

Assessment date 14 July 2017

<b><i>Cryptostegia grandiflora</i> All Zones</b>		<b>Answer</b>	<b>Score</b>
1.01	Is the species highly domesticated?	n	0
1.02	Has the species become naturalised where grown?		
1.03	Does the species have weedy races?		
2.01	Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high) North Zone: suited to Zones 8, 9 Central Zone: suited to Zones 9, 10 South Zone: suited to Zone 10	2	
2.02	Quality of climate match data (0-low; 1-intermediate; 2-high)	2	
2.03	Broad climate suitability (environmental versatility)	y	1
2.04	Native or naturalized in habitats with periodic inundation North Zone: mean annual precipitation 50-70 inches Central Zone: mean annual precipitation 40-60 inches South Zone: mean annual precipitation 40-60 inches	y	1
2.05	Does the species have a history of repeated introductions outside its natural range?	y	
3.01	Naturalized beyond native range	y	2
3.02	Garden/amenity/disturbance weed	y	2
3.03	Weed of agriculture	y	4
3.04	Environmental weed	y	4
3.05	Congeneric weed	y	2
4.01	Produces spines, thorns or burrs	n	0
4.02	Allelopathic	unk	0
4.03	Parasitic	n	0
4.04	Unpalatable to grazing animals	y	1
4.05	Toxic to animals	y	1
4.06	Host for recognised pests and pathogens	y	1
4.07	Causes allergies or is otherwise toxic to humans	y	1
4.08	Creates a fire hazard in natural ecosystems	unk	0
4.09	Is a shade tolerant plant at some stage of its life cycle	n	0
4.10	Grows on infertile soils (oligotrophic, limerock, or excessively draining soils). North & Central Zones: infertile soils; South Zone: shallow limerock or Histisols.	unk	0
4.11	Climbing or smothering growth habit	y	1
4.12	Forms dense thickets	y	1
5.01	Aquatic	n	0
5.02	Grass	n	0
5.03	Nitrogen fixing woody plant	n	0
5.04	Geophyte	n	0

6.01	Evidence of substantial reproductive failure in native habitat	n	0
6.02	Produces viable seed	y	1
6.03	Hybridizes naturally	unk	-1
6.04	Self-compatible or apomictic	y	1
6.05	Requires specialist pollinators	n	0
6.06	Reproduction by vegetative propagation	n	-1
6.07	Minimum generative time (years)	1	1
7.01	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y	1
7.02	Propagules dispersed intentionally by people	y	1
7.03	Propagules likely to disperse as a produce contaminant	n	-1
7.04	Propagules adapted to wind dispersal	y	1
7.05	Propagules water dispersed	y	1
7.06	Propagules bird dispersed	y	1
7.07	Propagules dispersed by other animals (externally)	y	1
7.08	Propagules dispersed by other animals (internally)	unk	-1
8.01	Prolific seed production	y	1
8.02	Evidence that a persistent propagule bank is formed (>1 yr)	n	-1
8.03	Well controlled by herbicides	?	
8.04	Tolerates, or benefits from, mutilation or cultivation	y	1
8.05		?	
<b>Total Score</b>			<b>28</b>
<b>Implemented Pacific Second Screening</b>			<b>NO</b>
<b>Risk Assessment Results</b>			<b>High</b>

section	# questions answered	satisfy minimum?
