Family: *Asclepiadaceae*

Taxon: *Cryptostegia grandiflora*

Synonym: *Nerium grandiflorum Roxb. ex R. Br.*

Common Name Rubber vine
purple allamanda
caucho de la India
liane de gatope

Questionaire : current 20090513 **Assessor:** Chuck Chimera **Designation:** H(HPWRA)

Status: Assessor Approved **Data Entry Person:** Chuck Chimera **WRA Score** 28

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**	**n**
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)**	**n**
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**	**n**
402	**Allelopathic**	**y=1, n=0**	**n**
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**	
407	**Causes allergies or is otherwise toxic to humans**	**y=1, n=0**	**y**
408	**Creates a fire hazard in natural ecosystems**	**y=1, n=0**	**y**
409	**Is a shade tolerant plant at some stage of its life cycle**	**y=1, n=0**	**y**
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y=1, n=0**	**y**

411	**Climbing or smothering growth habit**	**y=1, n=0**	**y**
412	**Forms dense thickets**	**y=1, n=0**	**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**	**y**
604	**Self-compatible or apomictic**	**y=1, n=-1**	
605	**Requires specialist pollinators**	**y=-1, n=0**	**y**
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**	**n**
704	**Propagules adapted to wind dispersal**	**y=1, n=-1**	**y**
705	**Propagules water dispersed**	**y=1, n=-1**	**y**
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**	**n**
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**	**n**

Designation: H(HPWRA) **WRA Score** **28**

Supporting Data:

101	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	No evidence
102	2011. WRA Specialist. Personal Communication.	NA
103	2011. WRA Specialist. Personal Communication.	NA
201	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Rubber vine is a native of south west Madagascar. It has been introduced to most tropical and subtropical regions by man, either as a potential source of rubber or as an ornamental."
202	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Rubber vine is a native of south west Madagascar. It has been introduced to most tropical and subtropical regions by man, either as a potential source of rubber or as an ornamental."
203	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	'Plants tolerate shade and grow in a wide range of temperatures; the major response to temperature is the killing of all aerial growth by frost. In contrast, water supply is critical. Although rubber vine is naturalised in arid regions, it usually grows only in places where extra water is available." [water likely to be limiting factor in Hawaii and other tropical islands]
204	2001. Klackenberg, J.. Revision of the genus Cryptostegia R. Br. (Apocynaceae, Periplocoideae). Adansonia. 23(2): 205-218.	"Distribution and Habitat. — Cryptostegia grandiflora is distributed in the southern part of Madagascar, mostly in the drier southwestern and western domains. It grows from sea level up to 600 m alt., usually in full sun. It is found in dry forest (e.g. Didiereaceae), savannah, disturbed grazed grassland, on laterite soil often on river beds."
205	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"It has been introduced to most tropical and subtropical regions by man, either as a potential source of rubber or as an ornamental."
301	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"It is now naturalized in East Africa, Egypt, Morocco, Mauritius, India, Southeast Asia, Mexico, the United States, Central and South America, the West Indies, New Caledonia, Fiji and Australia."
302	2011. WRA Specialist. Personal Communication.	An agricultural and environmental weed [see 3.03 & 3.04]
303	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"The important properties of rubber vine are its ability to climb over and smother tall trees and to extend into run-down pastures. In such situations it forms dense thickets, particularly along watercourses, being impenetrable to man and beast, restrict access to water, reduce the grazing capacity and increase mustering problems."
303	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"Rubber vine has impacts on pastoral and conservation areas of northeastern Australia. Its main impact on pastoralism is the loss of grazing country, which in 1995 was estimated to cost the Queensland beef industry $18 million. It also increases the costs of mustering and fencing."
304	1990. McFadyen, R.E./Harvey, G.J.. Distribution and control of rubber vine, Cryptostegia grandiflora, a major weed in northern Queensland. Plant Protection Quarterly. 5(4): 152-155.	"Since its introduction into N. Australia in 1917, C. grandiflora has spread to >30,000 km² of tropical Queensland. From initial infestations alongside rivers, dense impenetrable thickets become established which can cover trees up to 30 m tall and which choke out native vegetation. C. grandiflora then progressively invades surrounding areas. Chemical control is effective and C. grandiflora is susceptible to a wide range of herbicides but control is dependent on formulation, application method and, for foliar sprays, the timing of spray application. However the vast areas of infestation and difficult terrain makes herbicide control uneconomic. In 1988 a leaf feeding moth, Euclasta whalleyi, was released as a potential biocontrol agent but it has so far failed to become established. A leaf rust, Maravalia crytostegiae, is currently being investigated."
304	1994. Vitelli, J.S./Mayer, R.J./Jeffrey, P.L.. Foliar application of 2,4-D/picloram, imazapyr, metsulfuron, triclopyr/picloram, and dicamba kills individual rubber vine (Cryptostegia grandiflora) plants. Tropical Grasslands. 28: 120-126.	"Also threatened are the specific habitat requirements of native fauna such as the greater glider (Petauroides volans) and squirrel glider (Petraurus norfolcensis) (B.C. Lawrie, personal communication). Rubber vine is broadly distributed over 20070 of Queensland (34.6 million hectares of which 700 000 hectares is densely infested) (Chippendale 1991) and is spreading at an estimated 1-3% per annum (Dale 1980). It currently costs the north Queensland cattle industry $8 million per year (Chippendale 1991) in direct costs and increased stock management costs."

