

Family: Solanaceae

Taxon: Solanum torvum

Synonym: Solanum ficifolium Ortega
Solanum rudepannum Dunal

Common Name turkeyberry
devil's-fig
pea eggplant
platebrush

Questionnaire :	current 20090513	Assessor:	Chuck Chimera	Designation:	H(Hawai'i)
Status:	Assessor Approved	Data Entry Person:	Chuck Chimera	WRA Score	24
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)	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)	
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)	y
305	Congeneric weed			n=0, y = 1*multiplier (see Appendix 2)	y
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	y
405	Toxic to animals			y=1, n=0	y
406	Host for recognized pests and pathogens			y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans			y=1, n=0	
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
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	y
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	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	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	
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	n
708	Propagules survive passage through the gut	y=1, n=-1	y
801	Prolific seed production (>1000/m2)	y=1, n=-1	n
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	
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)	y=-1, n=1	

Designation: H(Hawai'i)

WRA Score 24

Supporting Data:

101	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.	No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	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.	"Native to the Antilles, now a pantropical weed."
202	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.	"Native to the Antilles, now a pantropical weed."
203	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Ecology.—In Puerto Rico, turkey berry grows in upland sites that receive from about 1000 to 4000 mm of annual precipitation. It also grows in riparian zones in drier areas. Turkey berry grows on all types of moist, fertile soil at elevations from near sea level to almost 1,000 m in Puerto Rico (Little and others 1974) and 2,000 m in Papua New Guinea (Pacific Island Ecosystems at Risk 2001)." [elevation range >1000 m; displays environmental versatility]
203	2011. Tropilab Inc.. Solanum torvum- Turkey Berry. http://www.tropilab.com/turkeyberry.html	"USDA zone 9 - 11"
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.	"Native to the Antilles, now a pantropical weed; in Hawaii naturalized in Kaneohe and Palolo Valley, Oahu and along Iao Stream Maui. First collected on Maui in 1954."
205	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.	"Native to the Antilles, now a pantropical weed."
301	1999. Oppenheimer, H.L./Meidell, J.S./Bartlett, R.T.. New plant records for Maui and Molokai. Bishop Museum Occasional Papers. 59: 7-11.	"Solanum torvum Sw. Range extension According to Wagner et al. (1990: 1276) the naturalized range of this species in Hawai'i was previously known to be O'ahu and along Iao Stream on West Maui. The following collection extends its range to East Maui. Material examined. MAUI: East Maui, Hana District, Ka'eleku, along the road to Hana Airport, 61 m, 21 Jun 1998, Oppenheimer 305 (BISH)."
301	2003. Starr, F./Starr, K./Loope, L.L.. New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers. 74: 23-34.	"Previously known from O'ahu and Maui (Wagner et al., 1990; Oppenheimer et al., 1999), S. torvum (turkeyberry) is now also known from Hilo, Hawai'i where it was volunteering in waste areas. Material examined: HAWAII: Hilo, University of Hawaii Hilo campus, 200 ft [60 m], 1 Aug 2001, Starr & Martz 010801-1."
301	2003. Wunderlin, R.P./Hansen, B.F.. Guide to the Vascular Plants of Florida. University Press of Florida, Gainesville, FL	"Disturbed areas. Occasional; Colombia Co., central and southern peninsula. Native to the West Indies." [Florida]
302	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic Solanum spp. (Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"This noxious solanum invades disturbed sites such as pastures, crop fields, roadsides, damp waste areas and forest clearings where it competes with desirable plants for moisture, light and nutrients." [a disturbance weed with agricultural and environmental impacts. See 3.03 & 3.04]
302	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"Solanum torvum establishes itself on open land in disturbed soil, along roads and on waste places, where it often turns into a weed that becomes hard to control."
302	2010. Nelson, G.. The Trees of Florida. 2nd Edition. Pineapple Press Inc, Sarasota, FL	"Origin: Not native (West Indies), invasive, EPPC listed...Distribution: Thickets, waste places, disturbed sites, edges of hammocks; from about Columbia, St. Johns, Putnam, and Pasco counties southward, including the Keys."
303	1995. Devendra, C./Gardiner, P.. Global agenda for livestock research: proceedings of the consultation for the South-East Asia Region : 10-13 May 1995, IRRI. International Livestock Research Institute, Nairobi, Kenya	"High levels of weed infestation are a major problem facing livestock farmers. Common weeds include guava (<i>Psidium guajava</i>)...prickly solanum (<i>Solanum torvum</i>)..."