A		11 yes
B		9 yes
C		20 yes
total		40 yes

	Reference	Source data
1.01		Insufficient evidence of selection for reduced weediness
1.02		Skip to 2.01
1.03		Skip to 2.01
2.01	<p>1. Global Plant Hardiness Zones for Phytosanitary Risk Analysis. <a href="http://naldc.nal.usda.gov/download/36586/PDF">http://naldc.nal.usda.gov/download/36586/PDF</a> (Accessed: 9 February 2017) 2. US National Plant Germplasm System. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531">https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531</a> (Accessed: 9 February 2017) 3. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017)</p>	<p>1. Figure 3. Florida North Zone: Hardiness zones 8 and 9. Central Zone: Hardiness zones 9 and 10. South Zone: Hardiness zone 10. Native to USDA climate zones 6 through 12. 2. Native to Madagascar and naturalized in Reunion, India, Australia, Florida, Mexico, New Caledonia, Brazil, Bahamas, Cayman Islands, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Virgin Islands, Honduras, and Peru 3. "Native to south-western Madagascar"; "widely naturalised in the north-eastern parts of Australia. It is particularly widespread and abundant in the northern parts of Queensland"; "Naturalised overseas in Mauritius, New Caledonia, south-eastern USA (i.e. Florida), Mexico, Central America, Ecuador and the Caribbean"</p>
2.02		Native and naturalized range well known
2.03	<p>1. The University of Melbourne. Köppen-Geiger Climate Map of the World. <a href="http://people.eng.unimelb.edu.au/mpeel/koppen.html">http://people.eng.unimelb.edu.au/mpeel/koppen.html</a> (Accessed: 9 February 2017) 2. US National Plant Germplasm System. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531">https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531</a> (Accessed: 9 February 2017) 3. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017)</p>	<p>1. Native or naturalized to Köppen-Geiger Climate Zones: Af, Am, Aw, BWh, BWk, BSh, Cwa, Cwb, Cfa, and Cfb 2. Native to Madagascar and naturalized in Reunion, India, Australia, Florida, Mexico, New Caledonia, Brazil, Bahamas, Cayman Islands, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Virgin Islands, Honduras, and Peru 3. "Native to south-western Madagascar"; "widely naturalised in the north-eastern parts of Australia. It is particularly widespread and abundant in the northern parts of Queensland"; "Naturalised overseas in Mauritius, New Caledonia, south-eastern USA (i.e. Florida), Mexico, Central America, Ecuador and the Caribbean"</p>
2.04	<p>1. Climate Charts. World Climate Maps. <a href="http://www.climate-charts.com/World-Climate-Maps.html#rain">http://www.climate-charts.com/World-Climate-Maps.html#rain</a> (Accessed: 9 February 2017) 2. US National Plant Germplasm System. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531">https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531</a> (Accessed: 9 February 2017) 3. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017) 4. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. Native and naturalized in areas with rainfall within these ranges. 2. Native to Madagascar and naturalized in Reunion, India, Australia, Florida, Mexico, New Caledonia, Brazil, Bahamas, Cayman Islands, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Virgin Islands, Honduras, and Peru 3. "Native to south-western Madagascar"; "widely naturalised in the north-eastern parts of Australia. It is particularly widespread and abundant in the northern parts of Queensland"; "Naturalised overseas in Mauritius, New Caledonia, south-eastern USA (i.e. Florida), Mexico, Central America, Ecuador and the Caribbean" 4. Now occurs all along Queensland coast mainly in the 500-1000mm annual rainfall zone extending to the Gulf country where rainfall is as low as 40mm. maximum growth is achieved with a water supply equivalent to an annual rainfall of 1500-2000mm.</p>
2.05	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. USDA Plants Database. <a href="https://plants.usda.gov/core/profile?symbol=CRGR6">https://plants.usda.gov/core/profile?symbol=CRGR6</a> (Accessed: 9 February 2017)</p>	<p>1. Introduced to India, Philippines, Singapore, Taiwan, Egypt, Ethiopia, Mauritius, Morocco, Namibia, Seychelles, Bermuda, Mexico, USA, Aruba, Bahamas, Belize, Cuba, Curacao, Dominican Republic, Grenada, Haiti, Honduras, Jamaica, Panama, Virgin Islands, Argentina, Brazil, Colombia, Ecuador, Peru, Venezuela, Australia, Fiji, French Polynesia, Guam, Marshall Islands, New Caledonia, Northern Mariana Islands, and Solomon Islands 2. Introduced to Florida and Texas</p>