304	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"Rubber vine is a Weed of National Significance. It is regarded as one of the worst weeds in Australia because of its invasiveness, potential for spread, and economic and environmental impacts...Rubber vine threatens waterways, woodlands and rainforests throughout northeastern Australia, including significant conservation areas such as the Wet Tropics World Heritage Area and Cape York. It also severely threatens riverine vegetation, and can potentially displace the plants and animals that inhabit riverbanks, thereby affecting the water quality of streams. The whole ecological integrity of native vine thickets and riverine systems of northern Australia is under threat from rubber vine."
304	2003. Kriticos, D.J./Sutherst, R.W./Brown, J.R./Adkins, S.W./Maywald, G.F.. Climate change and biotic invasions: a case history of a tropical woody vine. Biological Invasions. 5: 145–165.	"Cryptostegia grandiflora has attained prominent weed status due to its ability to form dense monospecific stands, especially in riparian habitats. The presumed resulting reduction in native plant biodiversity has raised concern from a conservation perspective. The dense infestations of C. grandiflora also cause reductions in domestic livestock production by restricting access to the relatively productive riparian habitat in semi arid regions. There are also concerns about the potential for stock poisoning because C. grandiflora contains glycosides with toxic effects on cardiac systems (Mackey 1996). Previous analyses of the potential distribution of C. grandiflora under current climatic conditions indicate that it has not yet invaded all of the climatically suitable areas of Australia (Chippendale 1991; Kriticos 1996). The magnitude of the perceived threat posed by C. grandiflora has resulted in it being listed as one of Australia's Weeds of National Significance (Anonymous 1997)."
304	2006. Valentine, L.E.. Habitat avoidance of an introduced weed by native lizards. Austral Ecology. 31: 732–735.	"Abstract: Rubber vine (Cryptostegia grandiflora) is an environmental weed that frequently invades riparian habitats in northern Australia. I examined the habitat use of lizards in riparian and woodland environments comprised of native and rubber vine vegetation. Rubber vine was a major component of vegetation in the riparian habitat (approximately 40%), but only a minor component of woodland habitat (approximately 5%). Of 132 lizards, none were observed using rubber vine vegetation in riparian habitats, significantly less than expected, and only one lizard was observed in rubber vine vegetation in the woodland habitat. As rubber vine vegetation contains features that superficially resemble native habitat used by lizards, such as leaf litter, the avoidance of rubber vine by lizards suggests that rubber vine has underlying characteristics that create a suboptimal environment for lizards...One of Australia's most serious environmental weeds is rubber vine (Cryptostegia grandiflora), which is listed as a weed of national significance (Commonwealth of Australia 1999). Rubber vine was originally introduced from Madagascar in the 1870s and is now widespread throughout central and northern Queensland (Humphries et al. 1991; Tomley 1998). Rubber vine threatens several plant communities, but favours riparian habitats (Humphries et al. 1991), where it grows as a free-standing shrub or a towering vine, smothering native vegetation (Tomley 1998)."
305	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"Cryptostegia madagascariensis is closely related to rubber vine, and also occurs either in gardens or as a naturalised weed in Western Australia, the Northern Territory and Queensland. Its flowers are slightly smaller and a deeper pink colour but it is otherwise difficult to separate the two species. The risks posed by Cryptostegia madagascariensis are high, especially because it could cross-breed with rubber vine. Note that the common name 'rubber vine' may also be used for other unrelated nursery plants."
305	2005. Hadden, K./Frank, K./Byrd, C.. Identification Guide For Invasive Exotic Plants of the Florida Keys 2005-2006. http://www.floridainvasives.org/Keys/Resources.html	"Cryptostegia madagascariensis...Vigorous climbing shrub with milky sap...Treatment: Basal with 10% Garlon 4" [controlled in Florida Keys]
305	2006. Staples, G.W./Herbst, D.R./Imada, C.T.. New Hawaiian plant records for 2004. Bishop Museum Occasional Papers. 88: 6-9.	"Cryptostegia madagascariensis...Field surveys by Moloka'i Invasive Species Committee personnel discovered a naturalized population of this Madagascan native along the south shore of Moloka'i, near Kamalö. Widely cultivated throughout the Hawaiian Islands for over a century, this is the first documented report of the Madagascar rubber vine being naturalized here. The population is reported to cover three acres of disturbed secondary vegetation near sea level, with thousands of plants in all size classes from seedlings to mature specimens."

