

Ficus cf. platypoda

Port jackson fig

Moraceae

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January, 2003

OVERVIEW

There are no *Ficus* species native to Hawai'i. *F. cf. platypoda* is one of about 60 species of *Ficus* that is cultivated in Hawai'i (Wagner et al. 1999). About 39,000 *F. cf. platypoda* trees were planted in the state of Hawai'i during the 1920's and 1930's as a forestry tree (Skolmen 1960). On Maui, *F. cf. platypoda* were planted in plantations along the Hana Hwy. from Ha'iku to Hana and in Fleming Arboretum on West Maui. The pollinator wasp for *F. cf. platypoda*, *Pleistodontes imperialis* Saunders, was introduced to Hawai'i in 1922 (Wagner et al. 1999) to facilitate the spread of this tree species as each *Ficus* species needs a specific pollinating wasp in order to reproduce and spread (Ramirez 1970). As a result, *F. cf. platypoda* is reproducing sexually in Hawai'i today. It was first reported by Nagata (1995) under the name *F. rubiginosa* Desf as naturalized on O'ahu. It was then later reported as naturalized on both West and East Maui (Wagner et al. 1999, Oppenheimer and Bartlett 2000). Two other *Ficus* species that have had their associated pollinator wasps introduced are also spreading on Maui. These include *F. microcarpa* and *F. macrophylla* (Wagner et al. 1999, Oppenheimer and Bartlett 2000). All three species invade both disturbed and native ecosystems. *F. cf. platypoda* is capable of germinating in native host trees, such as koa (*Acacia koa*) and ohia (*Metrosideros polymorpha*), growing as epiphytes, sending down aerial roots, and eventually destroying the host tree. Control of this species is difficult due to epiphytic growth in usually steep and wet terrain.

TAXONOMY

Family: Moraceae (Mulberry family) (Wagner et al. 1999).

Latin name: *Ficus cf. platypoda* (A. Cunningham ex Miquel) A. Cunningham ex Miguel (Wagner et al. 1999, Oppenheimer and Bartlett 2000).

Synonyms: *F. rubiginosa* Desf (Nagata 1995, Wagner et al. 1999).

Common names: Port Jackson fig, rusty fig, little-leaf fig (Neal 1965, Bailey and Bailey 1976).

Taxonomic notes: The genus *Ficus* is made up of about 1,000 species from pantropical and subtropical origins (Wagner et al. 1999). Plants in the genus are all woody, ranging from trees and shrubs to climbers (Neal 1965).

Nomenclature: Currently, this species is being called *F. cf. platypoda*. In Hawai'i, three species *F. rubiginosa*, *F. platypoda*, and *F. obliqua* form a species complex and share the same associated pollinator wasp *Pleistodontes imperialis* Saunders (Oppenheimer and Bartlett 2000). Further taxonomic revisions of these species seems likely.

Related species in Hawai'i: Several cultivars are grown including a variegated form (Bailey and Bailey 1976). This species is somewhat similar in appearance to *F. macrophylla*, though leaves and fruit of *F. cf. platypoda* are generally smaller and distribution on Maui is generally more abundant and widespread.

DESCRIPTION

"Wide spreading, 50 ft (15 m) x 50 ft (15 m), evergreen tree, sometimes with aerial roots, a few of which become props. Leaves oblong to elliptic or ovate, 3-7 in (8-18 cm) long, rust hairy when young, then smooth, leathery, dark green above, paler beneath. Bears pairs of spherical figs, to .5 in (1.5 cm) across, ripening to greenish brown with soft, rust-brown hairs." (Brickell and Zuk 1997). Seeds are minute.

BIOLOGY & ECOLOGY

Cultivation: This tree is commonly used as a houseplant, specimen, street, or shade tree (Dehgan 1998). It has evergreen dense growth with a rusty appearance to leaves and young branches. In Hawai'i, *F. cf. platypoda* was a popular forestry tree and several thousands were planted on O'ahu (2,186), Maui (1,057), and Hawai'i (36,535) during the 1920's-1930's (Skolmen 1960). *F. cf. platypoda* is also occasionally used as a street tree or grown singly in yards.