303	1998. Agyakwa, C.W./Akobundu, I.O.. A handbook of West African weeds. International Institute of Tropical Agriculture, Ibadan, Nigeria	"Habitat" A common weed of cultivated crops and waste areas in the forest zones."
303	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"Tropical soda apple, <i>Solanum viarum</i> Dunal, wetland nightshade, <i>S. tampicense</i> Dunal, and turkey berry, <i>S. torvum</i> Swartz, are considered three of Florida's most invasive plant species. These nonnative perennial broadleaf weeds are disrupting native plant communities in agricultural areas and natural ecosystems. The lack of natural enemies in Florida is thought to be an important factor contributing to their invasiveness."
303	2006. USDA Natural Resources Conservation Service. Federal noxious weed list. http://plants.usda.gov/java/noxious?rptType=Federal	The plant is legally designated a federal noxious weed in the United States.
304	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"Tropical soda apple, wetland nightshade and turkey berry are currently recognized as three of Florida's most invasive nonnative plant species (FLDACS 1999, FLEPPC 1999, Langeland 2001). Although it is unclear why these exotic solanaceous plants have become weeds, the lack of hostspecific natural enemies in Florida (the introduced range) may have afforded these plants a competitive advantage over native species (Cuda et al. 2002)."
304	2006. USDA Natural Resources Conservation Service. Federal noxious weed list. http://plants.usda.gov/java/noxious?rptType=Federal	The plant is legally designated a federal noxious weed in the United States.
304	2009. Liu, H./Pemberton, R.W.. Solitary invasive orchid bee outperforms co-occurring native bees to promote fruit set of an invasive <i>Solanum</i> . Oecologia. 159: 515-525.	"The weed is under eradication in southern Florida and therefore currently occurs as scattered and ephemeral individual plants or groups of plants."
305	2006. USDA Natural Resources Conservation Service. Federal noxious weed list. http://plants.usda.gov/java/noxious?rptType=Federal	<i>Solanum tampicense</i> and <i>Solanum viarum</i> listed as Federal noxious weeds.
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.	"Spreading or sprawling shrubs 2-3 m tall, prickles 3-7 mm long, slightly hooked, laterally flattened, scattered on stems, both leaf surfaces, and main veins, sparse on aged and mature growth"
402	2011. 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.	"Spreading or sprawling shrubs 2-3 m tall" [not parasitic]
404	1997. Swarbrick, J.T.. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	"Tolerant to fire. Unpalatable to stock because of thorns. Controlled by cultivation and grubbing"
404	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"Palatability: Not known to be eaten"
404	2008. De Garine-Wichatitsky, M./Spaggiari J.. Alien plants in native sclerophyll forests of New Caledonia : the role of ungulates. Pages 80-84 in Proceedings of the Regional Workshop on Invasive Plant Species in Pastoral Areas. SPC, Suva, Fiji	"The frequency of browse of the introduced species (Table 1) varied greatly between species (e.g. <i>D. virgatus</i> or <i>S. retusa</i> were almost always browsed, whereas <i>H. pectinata</i> and <i>S. torvum</i> were never browsed)."
405	2000. Simmonds, H./Holst, P./Bourke, C.. The palatability, and potential toxicity of Australian weeds to goats. Rural Industries Research and Development Corporation, Barton, Australia	"Toxicity to Goats: Toxic, low risk...Toxicity to Other Species: Potentially toxic to sheep and cattle...Poisonous Principle: Hydroxycholecalciferols...Signs and symptoms; Weight loss, bony changes, eventually respiratory difficulties...Health and production problems; Chronic ill thrift hence reduced productivity...The consumption of large amounts of this plant over a long period can cause a chronic form of vitamin D toxicity, hence the signs and symptoms of excessive calcium deposition and insufficient phosphorus and magnesium uptake."

