

Cryptostegia spp.

Rubber vine
Asclepiadaceae

Forest Starr, Kim Starr, and Lloyd Loope
United States Geological Survey--Biological Resources Division
Haleakala Field Station, Maui, Hawai'i

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OVERVIEW

Cryptostegia species, *C. grandiflora* and *C. madagascariensis*, are widely cultivated and have become pests in places where they are introduced, including Australia, where *C. grandiflora* has been called one of their worst weeds, and in Florida, where *C. madagascariensis* is considered a category II weed by the Florida Exotic Pest Plant Council. On Maui, the distribution of *Cryptostegia* spp. is still small and the species are only sparingly naturalized in two locations. *Cryptostegia* is also sparingly naturalized in Kawaihae, Hawai'i, and likely cultivated at least on O'ahu and possibly other Hawaiian Islands. Because of its weedy history and limited distribution on Maui, *Cryptostegia* spp. has been targeted by the Maui Invasive Species Committee (MISC) for eradication. Hopefully, this invader will be stopped before it is rampant and widespread. Controlling this aggressive vine now could potentially save large amounts of resources, time, and money in the future.

TAXONOMY

Family: Asclepiadaceae (milkweed family) (Neal 1965).

Latin name: *Cryptostegia grandiflora* R. Br. and *Cryptostegia madagascariensis* Bojer. (Bailey and Bailey 1976).

Synonyms: *Nerium grandiflorum* Roxb. ex R. Br. (PLANTS 2001).

Common names: Rubber vine, India rubber vine, Palay rubber vine (Neal 1965, Bailey and Bailey 1976, PLANTS 2001).

Taxonomic notes: *Cryptostegia* is within the milkweed family, Asclepiadaceae, which includes about 220 genera and 2,000 species of perennial herbs, shrubs, and vines, with milky juice (Neal 1965). The genus, *Cryptostegia*, is made up of probably three species of woody lianas with milky sap, native to tropical Africa and Madagascar (Bailey and Bailey 1976).

Nomenclature: Unknown.

Related species in Hawai'i: On Maui, few vouchers have been sent to Bishop Museum for determination. One specimen from Kahului was recently identified as *Cryptostegia madagascariensis* Boj. ex Decne. var. *glaberrima* (Hochr.) J. Marohasy and P. Forst.

DESCRIPTION

C. grandiflora: "Woody, strong-growing vine. Leaves oblong, 3-4 in. long, glabrous and shining. Flowers lilac-purple, 2-3 in. across, calyx leafy, about .5 in. long; corona lobes deeply forked into 2 filiform segments, follicles to 4 in. long, sharply angled." (Bailey and Bailey 1976). "Seed pods are rigid and grow in pairs at the end of a short stalk. The

Pods are 10-12 cm long, 3-4 cm wide and each can contain up to 450 brown seeds. Each seed has a tuft of long white silky hairs which enable easy dispersal by wind and water." (DNRM 2001).

C. madagascariensis: "Similar to *C. grandiflora*, but differs in having flowers reddish-purple, calyx to 1.25 in. long, and corona lobes entire" (Bailey and Bailey 1976).

In Hawai'i, and elsewhere, there has been much confusion between the two species and they are difficult to tell apart from each other. McFadyen and Harvey (1991) report the following: "The two species are easily separated with living specimens. The leaves of *C. grandiflora* have purple-coloured midribs and petioles, the flowers are paler and larger and the fruit is larger, and the corolla glands in the flowers are white or pale pink, and bifurcate, forming 2 narrow filaments. The leaves of *C. madagascariensis* never have purple colouration in the petiole and midribs, and the corolla glands are deep pink and single."

BIOLOGY & ECOLOGY

Cultivation: Rubber vine has been cultivated in warmer regions of the world as an ornamental and for the production of rubber. It is an attractive vine with shiny evergreen leaves and attractive pink-purple blooms. In Hawai'i, it is cultivated as an ornamental and is occasionally observed on Maui in yards along driveways or fronting properties.