3.01	<p>1. US National Plant Germplasm System. <a href="https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531">https://npgsweb.ars-grin.gov/gringlobal/taxonomydetail.aspx?12531</a> (Accessed: 9 February 2017) 2. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 3. Patterson, Thomas F. Nesom, Guy L. <i>Cryptostegia grandiflora</i>, A New Non-Native Weed for Texas. The Journal of the Botanical Research Institute of Texas. Vol. 3, No. 1. <a href="https://www.jstor.org/stable/41972201?seq=1#page_scan_tab_contents">https://www.jstor.org/stable/41972201?seq=1#page_scan_tab_contents</a> (Accessed: 6 March 2017) 4. Parsons/Cuthbertson (2001) <i>Noxious Weeds of Australia</i>. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. Naturalized in Reunion, India, Australia, Florida, Mexico, New Caledonia, Brazil, Bahamas, Cayman Islands, Cuba, Dominican Republic, Haiti, Jamaica, Puerto Rico, Virgin Islands, Honduras, and Peru 2. "Rubber vine (<i>Cryptostegia grandiflora</i>) is widely naturalised in the north-eastern parts of Australia." ; "Naturalised overseas in Mauritius, New Caledonia, south-eastern USA (i.e. Florida), Mexico, Central America, Ecuador and the Caribbean." 3. "<i>Cryptostegia grandiflora</i> is naturalized in Starr County, Texas, where it has been observed at two localities along the Rio Grande" 4. Introduced to Queensland in the 1860s where it became naturalized (also naturalized in major colonies from Charter Towers and Chillagoe districts in the early 1900s). Now occurs all along Queensland coast mainly in the 500-1000mm annual rainfall zone extending to the Gulf country where rainfall is as low as 40mm.</p>
3.02	<p>1. Marohasy J, Forster PI, 1991. A taxonomic revision of <i>Cryptostegia</i> R. Br. (<i>Asclepiadaceae</i>: <i>Periplocoideae</i>). <i>Australian Systematic Botany</i>, 4:571-577. (Accessed: 9 February 2017) 2. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 3. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/species/cryptostegia_grandiflora/">http://www.hear.org/gcw/species/cryptostegia_grandiflora/</a> (Accessed: 8 March 2017)</p>	<p>1. sprawling shrub along gullies, creeks, as well as disturbed areas such as roadside ditches 2. "A weed of semi-arid, tropical and sub-tropical environments. It infests creekbanks and other waterways (i.e. riparian zones), open woodlands, grasslands, closed forests, forest margins, pastures, roadsides, disturbed sites and waste areas. It prefers sites with ample moisture and low shrubs or trees to support its climbing stems." 3. <i>Cryptostegia grandiflora</i> is classified as a garden thug</p>
3.03	<p>1. Tomley AJ, 1995. The biology of Australian weeds. 26. <i>Cryptostegia grandiflora</i> R. Br. <i>Plant Protection Quarterly</i>, 10(4):122-130; 50 ref. (Accessed: 9 February 2017) 2. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 3. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017) 4. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/species/cryptostegia_grandiflora/">http://www.hear.org/gcw/species/cryptostegia_grandiflora/</a> (Accessed: 8 March 2017)</p>	<p>1. <i>C. grandiflora</i> is not a weed of agricultural crops but can smother and out-compete both wild and pasture grasses being a serious weed of pastures. It also invades and disrupts indigenous forest systems 2. "Its main impact on pastoralism is the loss of grazing country, which in 1995 was estimated to cost the Queensland beef industry \$18 million." 3. "This species has a very significant negative impact on the pastoral industry in northern Queensland. It is toxic to livestock and dense infestations replace productive species, rendering grazing country less productive or even unuseable. Infestations can also restrict access and increase the costs of mustering and fencing. In 1995, rubber vine (<i>Cryptostegia grandiflora</i>) was estimated to cost the Queensland beef industry \$18 million per annum." 4. <i>Cryptostegia grandiflora</i> is classified as an agricultural weed</p>

3.04	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 3. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/species/cryptostegia_grandiflora/">http://www.hear.org/gcw/species/cryptostegia_grandiflora/</a> (Accessed: 8 March 2017)</p>	<p>1. "C. grandiflora is a highly invasive weed in semi-arid natural ecosystems, especially dry or monsoonal rainforest. It has the potential to spread much further, especially in Australia where it poses a threat to national parks. The historical evidence suggests that there is a significant lag period before the plant assumes an invasive status." 2. "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." 3. <i>Cryptostegia grandiflora</i> is classified as an environmental weed</p>
3.05	<p>1. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Global Compendium of Weeds. <a href="http://www.hear.org/gcw/species/cryptostegia_madagascariensis/">http://www.hear.org/gcw/species/cryptostegia_madagascariensis/</a> (Accessed: 8 March 2017)</p>	<p>1. "<i>Cryptostegia madagascariensis</i> 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 <i>Cryptostegia madagascariensis</i> are high, especially because it could cross-breed with rubber vine." 2. <i>Cryptostegia madagascariensis</i> is classified as an agricultural weed, cultivation escape, environmental weed, and noxious weed</p>