305	2008. Frohlich, D./Lau, A.. New plant records from O'ahu for 2007. Bishop Museum Occasional Papers. 100: 3-12.	"Cryptostegia madagascariensis...On O'ahu, it was observed sprouting out of cultivated naupaka hedges in a dry coastal setting and has persisted there through the current drought, outlasting the dead and dying naupaka. The species has also been observed escaping cultivation in Koko Crater, growing on barren exposed rocky soil. Material examined. O'AHU: Diamond Head Road, along beach parking area (UTM 623799, 2350920), woody vine with stems to 4 m long, exuding copious white sap, several plants sprouting up on both sides of road, mostly out of thick naupaka hedge, 36.5 m (120 ft), 27 Apr 2007, A. Lau & D. Frohlich 2007042702."
401	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"A woody climber >15 m tall or a many-stemmed shrub of 1-3 m height, with greyish brown and slender stems. Stems are either branched, leaf-bearing and up to 2 m long, or unbranched, leafless, 3-8 m long and climbing over supports. The dark green, simple leaves are opposite, glossy, elliptic, 6-10 cm long and 2-4 cm wide, entire and with short panicles." [no spines, thorns, or burrs]
402	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	No evidence
403	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	Not parasitic
404	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"The plant is, however, extremely unpalatable and rarely causes death in the field. Nevertheless, some losses occur, and are more likely where animals, especially in the year after a burn or in dry seasons when other greenfeed is scarce, forcing their way through the thickets to get to water, tend to eat some of the plant."
405	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"…the plant is highly toxic to cattle, goats, sheep, and especially horses; in feeding tests, less than 10 g of chaffed rubber vine leaves mixed with bran killed a 400 kg horse within 6 days…The toxic principe is a group of cardenolides which include cryptograndioside A abd B. These two glycosides have proved fatal to cats in laboratory tests, the monoside, crypograndioside A being more than twice as potent as the bioside, crypograndioside B, but they are not yet proven as the toxic agent in other animals."
406	1998. Evans, H.C.. The Safe Use of Fungi for Biological Control of Weeds. Phytoprotection. 79(40: 67-74.	"An even more problematic case concerned the rust Maravalia cryptostegiae (Cummins) Ono and its rubber-vine host, Cryptostegia grandiflora Roxb. ex R. Br. (Asclepiadaceae), from Madagascar; which is a major invasive weed in Queensland, Australia. After screening of over 70 tests species with no adverse results, a newly described species of the Australian Asclepiadaceae, Cryptolepis grayi Forster, was received for inclusion in the screens. Low levels of rust inoculum failed to induce symptoms on this species but, at saturation levels, several of the test plants developed symptoms of infection with the formation of fertile rust pustules (Evans & Tomley, 1994). Despite the fact that the sori developed much more slowly and were significantly smaller and fewer in number than on the rubber-vine weed, there was still cause for concern." [not a generalist rust]
406	2011. WRA Specialist. Personal Communication.	Unknown if C. grandiflora is host to other important pests or pathogens
407	2007. Nelson, L./Shih, R.D./Balick, M.J.. Handbook of poisonous and injurious plants. The New York Botanical Garden. Springer, New York, NY	"Toxic Part: All parts of this plant are poisonous…Clinical Findings: There are no adequately documented human poisonings, and clinical descriptions are derived primarily from animal reports. Substantial ingestion may lead to toxicity. Poisoning would be expected to produce clinical finding typical of carioactive steroid poisoning. Toxicity has a variable latent period that depends on the quantity ingested. Dysrhythmias are usually expressed as sinus brachycardia, premature ventricular contractions, atrioventricular conduction defects, or ventricular tachydysrhythmias. Hyperkalemia, if present, may be an indicator of toxicity."
407	2009. Almost Eden. Vines - India Rubber Vine. http://www.almostedenplants.com/	"Please be advised that humans and/or animals may have allergic reactions if part(s) of this plant are consumed or by coming into contact with sap from bruised or broken plant parts: Leaves - Highly toxic if ingested, Sap - Eye Irritation and/or Dermatitis"
408	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Regrowth of rubber vine can be controlled by burning or spraying. If the area is to be burnt, remove stock in the autumn of the year after spraying and burn in late winter or early spring. Much care is necessary during the burn, however, because even green rubber vine burns vigorously." [could act as a fuel ladder into treetops]