405	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"Although it is frequently cultivated as a yard plant in south Florida (Westbrooks & Eplee 1989), turkey berry is potentially poisonous to animals (Chadhokar 1976, Abatan et al. 1997), and possibly carcinogenic to humans (Balachandran & Sivaramkrishnan). Although it is frequently cultivated as a yard plant in south Florida (Westbrooks & Eplee 1989), turkey berry is potentially poisonous to animals (Chadhokar 1976, Abatan et al. 1997), and possibly carcinogenic to humans (Balachandran & Sivaramkrishnan 1995)."
406	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"Turkey berry has been reported as a reservoir for <i>Alternaria solani</i> Sorauer (Deuteromycetes: Dematiaceae), the causative agent of wilt disease in potatoes and tomatoes (Mune & Parham 1967)..."
406	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"Diseases and pests. Pea eggplant may suffer from some of the diseases that are found on other solanaceous crops..."
407	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defuncta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"Although it is frequently cultivated as a yard plant in south Florida (Westbrooks & Eplee 1989), turkey berry is potentially poisonous to animals (Chadhokar 1976, Abatan et al. 1997), and possibly carcinogenic to humans (Balachandran & Sivaramkrishnan)."
407	2004. Bryson, C.T./Carter, R.. Biology of Pathways for Invasive Weeds. Weed Technology. 18(sp1): 1216-1220.	"Fruits of turkeyberry are used in stir fry dishes, and the leaves of swamp morning glory are eaten like spinach or greens." [apparently not acutely toxic to humans, but see Cuda et al. 2002]
407	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"In Cote d'Ivoire the plant is known to cause instant insanity when eaten raw and it has been used as poison for people."
408	1997. Swarbrick, J.T.. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	"Tolerant to fire." [but no indication that plant increases fire risks]
408	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching, L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.htm	No evidence of increased fire hazard
408	2008. Langeland, K.A./Burks, K.C. (eds.). Identification and Biology of Non-Native Plants in Florida's Natural Areas. UF/IFAS Distribution, Gainesville, FL http://www.fleppc.org/ID_book.htm	Fire hazards not listed among negative impacts
409	1999. Staples, G./Kristiansen, M.S.. Ethnic culinary herbs: a guide to identification and cultivation in Hawaii. University of Hawaii Press, Honolulu, HI	"Turkeyberry thrives in sunny, dry habitats in Hawaii."
409	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"Seeds require sunlight for germination and shading may thus control the spread of <i>Solanum torvum</i> as a weed."
409	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnisc Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"It grows best in full sunlight and does well in light shade or shade for part of the day, but cannot survive under a closed forest canopy."
410	1997. Swarbrick, J.T.. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	"It prefers moist, fertile soil, but will tolerate drought."

410	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Turkey berry grows on all types of moist, fertile soil at elevations from near sea level to almost 1,000 m in Puerto Rico (Little and others 1974) and 2,000 m in Papua New Guinea (Pacific Island Ecosystems at Risk 2001)."
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.	"Spreading or sprawling shrubs 2-3 m tall" [not climbing or smothering]
412	2003. Motoooka, P./Castro, L./Nelson, D./Nagai, G./Ching, L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	"Infests pastures in solid stands that shade out undergrowth. Because of spines, interferes with passage of people and animals"
412	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Given an equal start after disturbance, turkey berry quickly overtops most herbs, grasses, and other shrubs. It grows best in full sunlight and does well in light shade or shade for part of the day, but cannot survive under a closed forest canopy. Turkey berry single plants, groups, and thickets are most frequently seen on roadsides, vacant lots, brushy pastures, recently abandoned farmland, landslides, and river banks."
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.	"Spreading or sprawling shrubs 2-3 m tall" [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.	Solanaceae
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.	Solanaceae [not a nitrogen fixing woody plant]
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.	Solanaceae [not a geophyte]
601	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanales: Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defecta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	No evidence of substantial reproductive failure in native habitat
602	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	" <i>Solanum torvum</i> is normally propagated by seed."
602	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Reproduction.—Flowering and fruiting is continuous after the shrubs reach about 1 to 1.5 m in height. Ripe fruits collected in Puerto Rico averaged 1.308 + 0.052 g. Air dry seeds from these fruits weighed an average of 0.00935 g or 1,070,000 seeds/kg. These seeds were sown on commercial potting mix and 60 percent germinated between 13 and 106 days following sowing. The seedlings are common in recently disturbed ground. Frugivorous birds eat the fruits and spread the seeds"