4.01	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017)</p>	<p>No evidence of these features</p>
4.02		<p>No evidence</p>
4.03		<p>No evidence</p>
4.04	<p>1. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017) 2. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 3. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "This species has a very significant negative impact on the pastoral industry in northern Queensland. It is toxic to livestock and dense infestations replace productive species, rendering grazing country less productive or even unuseable." 2. "It is highly toxic to stock, though unpalatable." 3. Very toxic to grazing animals, but also HIGHLY unpalatable rarely causing death in the field.</p>
4.05	<p>1. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017) 2. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 3. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "This species has a very significant negative impact on the pastoral industry in northern Queensland. It is toxic to livestock and dense infestations replace productive species, rendering grazing country less productive or even unuseable." 2. "It is highly toxic to stock, though unpalatable." 3. Highly toxic to cattle, goats, sheep, and horses</p>
4.06	<p>1. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Volger and Lindsay. Thirteenth Australian Weeds Conference. <a href="http://caws.org.au/awc/2002/awc200211801.pdf">http://caws.org.au/awc/2002/awc200211801.pdf</a> (Accessed: 8 March 2017)</p>	<p>1. "The rubber vine rust <i>Maravalia cryptostegiae</i> forms on the underside of leaves and causes them to turn yellow and drop. The rust thrives during the wet season but is less active over the dry season. Frequent showers early in the season should result in heavy infestations of rust." 2. Rust (<i>Maravalia cryptostegiae</i>) decreased the number of plants by more than 40% and eliminated seedlings almost entirely.</p>

4.07	<p>1. Dave's Garden. <a href="http://davesgarden.com/guides/pf/go/2071/#b">http://davesgarden.com/guides/pf/go/2071/#b</a> (Accessed: 8 March 2017) 2. Hawaii Invasive Species Council. <a href="http://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/rubbervine/">http://dlnr.hawaii.gov/hisc/info/invasive-species-profiles/rubbervine/</a> (Accessed: 8 March 2017) 3. Maui Invasive Species Committee. <a href="http://mauiinvasive.org/2011/12/08/poisonous-rubber-vine-needs-to-be-controlled/">http://mauiinvasive.org/2011/12/08/poisonous-rubber-vine-needs-to-be-controlled/</a> (Accessed: 8 March 2017)</p>	<p>1. "Danger: All parts of plant are poisonous if ingested" 2. "Extremely poisonous: it contains cardiac glycosides, which interfere with heart operation in humans and animals when the plant is eaten." 3. "This invasive plant is extremely poisonous; it contains cardiac glycosides, chemicals that interfere with heart function in humans and animals when the plant is ingested. Contact with the plant's milky sap can cause burning rashes and blisters. When the vine is dry, a powdery dust emerges that can cause violent coughing, swelling of the nose, and painful blistering of the eyelids."</p>
4.08		No evidence
4.09	<p>1. Dave's Garden. <a href="http://davesgarden.com/guides/pf/go/2071/#b">http://davesgarden.com/guides/pf/go/2071/#b</a> (Accessed: 8 March 2017) 2. Top Tropicals. <a href="https://toptropicals.com/catalog/uid/cryptostegia_grandiflora.htm">https://toptropicals.com/catalog/uid/cryptostegia_grandiflora.htm</a> (Accessed: 8 March 2017)</p>	<p>1. "Sun Exposure: Sun to Partial Shade" 2. Full sun or semi shade</p>
4.10	<p>1. Tomley AJ, 1995. The biology of Australian weeds. 26. <i>Cryptostegia grandiflora</i> R. Br. Plant Protection Quarterly, 10(4):122-130; 50 ref. (Accessed: 8 March 2017)</p>	<p>1. <i>C. grandiflora</i> is tolerant of a wide variety of soil types and grows on soils ranging from beach sand to heavy clay soils</p>
4.11	<p>1. Giving nature a helping hand. Plantages Porto Mari, No. 2002/5. (Accessed: 9 February 2017) 2. Marohasy J, Forster PI, 1991. A taxonomic revision of <i>Cryptostegia</i> R. Br. (Asclepiadaceae: Periplocoideae). Australian Systematic Botany, 4:571-577. (Accessed: 9 February 2017) 3. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 4. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 6 March 2017) 5. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. In Curaçao, it has invaded the dry, hilly national park, smothering indigenous cacti 2. climber in the upper storey of gallery forests 3. "young plants rapidly grow over and smother other plants, often completely dominating the vegetation" 4. "Without support it grows into a multi-branched shrub 1-3 m tall, but as a climber it can reach a height of up to 30 m when growing over tall vegetation." 5. Description: " An aggressive woody climbing shrub which is capable of growing over trees up to 15m or high or, in open areas, as an unsupported many-stemmed shrub"</p>