409	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Plants tolerate shade and grow in a wide range of temperatures;"
410	1998. Riffle, R.L.. The Tropical Look - An Encyclopedia of Dramatic Landscape Plants. Timber Press, Portland, OR	"Humusy, well-drained soil"
410	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"It grows on all soil types, but is more likely to germinate on soils that retain moisture."
410	2011. Dave's Garden. PlantFiles: Purple Allamanda, Rubber Vine. http://davesgarden.com/guides/pf/go/2071/	"Soil pH requirements: 5.6 to 6.0 (acidic) 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)"
411	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"An aggressive woody climbing shrub which is capable of growing over trees up to 15 m high or, in open areas, as an unsupported many-stemmed shrub 1 to 3 m high, reproducing by seed."
411	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Where invasive, it covers trees with a dense carpet, causing damage to them during floods due to debris accumulation>"
412	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"The climber forms dense impenetrable thickets and smothers all native vegetation up to 40 m height."
501	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	Terrestrial
502	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	Asclepiadaceae [or Apocynaceae]
503	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	Asclepiadaceae [or Apocynaceae] [not a Nitrogen fixing woody plant]
504	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Root - Reddish brown externally, consisting of a mass of downward spreading rather robust secondary roots to depths of 12 m and thin fibrous feeding roots." [not a geophyte]
504	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"The root system reaches a depth of up to 12 m."
601	2001. Klackenberg, J.. Revision of the genus Cryptostegia R. Br. (Apocynaceae, Periplocoideae). Adansonia. 23(2): 205-218.	No evidence of substantial reproductive failure in native habitat
602	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"reproducing by seed"
603	2001. Klackenberg, J.. Revision of the genus Cryptostegia R. Br. (Apocynaceae, Periplocoideae). Adansonia. 23(2): 205-218.	"Interspecific hybrids between Cryptostegia grandiflora and C. madagascariensis were studied on cultivated material by Polhamus et al. (1934). The hybrid plants exhibited an exceptional vegetative vigour. It furthermore showed several intermediate character states, e.g. in node and internode structure as well as in number and size of lenticels, in degree of bifidity of the corona lobe, the shape of the translator spathe, and follicle morphology. Polhamus et al. (1934) also showed that the hybrid had a more than doubled content of latex. These findings also point at the existence of two species." [ability to naturally hybridize unknown]
603	2004. The State of Queensland (Department of Natural Resources, Mines & Energy. Rubber vine management. http://www.weeds.org.au/docs/Rubber_Vine_Mgmnt.pdf	"Rubber vine can be confused with its close relative C. madagascariensis, and the native vines Marsdenia australis , M. viridiflora and Gymnanthera oblonga. Rubber vine is best distinguished from all these species by its flowers and pods. C. madagascariensis is distinguished from rubber vine (C. grandiflora) by its shorter pods, smaller number of seeds (up to 126 per pod), white-coloured leaf mid-ribs and stalks, and purplish flowers. In Madagascar these two species have been shown to hybridise."