Invasiveness: *F. cf. platypoda* is spreading and considered a pest in New Zealand and Hawai'i (Haley 1997, Oppenheimer and Bartlett 2000, DLNR-DOFAW 2002). In New Zealand, *F. cf. platypoda* has only recently become naturalized after the pollinator wasp was introduced some time in the 1960's or 1970's (Gardner and Early 1996). It is not known exactly how or when the wasps arrived, but soon after, *F. cf. platypoda* seedlings soon began to appear near parent trees on rocks and stone walls, and also as epiphytes on rough-barked trees such as pines, cypresses, and palms (Gardner 1983). Gardner and Early (1996) reported that *F. cf. platypoda* and *F. macrophylla* were not considered invasive in Hawai'i. At the time, perhaps they were correct. However, since then, evidence of the invasiveness of these two species in Hawai'i has been shown. In areas near plantings of *F. cf. platypoda* on both East and West Maui, seedlings commonly germinate in other trees, fenceposts, rocks, bridges, buildings, and other structures, eventually engulfing their hosts. *F. cf. platypoda* threatens mesic to moist forests on Maui by germinating on many native host trees such as koa (*Acacia koa*) and ohia (*Metrosideros polymorpha*) eventually killing them as they grow to enormous heights. Large mature trees are observed on ridgetops, steep gulch walls, and ascending up the gulches. Invasive characteristics are numerous and include the introduction and successful establishment of associated pollinator wasps which allows sexual reproduction of *F. cf. platypoda*, a widespread distribution in the State due to earlier forestry plantings, proximity of plantings to moist habitats conducive to rapid growth rates, proximity of plantings to native rainforest habitat, ability to germinate and grow on other trees allowing invasion into relatively closed canopy areas, large habitat altering size of mature trees, large seed set, the presence of fruit eating animals (birds, bats, other mammals) that are potential dispersal agents of seeds, and difficulty in controlling epiphytic plants on native hosts in steep and wet terrain.

Pollination: The fruit (syconium or fig) and reproduction systems of species in the genus *Ficus* are unique. Each species of *Ficus* has an associated species of agaonid wasp (Hymenoptera: Chalcoidea: Agaonidae). *Ficus* species can only be pollinated by their associated agaonid wasps and in turn, the wasps can only lay eggs within their associated *Ficus* fruits. The pollinator wasp for *F. cf. platypoda* is *Pleistodontes imperialis* Saunders. It was introduced to O'ahu in January 1922 (Wagner et al. 1999, McKey 1989). By January 1923, the wasp was considered locally established there and by July 1933 the wasp had reached Kaua'i on its own (McKey 1989). As a result, reproduction of *F. cf. platypoda* is occurring in Hawai'i.

Propagation: *F. cf. platypoda* are usually propagated from cuttings or air layers (Dehgan 1998).

Dispersal: Many *F. cf. platypoda* trees were planted in Hawai'i during reforestation efforts. After the pollinator wasp established, *F. cf. platypoda* seeds were collected from pollinated trees and dispersed by aircraft into the forests (McKey 1989). Today, seeds are most likely being dispersed by animals. *F. cf. platypoda* is a fairly large fruited *Ficus* that presents numerous (hundreds?) seeds along with a sticky substance. In this way, some *Ficus* seeds may be dispersed without being ingested. They also provide a tasty morsel to a variety of animals who can disperse the seed through ingestion and deposition elsewhere. Some of the more conspicuous groups of animals worldwide eating and dispersing *Ficus* fruits and seeds include birds, bats, and monkeys (Herre 1989). On Maui, some birds observed flying into *F. cf. platypoda* trees include Japanese white-eyes (*Zosterops japonicus*) and Northern cardinals (*Cardinalis cardinalis*). Common mynas (*Acridotheres tristis tristis*) were observed picking at fruits in trees. Underneath trees mynas and blue faced doves (*Geopelia striata*) were seen picking at the fruit which had been dropped to the ground and crushed by passing cars. House finches (*Carpodacus mexicanus*) were seen on nearby trees. Mitred conures (*Aratinga mitrata*) have been observed feeding on mature *F. cf. platypoda* fruits (pers. obs. Duvall and Carter). It is possible that other animals, such as bats, mammals, rodents, or insects could potentially spread *Ficus* seeds, though further investigation in Hawai'i is needed to be sure. Seedlings are often seen germinating on fenceposts, other host trees, and the sides of steep banks.

Pests and diseases: Some problems in cultivation include mites and scale and the tree is subject to root rot if over-watered (Dehgan 1998).

DISTRIBUTION

Native range: *F. cf. platypoda* is native to New South Wales and Queensland, Eastern Australia (Bailey and Bailey 1976, Haley 1997).

