

Pittosporum undulatum

Victorian box
Pittosporaceae

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

May, 2005

OVERVIEW

Pittosporum undulatum (Victorian box), native to Australia, is widely cultivated throughout the world as an ornamental plant (Wagner et al. 1999). *P. undulatum* is considered invasive in several places, including Hawai'i, Jamaica, South Africa, and other Pacific and Atlantic islands (Binggeli 1998). In these areas, it spreads via bird dispersed fruit and invades moist disturbed forests from low to middle elevations. In Hawai'i, *P. undulatum* was introduced as early as 1875 and is now naturalized on Lana'i and Hawai'i in disturbed mesic forest, 500-1,200 m (1,640-3,937 ft) (Wagner et al. 1999). *P. undulatum* was not found during initial roadside surveys in 2000. It has recently been reported from a few locations on East Maui. Most locations that have been found so far are cultivated trees or hedges and a few seedlings have been observed nearby initial plantings. The distribution is currently limited and the potential range of this invasive tree on Maui could be quite large. This species is being considered for addition as a target species by the Maui Invasive Species Committee.

TAXONOMY

Family: Pittosporaceae (Pittosporum family) (Wagner et al. 1999).

Latin name: *Pittosporum undulatum* Venten. (Wagner et al. 1999).

Synonyms: None known.

Common names: Victorian box, orange pittosporum, Victorian laurel, Pittosporum, cheesewood, Australian cheesewood, Australian mock orange (Wagner et al. 1999, PIER 2003).

Taxonomic notes: Pittosporaceae is a family made up of 9 genera and about 200 species from tropical and warm temperate areas of the Old World, being best developed in Australia (Wagner et al. 1999). The genus *Pittosporum* is made up of about 150 species of tropical and subtropical Africa, Asia, Australia, New Zealand, and some Pacific Islands (Wagner et al. 1999).

Nomenclature: The genus name, *Pittosporum*, is derived from the Greek word, *pittos*, meaning pitch, and *sporos*, meaning seeds, in reference to the black seeds covered with viscid resin (Wagner et al. 1999).

Related species in Hawai'i: In Hawai'i, *Pittosporum* is represented by 10 endemic species and 3 naturalized species which include *P. pentandrum*, *P. undulatum*, and *P. viridiflorum* (Herbarium Pacificum staff 1999, Starr et al. 1999, Wagner et al. 1999). In addition, *P. tobira* is cultivated in Hawai'i.

DESCRIPTION

"Trees 5-14 m tall, young parts and inflorescences sparsely brown pilose, the hairs somewhat appressed; branches glabrous. Leaves chartaceous, narrowly elliptic-ovate to ovate, 5-15 cm long, 2-4 cm wide, glabrous or pilose in very immature leaves, margins undulate, apex acuminate, base cuneate to attenuate, petioles 1.5-3.5 cm long. Flowers perfect, ca. 5-10 in terminal, branched, corymbose racemes, peduncles 10-32 mm long, pedicels 8-15 mm long, bracts subulate, 6-8 mm long; sepals narrowly lanceolate, 6-9 mm long, pilose, especially along margins, apex long-attenuate; petals white, 9-13 mm long; ovary 2 carpellate. Capsules depressed-subglobose, slightly compressed, ca. 10-14 mm long, the persistent style ca. 2-3 mm long, the valves with coriaceous exocarp ca. 1-2 mm thick, the surface roughened-rugulose. Seeds ca. 3 mm long." (Wagner et al. 1999).

BIOLOGY & ECOLOGY

Cultivation: *P. undulatum* is widely cultivated as an ornamental tree with fragrant flowers. It is also used for firewood and as an all purpose timber (Binggeli 1998).

Invasiveness: *P. undulatum* is considered invasive in several places, including Hawai'i, Jamaica, South Africa, and other Pacific and Atlantic islands (Binggeli 1998). In these areas, *P. undulatum* spreads by fruit eating birds, invades, and becomes dominant in moist disturbed secondary forests and some primary forests from low to middle elevations.

Pollination: Inflorescences bear between 1 and 4 insect pollinated flowers (Binggeli 1998). Flowering begins at about 5 years and is enhanced in higher light levels (Binggeli 1998).

Propagation: *Pittosporum* spp. can be propagated from seeds as soon as they are ripe. Semi-ripe cuttings or air layers are also effective propagation methods (Brickell and Zuk 1997). Seedling recruitment can occur below forest canopies, but increases with higher light levels (Binggeli 1998).

Dispersal: *P. undulatum* are spread long distances by humans who use the plant in landscaping. *P. undulatum* fruits mature in roughly 6 months and usually contain 20-40 sticky orange seeds which are bird dispersed (Binggeli 1998).

Pests and diseases: According to Brickell and Zuk (1997), *Pittosporum* spp. are susceptible to aphids, spider mites, mealybugs, scale insects, leaf spots, dieback, root knot nematode, galls, and cankers.