603	1998. Bletsos, F.A. et al.. Interspecific hybrids between three eggplant (<i>Solanum melongena</i> L.) cultivars & two wild species (<i>Solanum torvum</i> Sw. and <i>Solanum sisymbriifolium</i> Lam.). <i>Plant Breeding</i> . 117: 159—164.	"Abstract: Three Greek eggplant cultivars, 'Langada', 'Tsakoniki' and 'Emi' (2n= 24), were crossed with two wild species (<i>Solanum torvum</i> Sw., 2n= 24 and <i>Solanum sisymbriifolium</i> Lam., 2n= 24). Ovules isolated 15-27 days after pollination were cultured in a modified MS medium at 24°C and a 16h photoperiod. Fifty days later, the ovules were dissected and the interspecific embryos were cultured in the same medium. Interspecific hybrids were achieved only from crosses between the eggplant cultivars and <i>S. torvum</i> . The hybridity of the putative interspecific F1 hybrid (<i>Solanum melongena</i> × <i>S. torvum</i>) was confirmed by using morphological and biochemical (isozyme isocitrate dehydrogenase A, phosphoglucomutase A, phosphoglucose isomerase B, 6 phosphogluconate dehydrogenase A, 6 phosphogluconate dehydrogenase B) markers. The F1 plants ('Langada' × <i>S. torvum</i>) were self-pollinated and backcrossed to both parents. Fruits, however, were produced only when the F1 hybrid was backcrossed as female with the eggplant cultivar 'Langada'." [ability to hybridize naturally unknown]
604	1999. Wagner, W.L./Herbst, D.R./Sohmer, S.H.. <i>Manual of the flowering plants of Hawaii</i> . Revised edition.. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Self-compatible"
604	2009. Liu, H./Pemberton, R.W.. Solitary invasive orchid bee outperforms co-occurring native bees to promote fruit set of an invasive <i>Solanum</i> . <i>Oecologia</i> . 159: 515–525.	"The plant is andromonoecious, producing inflorescences with both hermaphroditic flowers and functionally staminate flowers, with the latter on the distal portions of the inflorescence axes (Whalen and Costich 1986; Liu and Pemberton, unpublished data)...None of the flowers subjected to pollinator exclusion treatments set fruit, demonstrating the dependency of <i>S. torvum</i> on a pollinator for fruit set. In addition, selfing and outcrossing were not significantly different in terms of resultant fruit set"
605	2009. Liu, H./Pemberton, R.W.. Solitary invasive orchid bee outperforms co-occurring native bees to promote fruit set of an invasive <i>Solanum</i> . <i>Oecologia</i> . 159: 515–525.	"Flowers of <i>S. torvum</i> require specialized buzz pollination. Through timed floral visitor watches and two pollination treatments (control and pollen supplementation) at three forest edge and three open area sites, we found that the fruit set of <i>S. torvum</i> was pollen limited at the open sites where the native bees dominate, but was not pollen limited at the forest sites where the invasive orchid bees dominate. The orchid bee's pollination efficiency was nearly double that of the native halictid bees, and was also slightly higher than that of the native carpenter bee...The orchid bee was the most important pollinator of the weed at the forest sites, which could pose additional challenges to the management of this weed in the fragmented, endangered tropical hardwood forests in the region. This specialized invasive mutualism may promote populations of both the orchid bee and this noxious weed. Invasive solitary bees, particularly species that are specialized pollinators, appear to have more importance than has previously been recognized...Both the native and introduced bees contributed to the reproduction of <i>S. torvum</i> . Among the native bees, carpenter and halictid bees are the most frequent and consistent visitors to <i>S. torvum</i> , and they were the most important pollinators at the open area sites where the orchid bees were mostly absent. However, the plant suffered pollen limitation with pollination services provided by these native bees alone." [although seed set is better with specialized pollinators, they are not required for pollination]
606	2008. Langeland, K.A./Burks, K.C. (eds.). <i>Identification and Biology of Non-Native Plants in Florida's Natural Areas</i> . UF/IFAS Distribution, Gainesville, FL http://www.fleppc.org/ID_book.htm	"Sprouts from roots, forming thickets (N. Coile, Florida Department of Agriculture and Consumer Services, 1997 personal communication)."
607	2004. Grubben, G.J.H.. <i>Vegetables</i> . Volume 2 of <i>Plant resources of tropical Africa</i> . PROTA, Wageningen, Netherlands	"The plant starts flowering after 3-4 months and continues flowering during its lifetime of up to 5 years."
607	2009. Francis, J.K.. <i>Wildland Shrubs of the United States & its Territories: Thamnic Descriptions</i> General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Turkey berry grows about 0.75 to 1.5 m in height per year. The species is not long-lived; most plants live about 2 years."
701	2003. Starr, F./Starr, K./Loope, L.L.. <i>Solanum torvum</i> - Turkey berry - Solanaceae. USGS - Biological Resources Haleakala Field Station Maui, www.hear.org/starr/hiplants/reports/pdf/solanum_torvum.pdf	"On Maui, this species seems to be spread on equipment or in soil that has come from infested areas. Cleaning vehicles and equipment after being in contaminated areas may help decrease the spread on Maui. <i>S. torvum</i> appeared to be sparingly cultivated in Lahaina and it may be useful to educate the public that it is a noxious weed and is not legal to propagate, possess, or sell."