Invasiveness: *C. grandiflora* is a notorious invader in Australia. First introduced for ornament around 1860 and later planted for rubber production, rubber vine seeds rapidly spread by wind, floodwaters, and in mud sticking to machinery and in the hooves of animals (Tropical Savannas 2001). It quickly spread along water courses then to pastures and open country. In Australia, *C. grandiflora* forms dense impenetrable thickets by climbing up trees and covering them. It has the ability to choke out native vegetation (McFadyen and Harvey 1991). *C. grandiflora* is a declared plant in Australia where it is said to be one of the greatest threats to natural ecosystems within national park areas in northern Queensland (McFadyen and Harvey 1991). In addition, rubber vine is an expensive problem for ranchers in Australia who must control the plant which is toxic to cattle and horses. In Florida, *C. madagascariensis* is reported as a category II weed (FLEPPC 1999).

Pollination: Unknown.

Propagation: *Cryptostegia* spp. can propagate by seeds, which are approximately 95% viable (DNRM 2001). Plants can begin to reproduce after about 200 days and seeds remain viable for approximately 12 months (Russell 2001).

Pests and Diseases: In Australia, a rust and a moth have been introduced to help control *C. grandiflora* by defoliation. See the biological control section for more detail.

Dispersal: Plants are originally dispersed long distances by humans who use the plant in landscaping and for the production of rubber. In Australia, plants initially spread along

water courses then spread to pasture land and both open and forested areas. Numerous seed with tufts of silky hairs help disperse the seeds in the wind. Plants can also be dispersed via both fresh and salt water courses (Russell 2001).

DISTRIBUTION

Native range: Both *C. grandiflora* and *C. madagascariensis* are native to Madagascar (DNRM 2001). According to McFadyen and Harvey (1991), "In Madagascar, *Cryptostegia* occurs on the western coastal plain, below 500 m (1,640 ft) altitude. *C. grandiflora* is confined to the south-west, from the river Mangoky to Fort Dauphin in the extreme south, in areas receiving 350-800 mm (13-31 in) rainfall annually (McFadyen and Harvey 1991). *C. madagascariensis* is found from Tulear in the south west to Diego Suarez in the extreme north, in areas receiving 400-2,400 mm (16-94 in) annually."

Global distribution: *Cryptostegia* spp. are widely cultivated in tropical and subtropical regions of the world (DNRM 2001). According to McFadyen and Harvey (1991), "*C. madagascariensis* is widely grown as an ornamental in Kenya, Florida, the West Indies, India, and West Australia. There is no record of this species becoming a weed. *C. grandiflora* is also widely grown as an ornamental, and has become naturalized and weedy in Mexico, Central America, the drier West Indian islands, New Caledonia, and Australia." Other sources, however, do consider *C. madagascariensis* a potential weed (FLEPPC 1999).

In Australia, *C. grandiflora* now covers large acreage in tough terrain. The vine prefers habitat with annual rainfalls between 400 and 1,400 mm (16-55 in) and is well adapted to monsoon like conditions (DNRM 2001). Early infestations in Australia were recorded near Charters Towers. According to the Department of Natural Resources and Mines (2001), "The infestation now occurs throughout river systems of southern Cape York and the Gulf of Carpentaria, south along the coast to the Burnett River, and isolated infestations occur as far south as Gatton and as far west as the Northern Territory border. Infestations are common throughout central Queensland, while in western Queensland there are infestations in the Mt. Isa, Longreach, Aramac, Blackall, Quilpie and Charleville areas. Isolated infestations have been reported in Western Australia."

In Florida, both *C. madagascariensis* and *C. grandiflora* are reported to be present. *C. madagascariensis* is present in southern Florida in the Keys and in a few counties on the coast of south western Florida (PLANTS 2001). *C. madagascariensis* is listed by the Florida Exotic Pest Plant Council as a category II pest plant (FLEPPC 1999). These are species that have shown a potential to disrupt native plant communities. *C. grandiflora* is known from the keys (PLANTS 2001).

PIER (2001) reports that *C. grandiflora* is present in Micronesia in the Commonwealth of the Northern Mariana Islands (Saipan), Guam, and the Republic of the Marshall Islands (Kwajalein), in the Pacific in Fiji, Hawai'i, and New Caledonia (Voh, Gatope), and elsewhere in Australia, Mauritius, and southeast Asia. PIER (2001) also reports that *C. grandiflora* is known to be invasive in the Virgin Islands.