Global distribution: *F. cf. platypoda* is commonly cultivated as a houseplant, specimen, street, or shade tree. The associated pollinator wasp has been introduced to New Zealand and Hawai'i where this species is now spreading and becoming a pest (Haley 1997, DLNR-DOFAW 2002). In New Zealand, the invasion of the Port Jackson fig, called *F. rubiginosa* there, is a fairly recent phenomena. Owen (1996) reports that this species

began to naturalize in 1981 after its associated pollinator wasp was introduced. It is uncertain whether the wasp made it to New Zealand on its own or as an accidental introduction (Gardner and Early 1996). This species is now found on rocky walls, firm rocky outcrops, and in trunks of phoenix palms (Haley 1997).

State of Hawai'i distribution: *F. cf. platypoda* was a popular forestry tree in Hawai'i during the 1920's-1930's with several thousands planted on O'ahu (2,186), Maui (1,057), and Hawai'i (36,535) (Skolmen 1960). *F. cf. platypoda* occupies warm and wet areas from moist lowland disturbed urban and rural habitat to mid-elevation (2,000 ft) mesic to wet native rainforest habitat. It grows on steep walls, on other trees, in pastures, and on fenceposts.

Island of Maui distribution: On West Maui, at the Fleming Arboretum, *F. cf. platypoda* has been spreading from initial plantings for some time. This plant produces many fruits which are presumably bird dispersed from the parent tree to areas where they can germinate and grow. Hank Oppenheimer (Pu'u Kukui Watershed, West Maui) reports large numbers of mynas (*Acridotheres tristis tristis*) visiting fruit bearing trees when the fruit is ripe. Once deposited on a surface such as a rock, plant, or fencepost, the strangler fig germinates, begins to grow, sends down aerial roots, and then overwhelms whatever it lands on. Koa (*Acacia koa*) seems to be hit especially hard by this species. In some areas near the oldest *Ficus* trees, almost every koa had a *F. cf. platypoda* on it. In this area, entire koa trees have been strangled, being completely enveloped. On East Maui, there are plantings along the Hana Hwy. extending inland to about 1,500 ft (457 m) elevation from Ha'iku to Hana. In more urban areas, such as Ha'iku, trees are commonly observed germinating on fenceposts, on steep banks, and in pastures. Further towards Keanae and Hana, large specimens are commonly observed in gulches and often rooted around whatever trees are located nearby. In the area are large plantation style groves of other non-native trees or areas of native wet forest. In some cases, native trees, such as koa and ohia had several epiphytic *F. cf. platypoda* germinating in them. At maturity, trees are so large and conspicuous that they can be seen from across gulches filling the area with their crown. These trees were covered with numerous ripe and some immature fruits during late September 2000 and many fruit eating birds were observed foraging in them.

CONTROL METHODS

Physical control: Small seedlings on the ground or as epiphytes can be hand pulled. Control of *Ficus* species seems daunting. Often, trees will germinate on and grow as epiphytes on other desirable trees, concrete structures, and fenceposts. These are sometimes out of reach or on steep dangerous terrain. Care will need to be taken in order to successfully kill the unwanted *Ficus* while preserving the host. Without control, the host tree or structure is in danger of destruction through strangulation. Control of spreading *Ficus* trees in Hawai'i and New Zealand is just beginning to be explored.

Chemical control: "Fig trees are particularly sensitive to triclopyr herbicides as a basal or cut-stump treatment. Trees found growing on concrete or rock structures should be treated with herbicide while young to avoid costly structural damage. Use extreme

caution when applying herbicide to figs growing as epiphytes to ensure that the poison does not contact the host tree. When exotic figs germinate high in the branches of large trees in natural forest communities, it may be extraordinarily difficult to get close enough to the fig to treat it." (Hammer 1996). Information from New Zealand (Haley 1997) suggests that stem poisoning is the most cost effective option there. They also suggest immediate treatment of new infestations.

Biological control: Nadel et al. (1991) report that there is no current effort to control *Ficus* species with biological controls.

Cultural control: To prevent further establishment of *F. cf. platypoda* in areas that are currently free of this species, do not plant or transport trees or fruit to these areas.

Noxious weed acts: In New Zealand, this plant is prohibited from propagation, sale, and distribution (Haley 1997).

MANAGEMENT RECOMMENDATIONS

F. cf. platypoda was a popular forestry tree in Hawai'i and the campaign to spread this species in Hawai'i's forests has been successful. Unfortunately, the same characteristics which aided this species as a successful forestry tree also makes it an aggressive invader. Today, we are just beginning to realize the deleterious effects of aggressive non-natives in our ecosystems. *F. cf. platypoda* will continue to spread as it probably has not reached its full potential. Early detection of this species in or near vulnerable habitat and effective control will help prevent major infestations into new areas. Further introduction of *Ficus* pollinator wasps should be prohibited.

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