701	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"Solanum torvum establishes itself on open land in disturbed soil, along roads and on waste places, where it often turns into a weed that becomes hard to control."
702	1999. Staples, G./Kristiansen, M.S.. Ethnic culinary herbs: a guide to identification and cultivation in Hawaii. University of Hawaii Press, Honolulu, HI	"Solanum torvum is listed by the USDA as a federal noxious weed; therefore, growing or transporting it is prohibited. Despite this, it is being cultivated by Southeast Asian immigrants living in Hawaii and the fruits can be found in local ethnic produce markets."
702	2004. Bryson, C.T./Carter, R.. Biology of Pathways for Invasive Weeds. Weed Technology. 18(sp1): 1216-1220.	"Humans are vectors for turkeyberry (<i>Solanum torvum</i> Dun.) and swamp morningglory (<i>Ipomoea aquatica</i> L.). Fruits of turkeyberry are used in stir fry dishes, and the leaves of swamp morningglory are eaten like spinach or greens. Both are listed as Federal Noxious Weeds in the United States based on their biology and potential to be invasive in their native lands."
704	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.	"Berries few to 10 in clusters, drab yellow, brownish at maturity, mucilaginous, drying with age, globose, 1-1.5 cm in diameter, pedicels 1-1.5 cm long, thickened below calyx, calyx not much enlarged. Seeds numerous, drab brownish, flattened, discoid, 1.5-2 mm long, slightly reticulate." [no adaptations for wind dispersal]
705	1993. Walker, L.R./Neris, L.E.. Posthurricane Seed Rain Dynamics in Puerto Rico. Biotropica. 25(4): 408-418.	"Appendix A... <i>Solanum torvum</i> ...Dispersal mode...endozoochory" [no evidence of water dispersal]
706	1999. Staples, G./Kristiansen, M.S.. Ethnic culinary herbs: a guide to identification and cultivation in Hawaii. University of Hawaii Press, Honolulu, HI	"Unfortunately this species can become weedy, springing up some distance from the parent plant. It is suspected that birds distribute the seed."
706	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.	"Berries few to 10 in clusters, drab yellow, brownish at maturity, mucilaginous, drying with age, globose, 1-1.5 cm in diameter, pedicels 1-1.5 cm long, thickened below calyx, calyx not much enlarged. Seeds numerous, drab brownish, flattened, discoid, 1.5-2 mm long, slightly reticulate." [fleshy-fruited, bird-adapted fruit]
706	2001. Bhatt, D./Kumar, A.. Foraging ecology of Red-vented Bulbul <i>Pycnonotus cafer</i> in Haridwar, India. Forktail. 17: 109-110.	"...birds do contribute to the dispersal of unwanted shrubs, such as <i>Lantana camara</i> and <i>Solanum torvum</i> , whose fruits formed 27% of the observed diet..."
707	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.	"Berries few to 10 in clusters, drab yellow, brownish at maturity, mucilaginous, drying with age, globose, 1-1.5 cm in diameter, pedicels 1-1.5 cm long, thickened below calyx, calyx not much enlarged. Seeds numerous, drab brownish, flattened, discoid, 1.5-2 mm long, slightly reticulate." [possible that fruit could be carried externally, but no evidence & no means of external attachment]
708	2004. Grubben, G.J.H.. Vegetables. Volume 2 of Plant resources of tropical Africa. PROTA, Wageningen, Netherlands	"Birds and fruit bats eat the brownish yellow fruits and disperse the seeds through their droppings."
708	2004. Lobova, T.A./Mori, S.A.. Epizoochorous dispersal by bats in French Guiana. Journal of Tropical Ecology. 20: 581-582.	"Seven of the eight faecal samples which contained <i>C. prostrata</i> diaspores also contained numerous seeds of <i>Solanum torvum</i> Sw.; the eighth sample also had seeds of <i>Piper bartlingianum</i> (Miq.) C. DC. The fruits of <i>Solanum</i> and <i>Piper</i> are considered a staple food for species of <i>Sturnira</i> (Fleming 1986), but these bats also utilize many other plants (Mori & Blanchard, URL: http://www.botanypages.org/)."
708	2009. Liu, H./Pemberton, R.W.. Solitary invasive orchid bee outperforms co-occurring native bees to promote fruit set of an invasive <i>Solanum</i> . Oecologia. 159: 515-525.	" <i>Solanum torvum</i> , a short-lived perennial shrub with fleshy fruits that are likely dispersed by birds and mammals, is mostly—if not exclusively—propagated through seeds (Langeland and Craddock Burks 1998)."
801	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Ripe fruits collected in Puerto Rico averaged 1.308 + 0.052 g."
802	1983. Hopkins, M.S./Graham, A.W.. The Species Composition of Soil Seed Banks Beneath Lowland Tropical Rainforests in North Queensland, Australia. Biotropica. 15(2): 90-99.	"Table 1. The species germinated from the soil samples over a 14 week period between August and November 1980" [includes <i>S. torvum</i> . Persistence of seeds in soil >1 year unknown]