DISTRIBUTION

Native range: According to Binggeli (1998), "*P. undulatum* is native to the coastal belt and mountains of south-eastern Australia from Biggenden in Queensland to the south of Victoria. It is a common sub-canopy tree and shrub in several forest types and is also widespread in more open habitats. The climatic conditions of its native range vary from moist sub-tropical to dry temperate. *P. undulatum* is found in a variety of habitats, such as rain forests, scrub, gullies and grassland (if fire is suppressed). It is spreading outside its pre-European settlement range in several parts of Australia, a result of widespread

planting in gardens, the fire suppression policies in many areas close to habitation and the introduction of the European blackbird, *Turdus merula*."

Global distribution: *P. undulatum* has spread from plantings in several areas, including Jamaica, Hawai'i, South Africa and other Pacific and Atlantic islands (Binggeli 1998). In Jamaica, *P. undulatum* was planted as early as 1883 in the Cinchona Botanic Gardens, 1,450 m (4,757 ft) elevation, in the Blue Mountains. It is now considered dominant in many areas of secondary forests and locally common in primary forests (Binggeli 1998, PIER 2003). In Jamaica, areas invaded by *P. undulatum* experience a sharp decrease in native species richness has been recorded, likely due to the dense shade it casts (Binggeli 1998). The climate in the invaded range in Jamaica is moist, receiving about 2,700 mm (106 in) annually, with two rainy seasons and temperatures range from 18.5-20.5 C (65-69 F) (Binggeli 1998). *P. undulatum* is also considered invasive in South Africa, however, recently plants have been affected by a severe dieback (Binggeli 1998). According to PIER (2003), *P. undulatum* is also known from the Canary Islands, Norfolk Island, Lord Howe Island, and Guam.

State of Hawai'i distribution: In Hawai'i, *P. undulatum*, originally introduced to the island of Hawai'i around 1875, is cultivated and now naturalized in disturbed mesic forest, 500-1,200 m (1,640-3,937 ft), at least on Lana'ihale, Lana'i, and Hawai'i (Wagner et al. 1999).

Island of Maui distribution: *P. undulatum* was previously not detected during roadsides surveys in 2000. It has been found by Steve Anderson (NPS) and Mach Fukada (DOA) at several locations in Makawao and Kula, East Maui. In these locations hedges are usually grown on borders of residential properties. A few saplings have been observed coming up in nearby areas. The distribution seems fairly limited on Maui. Further survey on foot in the area as well as survey in other areas may turn up more locations.

CONTROL METHODS

Physical control: Seedlings can likely be hand pulled. Small trees can probably be dug up. Cutting the tree without herbicide treatment will result in re-growth.

Chemical control: Cut stump, frill, and basal bark methods employing herbicides are likely effective means of control for *P. undulatum*.

Biological control: None known. With numerous endemic *Pittosporum* species in Hawai'i, any biological control should be done with extreme caution.

Cultural control: The public could be discouraged from planting *Pittosporum* species that are known to spread.

Noxious weed acts: *P. undulatum* is a Hawai'i state noxious weed (HDOA 1992). In South Africa, *P. undulatum* is listed as a Category 1 Invasive Plant and can not be cultivated (Matshinyalo and Reynolds. 2002).

MANAGEMENT RECOMMENDATIONS

Pittosporum undulatum is cultivated and naturalized in various regions of the world, including Hawai'i, Jamaica, South Africa, and other Pacific and Atlantic islands. *P. undulatum* is spread by fruit eating birds and is known from disturbed mesic forests of Lana'i and Hawai'i. *P. undulatum* is sparingly cultivated and beginning to spread on Maui. The potential range on Maui could be much larger if no action is taken. It is being considered for additional as a target species by the Maui Invasive Species Committee.

REFERENCES

- Binggeli, P. 1998. *An Overview of Invasive Woody Plants in the Tropics*. School of Agricultural and Forest Sciences Publication Number 13, University of Wales, Bangor, UK.
- Brickell, C. and J.D. Zuk. 1997. *The American Horticultural Society A-Z Encyclopedia of Garden Plants*. DK Publishing, Inc., NY.
- HDOA (Hawai'i Department of Agriculture). 1992. *List of Plant Species Designated as Noxious Weeds for Eradication or Control Purposes* (June 18, 1992). Hawai'i Department of Agriculture, Honolulu, HI. Available: <http://www.botany.hawaii.edu/cpsu/-strawgua/other/noxious/noxious.html> (Accessed: July 25, 2001).
- Herbarium Pacificum Staff. 1999. New Hawaiian plant records for 1998. *Bishop Mus. Occas. Pap.* 58(1): 3-12.
- Matshinyalo, T.T. and Y. Reynolds. 2002. *Pittosporum viridiflorum* Sims. Witwatersrand National Botanical Garden. Available: <http://www.plantzafrica.com> (Accessed: May 27, 2003).
- PIER (Pacific Islands Ecosystems at Risk). 2003. Invasive Plant Species: *Pittosporum pentandrum*. Available: <http://www.hear.org/pier> (Accessed: May 27, 2003).
- Starr, F., K. Martz, and L.L. Loope. 1999. New plant records from East Maui for 1998. *Bishop Mus. Occ. Pap.* 59(2):11-15.
- Wagner, W.L., D.R. Herbst, and S.H. Sohmer. 1999. *Manual of the Flowering Plants of Hawai'i*. 2 vols. Bishop Museum Special Publication 83, University of Hawai'i and Bishop Museum Press, Honolulu, HI.