604	2010. GISP Global Invasive Species Database. Cryptostegia madagascariensis. National Biological Information Infrastructure (NBII) & IUCN/SSC Invasive Species Specialist Group (ISSG), http://www.invasivespecies.net/database/species/ecology.asp?si=868&fr=1	"Cryptostegia madagascariensis...They are self-compatible, however self pollination does not occur." [unknown for C. grandiflora]
605	1996. Mackey, A.P. (ed.). Rubber vine (Cryptostegia grandiflora) in Queensland - Pest Status Review. Department of Natural Resources and Mines, Queensland, Australia	"Rubber vine is insect pollinated but flower structure restricts the suite of available pollinators and in Queensland pollination has not been observed, although viable seed is produced (Tomley 1995a)."
606	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	No evidence
607	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"In the West Indies and California, seedling plants tend to flower between 5 and 7 months after germination, but comparable Queensland data are not available."
607	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"Rubber vine seedlings do not flower until the diameter of the stem at its base is at least 15 mm. Under normal conditions in Queensland this occurs shortly after the first year of growth. Although rubber vine can flower at almost any time of the year, most flowering takes place in summer. Seed pod formation usually occurs from summer to late autumn. Seed pods are not generally formed until the stem diameter has reached 35 mm at its base. The pods dry out and are ripe after about 200 days, when they split open and release the seeds."
607	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seedling growth is slow at first but increases rapidly thereafter, and plants may reach 4-5 m height in the first year."
701	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Aided by the tuft of silky hairs attached to the seeds, wind dispersal is an important means of spread. In Queensland, however, while some seeds are dispersed in mud sticking to animals and machinery, flood waters are considered the principal mode of spread, particularly along streams and into adjacent floodplains."
702	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"It has been introduced to most tropical and subtropical regions by man, either as a potential source of rubber or as an ornamental."
703	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Aided by the tuft of silky hairs attached to the seeds, wind dispersal is an important means of spread. In Queensland, however, while some seeds are dispersed in mud sticking to animals and machinery, flood waters are considered the principal mode of spread, particularly along streams and into adjacent floodplains." [no evidence of produce contamination]
704	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Fruits are greenish pods of 10-12 cm length and 3-4 cm width, borne in pairs on common stalks. Each fruit contains 200-250 brown, flat and ovate seeds that have long fine hairs of 10-15 mm length."
705	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"About 95% of seed produced by rubber vine is viable. It is scattered short distances from the parent plant by wind that catches the tufts on the seed ends, or longer distances by floating on floodwaters. Most seed remains viable even after the pods have floated on fresh or salt water for over a month, potentially leading to spread between catchments."
705	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Seeds are effectively dispersed by wind and water, and can withstand periods of drought up to 8 months."
706	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Aided by the tuft of silky hairs attached to the seeds, wind dispersal is an important means of spread. In Queensland, however, while some seeds are dispersed in mud sticking to animals and machinery, flood waters are considered the principal mode of spread, particularly along streams and into adjacent floodplains." [not fleshy fruited, and not adapted for bird dispersal]
706	2004. The State of Queensland (Department of Natural Resources, Mines & Energy. Rubber vine management. http://www.weeds.org.au/docs/Rubber_Vine_Mgmnt.pdf	"Each seed has a tuft of long white silky hairs that enable easy dispersal by wind and water. Animals, birds in particular, also spread the seed."

