

# *Cinnamomum burmannii*

Padang cassia

Lauraceae

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## OVERVIEW

*Cinnamomum burmannii*, native to southeast Asia and Indonesia, is cultivated for use as a spice, for ornamental purposes, and as a forestry tree. In Hawai'i, *C. burmannii* is cultivated and naturalized on Kaua'i, O'ahu, Maui, and Hawai'i (Wagner and Herbst 1995, Meidell et al. 1997, Wagner et al. 1997, Wagner et al. 1999, Starr et al. in press). On Maui, *C. burmannii* is known from both East and West Maui. On West Maui, dense infestations occur in moist to wet forested areas nearby original plantings from sea level up to about 2,000 ft (610 m). *C. burmannii* is considered a serious weed by Pu'u Kukui Watershed Management staff, who consider this species to be fairly widespread and focus control on satellite populations (Meidell et al. 1997). On East Maui, there are a few locations where *C. burmannii* is naturalized, also in moist to wet disturbed forested areas nearby original plantings, though these infestations are not yet as dense or widespread as West Maui. Currently, there are no control efforts being done on East Maui. It is not certain whether *C. burmannii* will invade intact native rainforests of East Maui, though it is likely to continue to spread in areas where it is established.

## TAXONOMY

**Family:** Lauraceae (Laurel family) (Wagner et al. 1999).

**Latin name:** *Cinnamomum burmannii* (Nees) Blume (Wagner et al. 1999).

**Synonyms:** *Laurus burmannii* Nees (Wagner et al. 1999), *Cinnamomum pedunculatum* Nees (Bailey and Bailey 1976).

**Common names:** Padang cassia (Wagner et al. 1999).

**Taxonomic notes:** The genus *Cinnamomum* is comprised of over 250 species of trees and shrubs from east and southeast Asia to Australia that are aromatic with glossy, leathery leaves, clusters of very small flowers, and berry like fruits (Bailey and Bailey 1976, Riffle 1998, Wagner et al. 1999).

**Nomenclature:** The genus name, *Cinnamomum*, is derived from the Greek word for cinnamon, *kinnamomon* (Wagner et al. 1999).

**Related species in Hawai'i:** Two other species are reported by Wagner et al. (1999): *C. camphora* (Camphor tree) [syn. *Camphora officianalis* Nees ex Steud.; *Laurus camphora* L.]; and *C. verum* (Cinnamon tree) [syn. *C. zeylanicum* Blume]. *C. camphora* is native to China and Japan and is widely cultivated as the source of camphor (Wagner et al. 1999). In Hawai'i, *C. camphora* is commonly cultivated as an ornamental street and specimen tree. It was also planted as a forestry tree, with over 3,600 trees planted during 1910 through 1960 throughout the state on Kaua'i, O'ahu, and Maui, the majority on O'ahu (Skolmen 1960). *C. verum*, native to Ceylon, is also cultivated in Hawai'i for ornament

and as a forestry tree (Skolmen 1960, Neal 1965). *C. verum* is naturalized on Kaua'i, O'ahu, Maui, and Hawai'i (Wagner et al. 1999, Imada et al. 2000). *C. verum* is described by PIER (2002) as, "Actively invading secondary forest in Samoa and on Tutuila, American Samoa." PIER (2002) rates *C. verum* a risk assessment score of 8: reject. It also lists *C. verum* as present in the following areas: Pacific Islands: Cook Islands (Rarotonga, Miti'aro), Federated States of Micronesia (Pohnpei (cult.)), Fiji, French Polynesia (Tahiti), Hawai'i, Palau, Samoa (Upolu, Savai'i), and in the Indian Ocean, Seychelles. On Maui, *C. verum* is sparingly cultivated. A third species, *C. cassia* (L.) Bl. (Cassia bark tree) [syn. *C. aromaticum*], native to Burma, also cultivated for cinnamon spice, was listed by Skolmen (1960), who reported 40 trees planted on Moloka'i in 1945 and 1,350 trees planted in Ko'olau, Maui in 1946. The current status of *C. cassia* in Hawai'i is not known and it is not listed in Wagner et al. (1999).

