to the shoes and clothing of people, and the fur and feathers of animals." "Tribulus terrestris fruits/burrs are also a contaminate of seed, feed, and wool of livestock."

705	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Each fruit section (coccus) has 2 sharp divergent spines and several other spines and warty protuberances enabling the Tribulus terrestris fruits to easily attach to animals and humans and to stick onto vehicle tires (cars, farm, airplane), subsequently facilitating long distance dispersion and spread. Due to the architecture of the schizocarp/fruit, the large and small spines are arranged at different angles with at least one of the spines always pointing upward no matter how the fruits/burrs fall from the plant, and can easily imbed into feet, hooves, or tires. After getting caught or imbedded into the hooves, feet, and wool of livestock and other animals, the fruits/burrs are subsequently broken off as the animals try to rid themselves of the irritation . Furthermore, they can stick to the shoes and clothing of people, and the fur and feathers of animals."
706	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Each fruit section (coccus) has 2 sharp divergent spines and several other spines and warty protuberances enabling the Tribulus terrestris fruits to easily attach to animals and humans and to stick onto vehicle tires (cars, farm, airplane), subsequently facilitating long distance dispersion and spread. Due to the architecture of the schizocarp/fruit, the large and small spines are arranged at different angles with at least one of the spines always pointing upward no matter how the fruits/burrs fall from the plant, and can easily imbed into feet, hooves, or tires. After getting caught or imbedded into the hooves, feet, and wool of livestock and other animals, the fruits/burrs are subsequently broken off as the animals try to rid themselves of the irritation . Furthermore, they can stick to the shoes and clothing of people, and the fur and feathers of animals."
707	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Each fruit section (coccus) has 2 sharp divergent spines and several other spines and warty protuberances enabling the Tribulus terrestris fruits to easily attach to animals and humans and to stick onto vehicle tires (cars, farm, airplane), subsequently facilitating long distance dispersion and spread. Due to the architecture of the schizocarp/fruit, the large and small spines are arranged at different angles with at least one of the spines always pointing upward no matter how the fruits/burrs fall from the plant, and can easily imbed into feet, hooves, or tires. After getting caught or imbedded into the hooves, feet, and wool of livestock and other animals, the fruits/burrs are subsequently broken off as the animals try to rid themselves of the irritation . Furthermore, they can stick to the shoes and clothing of people, and the fur and feathers of animals."
708	2010. WRA Specialist. Personal Communication.	Unknown.
801	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	Tribulus terrestris plants potentially produce thousands of seeds. "Tribulus terrestris plants typically bear numerous fruits/schizocarps/burrs (averaging 200-5000 per plant)."
802	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	Seeds of Tribulus terrestris can stay viable in the soil for 4-5 years.
803	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Colorado Natural Areas Program lists dicamba, picloram, and glyphosate as providing excellent control, and 2,4-D as providing good control of Tribulus terrestris."
804	2003. Guertin, P./Halvorson, W.L.. USGS weeds in the west project: status of introduced plants in southern Arizona parks. Factsheet for Tribulus terrestris L.. U.S. Geological Survey/ Southwest BiologicalScience Center Sonoran Desert Field Station Univers	"Frequent light cultivation in areas with Tribulus terrestris seedlings may be effective On more mature plants, shallow cultivation to sever the taproot just below the soil surface is suggested."