707	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Aided by the tuft of silky hairs attached to the seeds, wind dispersal is an important means of spread. In Queensland, however, while some seeds are dispersed in mud sticking to animals and machinery, flood waters are considered the principal mode of spread, particularly along streams and into adjacent floodplains."
707	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals."
708	2011. WRA Specialist. Personal Communication.	No evidence, but consumption and internal passage by animals is unlikely
801	1996. Grice, A.C.. Seed production, dispersal and germination in Cryptostegia grandiflora and Ziziphus mauritiana, two invasive shrubs in tropical woodlands of northern Australia. Australian Journal of Ecology. 21(3): 324–331.	"Large C. grandiflora can produce more than 8000 wind-dispersed seeds in a single reproductive episode and can set seed at least twice per year. More than 90% of seeds will germinate within 10 days of moisture becoming available. Few, if any, seeds survive for more than 12 months in the soil. "
801	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"With each seed pod producing between 340 and 840 seeds, a hectare of rubber vine can produce millions of seeds every year."
802	1996. Grice, A.C.. Seed production, dispersal and germination in Cryptostegia grandiflora and Ziziphus mauritiana, two invasive shrubs in tropical woodlands of northern Australia. Australian Journal of Ecology. 21(3): 324–331.	"Large C. grandiflora can produce more than 8000 wind-dispersed seeds in a single reproductive episode and can set seed at least twice per year. More than 90% of seeds will germinate within 10 days of moisture becoming available. Few, if any, seeds survive for more than 12 months in the soil. "
802	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Freshly ripened seeds have a high viability and can withstand at least 6 to 8 months drought without any loss of viability."
802	2003. CRC for Australian Weed Management. Weed Management Guide - Rubber vine (Cryptostegia grandiflora). http://www.weeds.org.au/docs/rubber_vine_mgt_guide.pdf	"However, the seed is not long lived. If conditions are too dry to allow germination, most of the seed will die after one year."
803	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Scattered plants may be treated by basal-bark application of picloram, triclopyr, or 2,4-D esters. Foliar treatments with 2,4-D, dicamba or imazapyr are also effective."
804	1997. Grice, A.C.. Post-fire regrowth and survival of the invasive tropical shrubs Cryptostegia grandiflora and Ziziphus mauritiana. Australian Journal of Ecology. 22: 49-55.	"Abstract Exotic shrubs are significant invaders of the tropical woodlands of northern Australia. They cause problems for pastoral industries and are likely to induce significant change in woodland communities. A single fire in the middle of the dry season affected the survival and vegetative growth of two important shrub species, Cryptostegia grandiflora and Ziziphus mauritiana. The fire killed about 96% of small plants (height < 100 cm), 80% of medium-sized plants and 45% of large plants (height > 200 cm) of C. grandiflora. However, only about 10% of small Z. mauritiana were killed. Most plants of Z. matiritiana resprouted vigorously within three months of the fire. Effects on the vegetative phenology of C grandiflora persisted until 10 months after the fire, but by four months after the fire, burnt and unburnt Z. mauritiana were similar as regards the distribution of individuals between phenological categories. Changed fire regimes may partially explain the colonization of northern and northeastern Queensland by C. grandiflora but probably had little effect on Z. mauritiana. Fire has significant potential as a tool in the management of C. grandiflora wherever adequate grass fuel can be attained. The use of fire will be particularly valuable for preventing range expansion, for situations where the species is in the early stages of invasion and in parts of the landscape where densities are relatively low."
804	2003. Weber, E.. Invasive Plant Species of the World. A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Fire is used for the control of dense infestations. If vines are cut, regrowth and emerging seedlings must be controlled by follow-up programs." [tolerates cutting, but not fire]
805	2001. Parsons, W.T./Cuthbertson, E.G.. Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia	"Several potential biological control agents from Madagascar brought into quarantine for study have been rejected as unsuitable for release in Australia. A leaf-feeding pyralid moth, Euclasta whalleyi, however, proved host-specific and was released in 1988. There was no evidence of its establishment in the field during 1989 and 199 but releases have been continued. In addition, a very damaging rust fungus, Maravalia cryptostegiae, is undergoing host-specificity tests in the United Kingdom." [but no agents released in Hawaiian Islands]