## **DESCRIPTION**

"Trees; young branches terete, glabrous. Leaves glossy green, alternate, often opposite at tips of young branches, narrowly ovate to ovate, ca. 10 cm long, 3-4 cm wide, tripliveined, glabrous, apex gradually acute. Flowers strigose, in short, paniculate inflorescences; tepals 6, equal, ca. 4 mm long, strigose; fertile stamens 9, outer 6 introrse, inner 3 extrorse, staminodia present, cordate. Fruit an ellipsoid berry, subtended by a small cupule that has the basal, truncate parts of tepals attached to the rim." (Wagner et al. 1999).

## **BIOLOGY & ECOLOGY**

**Cultivation:** *C. burmannii*, along with other *Cinnamomum* species are cultivated for a variety of purposes. The aromatic bark is used for making spices such as cinnamon, perfumery, and medicine (Bailey and Bailey 1976). In Hawai'i *C. burmannii* has been cultivated for ornament and for forestry plantations.

**Invasiveness:** *C. burmannii* naturalizes in moist and wet forests and may be difficult to control (PIER 2002). In Hawai'i, *C. burmannii* is considered a serious pest on West Maui by Pu'u Kukui Watershed staff (Meidell et al. 1997). Originally planted about 1920-1935, *C. burmannii* now numbers in the thousands in the areas of Honokohau and Honokahua Valleys (Meidell et al. 1997). It forms dense monotypic stands with exceptional seedling recruitment, even in low light environments.

**Pollination:** Unknown.

**Propagation:** *Cinnamomum* species are propagated by seeds sown when ripe in the spring and from root semi-ripe cuttings in the summer (Bailey and Bailey 1976, Brickell and Zuk 1997).

**Dispersal:** *C. burmannii* is dispersed by fruit eating birds (PIER 2002).

**Pests and Diseases:** Brickell and Zuk (1997) report that *Cinnamomum* species may be susceptible to aphids, scales, canker, root rot, and leaf spots.

## DISTRIBUTION

**Native range:** *C. burmannii* is native to southeast Asia and Indonesia (Bailey and Bailey 1976, Wagner et al. 1999).

**Global distribution:** *C. burmannii* is cultivated in warmer regions of the world for spice, as an ornamental tree, and in forestry plantations. PIER (2002) does not give *C. burmannii* a risk assessment score and only lists Hawai'i for presence on Pacific Islands. In the United States, several *Cinnamomum* species are cultivated in the south as ornamentals (Bailey and Bailey 1976). Collection records from the New York Botanical Garden (2002) include the following locations: Brazil, Rio Grande do Sul, Sao, Leopoldo, 8 m (26 ft) elevation; Peru, Lima, Collegio Lalesiands, 203 m (666 ft) elevation; and Puerto Rico, near Trujillo Alto, 200 m (656 ft) elevation.

**State of Hawai'i distribution:** In Hawai'i, *C. burmannii* is cultivated as an ornamental and is naturalized on Kaua'i, O'ahu, Maui, and Hawai'i (Wagner and Herbst 1995, Meidell et al. 1997, Wagner et al. 1997, Wagner et al. 1999, Starr et al. in press). On Kaua'i, *C. burmannii* was recently documented as naturalized near Limahuli Arboretum in a disturbed forest at 30 ft (9 m) elevation (Starr et al. in press). On O'ahu, it is naturalized at least in Manoa Valley and Pauoa Flats (Wagner et al. 1999). On Maui, it is known from both East Maui (Wagner and Herbst 1995) and West Maui (Meidell et al. 1997) (see below). On the island of Hawai'i, *C. burmannii* is reported from Nienie Ahupua'a, Hamakua, about 1,000 ft (305 m) elevation.

**Island of Maui distribution:** On Maui, *C. burmannii* is cultivated and naturalized in moist to wet disturbed forest areas from sea level up to at least 2,000 ft (610 m) elevation. Average annual rainfall in these areas ranges from 40-120 in (102-305 cm) (Juvik and Juvik 1998). According to Meidell et al. (1997), "Introduced to northern West Maui around 1920-1935, *C. burmannii* has now become extensively naturalized in the area between Honokohau and Honokahua Valleys, elevation 245-610 m (804-2,001 ft), and is viewed by Pu'u Kukui Watershed Management staff as a serious pest. The number of individuals is estimated to be in the thousands, with current eradication efforts focused on satellite populations". Trees were originally planted in the Maunalei Arboretum and now form monotypic stands with carpets of seedlings in disturbed areas nearby. *C. burmannii* is also naturalized near Nahiku, East Maui, about 5 miles West of Hana. There are also scattered individuals on East Maui near sea level in Keanae and near 1,000 ft (305 m) elevation in Ulumalu, Ha'iku.