802	1990. Graham, A.W./Hopkins, M.S.. Soil Seed Banks of Adjacent Unlogged Rainforest Types in North Queensland. Australian Journal of Botany. 38: 261-268.	"The density of viable seeds in the top 40 mm of soil varied from 84 seeds m ⁻² to 388 seeds m ⁻² in the four forest types (Table 2). Secondary species constituted 70-87% of the seed banks and contributed approximately half the number of species recorded in each. This component was dominated by well known secondary trees [e.g. <i>Alphitonia petriei</i> , <i>Polyscias elegans</i> (C. Moore & F. Muell.) Harms, <i>Euodia elleryana</i> F. Muell., <i>Ficus variegata</i> Bl., <i>Homalanthus novoguineensis</i> (Warb.) Lauterb. & Schumann] and shrubs [e.g. <i>Callicarpa longifolia</i> Lam., <i>Dendrocnide moroides</i> (Wedd.) Chew, <i>Solanum mauritianum</i> Scop., <i>Solanum torvum</i> Swartz]. Some secondary species [e.g. <i>A. petriei</i> and <i>Polyscias murrayi</i> (F. Muell.) Harms] were recorded from the soil seed of all forest types and were abundant in the majority of samples."
802	2008. Royal Botanic Gardens Kew. Seed Information Database (SID). Version 7.1. http://data.kew.org/sid/	"Storage Behaviour: Orthodox Storage Conditions: Long-term storage under IPGRI preferred conditions at RBG Kew, WP. Oldest collection 12 years"
803	1997. Swarbrick, J.T.. Weeds of the Pacific Islands. Technical paper no. 209. South Pacific Commission, Noumea, New Caledonia	"Susceptible to translocated herbicides, including glyphosate, 2,4-D, picloram and triclopyr applied to the foliage for freshly-cut stumps at standard rates"
803	2003. Motooka, P./Castro, L./Nelson, D./Nagai, G./Ching,L.. Weeds of Hawaii's Pastures and Natural Areas: An Identification and Management Guide. CTAHR, UH Manoa, Honolulu, HI http://www.ctahr.hawaii.edu/invweed/weedsHi.html	"Sensitive to foliar-applied triclopyr and soil-applied tebuthiuron"
804	2009. Francis, J.K.. Wildland Shrubs of the United States & its Territories: Thamnic Descriptions General Technical Report IITF-WB-1. U.S.D.A. Forest Service International Institute of Tropical Forestry, http://www.fs.fed.us/global/iitf/wildland_shrubs.htm	"Physical control of the shrub may be done by grubbing out the plants; lopping will not kill them. They can be killed by translocated herbicides applied to the leaves or the cut stumps"
805	1987. Waterhouse, D. F./Norris, K. R.. Biological control: Pacific prospects. Inkata Press, Melbourne, Australia	"Most organisms which are reported to attack <i>S. torvum</i> also attack other <i>Solanum</i> species of economic importance. However, the leaf-eating chrysomelid beetle <i>Leptinotarsa undecimlineata</i> , is reported to be host-specific and might be a useful control agent" [Unknown for Hawaiian Islands]
805	2002. Cuda, J.P./Parker, P.E./Coon, B.R. et al.. Evaluation of exotic <i>Solanum</i> spp. (Solanaceae) in Florida as host plants for the leaf beetles <i>Leptinotarsa defecta</i> & <i>L. texana</i> (Coleoptera: Chrysomelidae). Florida Entomologist. 85(4): 599-610.	"considered one of the most invasive weeds on other continents, particularly in parts of Australia and South Africa that are climatically similar to Florida (Holm et al. 1979). In the Pacific region, turkey berry was identified as a possible target for classical biological control (Waterhouse & Norris 1987). The occurrence of this plant as an invasive weed in other countries is perhaps the most compelling evidence for predicting its eventual effect on Florida's native plant communities."