4.12	<p>1. Marohasy, J./Forster, P. I. 1991. A taxonomic revision of <i>Cryptostegia</i> R. Br. (Asclepiadaceae: Periplocoideae). Aust. Syst. Bot. 4. (Accessed: 6 March 2017) 2. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 3. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "In the open, forms impenetrable thickets" 2. "Rubbervine favours watercourses where it forms impenetrable thickets, preventing animals from reaching the water to drink. It can also completely smother native plant communities, and causes soil erosion." 3. rubber vine has ability to climb over and smother tall trees and to extend into run-down pastures where it can form dense thickets. In the case where thickets are formed along streambanks, the thicket is described as " impenetrable to man and beast". restricting access to water.</p>
5.01	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017)</p>	<p>1. Terrestrial</p>
5.02	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. USDA Plants Database. <a href="https://plants.usda.gov/core/profile?symbol=CRGR6">https://plants.usda.gov/core/profile?symbol=CRGR6</a> (Accessed: 9 February 2017)</p>	<p>1. "Shrub, Vine / climber" 2. "Growth habit: vine"</p>
5.03	<p>1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017)</p>	<p>No evidence of nitrogen fixation 1. Woody</p>

5.04	1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017)	No evidence of these specialized structures
6.01		No evidence
6.02	1. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 2. ISSG Global Invasive Species Database. <a href="http://www.iucngisd.org/gisd/species.php?sc=347">http://www.iucngisd.org/gisd/species.php?sc=347</a> (Accessed: 2 March 2017)	1. "This plant reproduces mainly by seed" 2. Reproduces by seed
6.03		No evidence of natural hybridization (there are cases where <i>Cryptostegia grandiflora</i> and <i>C. madagascariensis</i> have hybridized, but not "naturally")
6.04	1. Dave's Garden. <a href="http://davesgarden.com/guides/pf/go/2071/#b">http://davesgarden.com/guides/pf/go/2071/#b</a> (Accessed: 8 March 2017)	1. "Self-sows freely; deadhead if you do not want volunteer seedlings next season"
6.05	1. Tomley AJ, 1995. The biology of Australian weeds. 26. <i>Cryptostegia grandiflora</i> R. Br. Plant Protection Quarterly, 10(4):122-130; 50 ref. (Accessed: 8 March 2017)	1. Flowers are insect-pollinated, possessing corolla glands for this purpose. However, no specific pollinators have been identified in Australia, although scarab beetles and thrips have been collected inside flower tubes in Madagascar.
6.06		No evidence
6.07	1. Tomley AJ, 1995. The biology of Australian weeds. 26. <i>Cryptostegia grandiflora</i> R. Br. Plant Protection Quarterly, 10(4):122-130; 50 ref. (Accessed: 8 March 2017) 2. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.	1. The seeds of <i>C. grandiflora</i> germinate with the first rains of the wet season in Australia. Growth rate is initially slow, but plants can reach 4-5 m in the first year, and appears to be marked by a well-defined periodicity. 2. " In the West Indies and California, seedling plants tend to flower between 5 and 7 months after germination."
7.01	1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017) 2. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 3. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 4. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.	1. "Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals." 2. "Seeds may also be spread in mud attached to animals and vehicles." 3 & 4. spreading its seed by wind, floodwaters, and in mud sticking to animals and machinery.
7.02	1. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 3. Georgia Vines. <a href="http://www.georgiavines.com/cart/index.php?main_page=product_info&amp;products_id=789">http://www.georgiavines.com/cart/index.php?main_page=product_info&amp;products_id=789</a> (Accessed: 8 March 2017)	1. "During the Second World War rubber vine was cultivated as a potential source of rubber, contributing to its spread." 2. "introduced as an ornamental garden plant in the 1860s, because of its glossy, dark-green leaves, pretty flowers and attractive venation" 3. Seeds can be purchased online in the US
7.03	1. CABI Invasive Species Compendium. <a href="http://www.cabi.org/isc/datasheet/16378">http://www.cabi.org/isc/datasheet/16378</a> (Accessed: 9 February 2017)	1. "Further inter-continental spread is unlikely as a trade contaminant."