## CONTROL METHODS

**Physical control:** Small seedlings may be hand pulled.

**Chemical control:** According to the Army Natural Resources staff on O'ahu, herbicide trials revealed that a cut stump method using Garlon 3A at concentrations higher than 1% was the most effective in controlling *C. burmannii* of all size classes. Other methods using 100% Garlon 3A including frill, drill, and EZJECT resulted in less effective kill, especially in larger trees.

**Biological control:** There are no known biological control agents for *C. burmannii*.

**Cultural control:** It could be suggested that the public not plant *Cinnamomum* species, especially in moist to wet sites near native forests, where they can readily naturalize and form large pure stands.

**Noxious weed acts:** *C. burmannii* is not listed as a noxious weed.

### MANAGEMENT RECOMMENDATIONS

*Cinnamomum burmannii* has long been cultivated in Hawai'i. *C. burmannii* spreads from initial plantings and is naturalized in moist to wet disturbed forests from sea level up to at least 2,000 ft (610 m). On West Maui, *C. burmannii* forms large pure stands, with carpet like seedling germination, even at low light levels, and is considered to be a serious weed in Honokohau and Honokahua Valleys. On East Maui, there are a few locations in lowland wet disturbed areas where *C. burmannii* is spreading locally. It is uncertain how high in elevation this species will spread or whether it will be a weed of disturbed areas or be able to penetrate into nearby native rain forest areas. Moist to wet forest areas nearby plantings are most vulnerable to invasion by *C. burmannii*. No control efforts have been organized on East Maui. On West Maui, this species covers large acreage and current eradication efforts are focused on satellite populations. *Cinnamomum* species tend to spread in Hawai'i and should be monitored in the future.

### REFERENCES

- Bailey, L.H. and E.Z. Bailey. 1976. *Hortus*. 3rd ed. Macmillan General Reference, NY.
- Brickell, C. and J.D. Zuk. 1997. *The American Horticultural Society A-Z Encyclopedia of Garden Plants*. DK Publishing, Inc., NY.
- Imada, C.T., G.W. Staples, and D.R. Herbst. 2000. New Hawaiian plant records for 1999. *Bishop Mus. Occas. Pap.* 63(1): 9-16.
- Juvik, S.P and J.O. Juvik. 1998. *Atlas of Hawai'i*. 3rd ed. Department of Geography, University of Hawai'i press, Honolulu, HI.
- Meidell, J.S., H.L. Oppenheimer, and R.T. Bartlett. 1997. New plant records from Pu'u Kukui Watershed and adjacent areas, Maui. *Bishop Mus. Occas. Pap.* 49(2): 17-19.
- Neal, M.C. 1965. *In Gardens of Hawai'i*. Bernice P. Bishop Museum Special Publication 40, Bishop Museum Press, Honolulu, HI.
- New York Botanical Garden. 2002. Specimen database. New York Botanical Garden. Available: <http://www.nybg.org> (Accessed: January 3, 2003).
- PIER (Pacific Islands Ecosystems at Risk). 2002. Invasive Plant Species: *Cinnamomum burmannii*. Available: <http://www.hear.org/pier> (Accessed: January 3, 2003).

Riffle, R.L. 1998. *The Tropical Look*. Timber Press, Portland, OR.

Skolmen, R.G. 1960. *Plantings on the Forest Reserves of Hawai'i: 1910-1960*. Institute of Pacific Islands Forestry, Pacific Southwest Forest and Range Experiment Station, United States Forest Service, Honolulu, HI.

Starr, F., K. Starr, and L.L. Loope. In press. New plant records for the Hawaiian Islands. *Bishop Mus. Occas. Pap.*

Wagner, W.L. and D.R. Herbst. 1995. Contributions to the flora of Hawai'i. IV. New records and name changes. *Bishop Mus. Occas. Pap.* 42(2): 13-27.

Wagner, W.L., R.K. Shannon, and D.R. Herbst. 1997. Contributions to the flora of Hawai'i. VI. *Bishop Mus. Occas. Pap.* 48(1): 51-65.

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.