State of Hawai'i distribution: *Cryptostegia* is naturalized on Maui and Hawai'i, though it has not been properly documented as so yet. The distribution on the island of Hawai'i is uncertain, though there are reports of a large infestation near Kawaihae (Christy Martin pers. comm.). The distribution on Maui is outlined below. It is cultivated on O'ahu and possibly present on other islands as well.

Island of Maui distribution: About a dozen locations of rubber vine have been found on Maui. Almost all of the sites are comprised of one or a few plants being cultivated in residential areas of Lahaina, Kahului, Kihei, Wailuku, Omaopio, and Kula. There are two sparingly naturalized locations, one at Kanaha Pond, and the other in Omaopio. At Kanaha Pond, the vine was climbing up several meters into kiawe (*Prosopis pallida*) with numerous seedlings germinating in and around the larger vine. The vine has since been controlled and seedlings pulled. It is uncertain which species this represented. The area is a lowland (sea level) wetlands and receives about 20-30 in (51-76 cm) annually (Juvik and Juvik 1998). The Omaopio plant was originally cultivated and has been controlled. After rains in the area, several seedlings were found, though no determination to species could be made without fertile material. This site is about 1,100 ft (335 m) elevation with average annual rainfall about 20-30 in (51-76 cm) (Juvik and Juvik 1998). One other specimen, probably a cultivated plant, from Kahului has been identified as *Cryptostegia madagascariensis* Boj. ex Decne. var. *glaberrima* (Hochr.) J. Marohasy and P. Forst. by George Staples of the Bishop Museum. Several *Cryptostegia* plants on Maui have already been controlled by MISC and the others are scheduled for control in the near future. Eradication seems to be within reach on Maui.

CONTROL METHODS

Physical control: Small plants can be controlled by hand pulling or digging out the plant. Fruits can be bagged and disposed of properly. Contact with the milky sap should be avoided.

Chemical control: A variety of chemicals listed by Australia includes: Grazon DS, Banvel, Brushoff, Tordon, Velpar, Graslan, and 2, 4-D. In Hawai'i, Garlon has been used in cut stump treatments as well as mechanical removal.

Foliar spray: Most effective on smaller plants. Spray plants when they are actively growing.

Basal bark: Does not work well on multi stemmed plants. For single stemmed plants, spray completely around base.

Cut stump: The most successful and cost effective method in Australia, though also the most labor intensive. Cut the stem as close to the ground as possible. Make the cut horizontal. Immediately spray or swab the surface.

Root application: A non-selective method not to be used near waterways. This method was found useful for farmers in Australia that were far off in the bush and needed a lightweight method for controlling individual occasional outliers.

Biological control: No biological controls have been introduced yet to Hawai'i. In Australia, two agents have been introduced, a rust and a moth. These agents do not kill established plants, but do cause abnormal defoliation, creating an energy sink, and leading to reduced seed production (DNRM 2001). Their success and potential damage depends on their abundance.

Rubber vine rust (*Maravalia cryptostegiae*) has been established over a wide area of Australia. Yellow spores form under leaves eventually causing defoliation, reducing seed production, causing dieback of stems, and killing young seedlings (DNRM 2001). The rust is spread by wind and appears to be most effective in the summer months, preferring moist conditions (DNRM 2001).

Rubber vine moth (*Euclasta whalleyi*) larvae feed on leaves. Moths prefer weakened plants and work well in combination with the rust (DNRM 2001).

Cultural control: Control of rubber vine can employ any combination of methods outlined above. Experience in Australia has shown that areas treated must be periodically checked and any re-growth must be treated or the initial treatment and efforts will be wasted. Fire has also been used as a control method in Australia, with a follow up chemical treatment.

Noxious weed acts: *C. grandiflora* is a declared plant in Queensland Australia. *C. madagascariensis* is a category II plant in Florida (FLEPPC 1999). *Cryptostegia* spp. are being considered for noxious weed status in Hawai'i.

MANAGEMENT RECOMMENDATIONS

MISC should continue to control all known populations of *Cryptostegia* spp. on Maui. The distribution of *Cryptostegia* spp. on other Hawaiian islands should be mapped. Other island invasive species committee could also target *Cryptostegia* spp. for eradication if feasible. It would also be good to determine which species are present in Hawai'i through collection and publication of naturalized material. Future plantings could be discouraged and *Cryptostegia* spp. could be made state noxious weeds.

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