7.04	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Queensland Government.  <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 3. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 4. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "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." 2. "dispersed by wind and floodwaters" - see photos 3. "spreading its seed by wind, floodwaters, and in mud sticking to animals and machinery" 4. Aided by tuft of silky hairs attached to seed, wind dispersal is an important means of spread.</p>
7.05	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Queensland Government.  <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 2 March 2017) 3. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017) 4. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "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." 2. "dispersed by wind and floodwaters" - see photos 3. "spreading its seed by wind, floodwaters, and in mud sticking to animals and machinery" 4. Flood waters are the principal means of spread, particularly along streams and into adjacent floodplains.</p>
7.06	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Invasive Species South Africa.  <a href="https://www.invasives.org.za/news-previews/item/1241-rubber-vine-cryptostegia-grandiflora">https://www.invasives.org.za/news-previews/item/1241-rubber-vine-cryptostegia-grandiflora</a> (Accessed: 8 March 2017)</p>	<p>1. "Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals." 2. "Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals."</p>
7.07	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Invasive Species South Africa.  <a href="https://www.invasives.org.za/news-previews/item/1241-rubber-vine-cryptostegia-grandiflora">https://www.invasives.org.za/news-previews/item/1241-rubber-vine-cryptostegia-grandiflora</a> (Accessed: 8 March 2017) 3. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals." 2. "Seeds can also be potentially spread by birds, or in mud attached to vehicles, machinery and animals." 3. some seeds are dispersed in mud sticking to animals.</p>
7.08		No evidence
8.01	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Curtis JT, 1946. Some factors affecting fruit production by <i>Cryptostegia</i>. <i>American Journal of Botany</i>, 33:763-769. (Accessed: 8 March 2017) 3. Grice A C 1996 Seed production, dispersal and germination in <i>Cryptostegia grandiflora</i> and <i>Ziziphus mauritiana</i>, two invasive shrubs in tropical woodlands of northern Australia <i>Australian Journal of Ecology</i> 21 324–31 (Accessed: 8 March 2017) 4. Parsons/Cuthbertson (2001) Noxious Weeds of Australia. Second Edition. CSIRO Publishing, Collingwood, Australia pp.176-179.</p>	<p>1. "With each seed pod producing between 340 and 840 seeds, a hectare of rubber vine can produce millions of seeds every year." 2. Estimates of pod production by cultivated plants in the Neotropics have been put at 15 pods per plant, with up to 700 seeds per pod, or 10,500 seeds per plant 3. it is prolific, producing large seed pods with up to 8000 seeds per mature plant per reproductive event 4. pods contain 200-250 seeds</p>



8.02	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Curtis JT, 1946. Some factors affecting fruit production by <i>Cryptostegia</i>. <i>American Journal of Botany</i>, 33:763-769. (Accessed: 8 March 2017) 3. Grice A C 1996 Seed production, dispersal and germination in <i>Cryptostegia grandiflora</i> and <i>Ziziphus mauritiana</i>, two invasive shrubs in tropical woodlands of northern Australia <i>Australian Journal of Ecology</i> 21 324–31 (Accessed: 8 March 2017)</p>	<p>1. "However, the seed is not long lived. If conditions are too dry to allow germination, most of the seed will die after one year." 2. Seed survival in nature is thought to be less than 1 year; buried seed will remain viable for 6-8 months in dry soil. However, dry-stored seed at 5°C can survive for many years. 3. "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."</p>
8.03	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Biosecurity Queensland.  <a href="https://www.daf.qld.gov.au/__data/assets/pdf_file/0020/52544/IPA-Rubber-Vine-PP11.pdf">https://www.daf.qld.gov.au/__data/assets/pdf_file/0020/52544/IPA-Rubber-Vine-PP11.pdf</a> (Accessed: 8 March 2017) 3. Land Manager. <a href="http://www.landmanager.org.au/rubbervine">http://www.landmanager.org.au/rubbervine</a> (Accessed: 8 March 2017)</p>	<p>1. "The strategic use of a range of registered herbicides is an effective method of controlling isolated or outlying rubber vine plants. Foliar spraying the entire plant from the ground and aerial spraying are most effective on smaller plants (less than 2 m tall, stem diameter less than 35 mm). However, note that leaves infected by the biocontrol rust will not take up herbicides. The basal bark technique, which uses spraying around the lowest bark up to a height of 500 mm (knee height), is effective on plants of stem diameter less than 35 mm at the base. For thicker rubber vine, up to 90 mm stem diameter at base, basal bark spray to 1 m high. Foliar, aerial and basal bark spraying should only be conducted when rubber vine is actively growing. When the stem diameter at the base exceeds 90 mm, or if the stems are heavily intertwined, the cut-stump method is preferred. The stems should be cut as close to the ground as possible using a machete or chainsaw, and immediately painted with herbicide. The cut-stump method uses minimal herbicides and is effective at all times but is labour intensive and therefore best suited to scattered infestations." 2. Multiple control methods are recommended even for scattered infestations 3. "Rubbervine control is a continuous, long-term process involving a combination of mechanical, chemical and biological means. Control programs also need to be an integral part of the land management of infested areas."</p>
8.04	<p>1. Australian Government Department of Environment and Energy.  <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Biosecurity Queensland.  <a href="https://www.daf.qld.gov.au/__data/assets/pdf_file/0020/52544/IPA-Rubber-Vine-PP11.pdf">https://www.daf.qld.gov.au/__data/assets/pdf_file/0020/52544/IPA-Rubber-Vine-PP11.pdf</a> (Accessed: 8 March 2017)</p>	<p>1. "Fire is an especially valuable part of the integrated control of rubber vine because it kills surface seeds, seedlings and adult plants, yet is relatively inexpensive. If there is sufficient fuel, rubber vine can be burnt whilst green with good success. Infestations may require an initial burn to open them out, a follow-up burn to control regrowth and seedlings in the next 12 months, and another burn several years later to continue the follow-up. In a fire research experiment west of Chillagoe in Queensland, 80% of rubber vine was killed in an initial fire (October 1997). A follow-up burn one year later resulted in a 99% kill rate."; "Blade or disc ploughs and cutter bars provide reasonable control of rubber vine, but are most often used to penetrate very dense infestations to allow easier access or to open up the canopy. Slashing harms the plant but often does not kill it." 2. "Scattered or medium-density infestations: Where possible, repeated slashing close to ground level is recommended. Dense infestations: During winter, stick-raking or blade-ploughing reduces the bulk of the infestation. Pasture should be sown and windrows burned to kill residual seed. Follow-up treatment is essential."</p>

8.05	<p>1. Australian Government Department of Environment and Energy. <a href="https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf">https://www.environment.gov.au/biodiversity/invasive/weeds/publications/guidelines/wons/pubs/c-grandiflora.pdf</a> (Accessed: 2 March 2017) 2. Volger and Lindsay. Thirteenth Australian Weeds Conference. <a href="http://caws.org.au/awc/2002/awc200211801.pdf">http://caws.org.au/awc/2002/awc200211801.pdf</a> (Accessed: 8 March 2017) 3. Queensland Government. <a href="https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm">https://keyserver.lucidcentral.org/weeds/data/media/Html/cryptostegia_grandiflora.htm</a> (Accessed: 8 March 2017) 4. Business Queensland. <a href="https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/weeds-diseases/invasive-plants/restricted/rubber-vine">https://www.business.qld.gov.au/industries/farms-fishing-forestry/agriculture/land-management/health-pests-weeds-diseases/weeds-diseases/invasive-plants/restricted/rubber-vine</a> (Accessed: 8 March 2017)</p>	<p>1. "Two biological control agents have become widespread in Queensland since their release in the early 1990s. The rubber vine rust <i>Maravalia cryptostegiae</i> forms on the underside of leaves and causes them to turn yellow and drop. The rust thrives during the wet season but is less active over the dry season. Frequent showers early in the season should result in heavy infestations of rust. The other agent is the moth <i>Euclasta whalleyi</i>, whose caterpillars feed on rubber vine leaves between March and October. The moth has a black spot on each wing and characteristically rests with its wings folded at 45° to a vertical surface. The caterpillars tend to feed on the underside of new leaves, often leaving fine silken threads and black bead-like droppings. Both agents, especially the rust, cause damage (eg reduced flowering, seed pod production and leaf cover) and occasionally the death of established plants. However, their effectiveness varies with climatic conditions." 2. Rust (<i>Maravalia cryptostegiae</i>) decreased the number of plants by more than 40% and eliminated seedlings almost entirely. 3. <i>Maravalia cryptostegiae</i> "an effective biological control agent" 4. "Moth <i>Euclasta whalleyi</i>, whose larvae are leaf feeders, is also established. Observation indicates moth prefers plants stressed by either limited soil moisture or high levels of rust infection."</p>
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