Cinnamomum camphora

Camphor tree
Lauraceae

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OVERVIEW

C. camphora is widely cultivated throughout the world and has become naturalized in several places where it is planted, including Hawai'i, southern United States, and Australia. In Florida and Australia, *C. camphora* spreads primarily in disturbed areas, but is also considered a pest in natural areas (FLEPPC 2001, Land Protection 2001). In Hawai'i, *C. camphora* has long been cultivated and has spread in both wet and dry conditions from about 1,000-4, 000 ft (305-1,219 m) elevation, primarily in disturbed areas nearby original plantings. It is uncertain how invasive this species will become in natural areas of Hawai'i. On Maui, *C. camphora* is fairly widespread on East Maui, and less widespread on West Maui. There are currently no control efforts on Maui. *C. camphora* could be discouraged from further plantings, especially near natural areas, and controlled once detected in natural areas to avoid large infestations.

TAXONOMY

Family: Lauraceae (Laurel family) (Wagner et al. 1999).
Latin name: *Cinnamomum camphora* (L.) J. Presl (Wagner et al. 1999).
Synonyms: *Laurus camphora* L., *C. officinalis* Nees ex Steud (Bailey and Bailey 1976, Wagner et al. 1999).
Common names: Camphor tree (Bailey and Bailey 1976, 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: Two other *Cinnamomum* species naturalized in Hawai'i are *C. burmanii* (Padang cassia) and *C. verum* (Cinnamon tree) [syn. *C. zeylanicum* Blume]. 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 (1910-1960), 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, terminal and axillary buds covered with bracts, forming a small cone, young branches with clusters of scars from fallen bracts. Leaves

broadly ovate, 7-10 cm long, 3-5 cm wide, tripliveined, with domatia in axils of main veins, glabrous, apex sharply acute, petioles slender, relatively long (+- 1/3 length of lamina). Flowers in axillary, glabrous inflorescences shorter than leaves; tepals 1.5-2 mm long, glabrous externally, pubescent within; staminodia and filaments pubescent. Fruit a globose berry, subtended by a small cupule with entire margins." (Wagner et al. 1999).

BIOLOGY & ECOLOGY

Cultivation: *C. camphora* is a large handsome tree cultivated in warm regions of the world for ornament as a specimen, street, or shade tree (Bailey and Bailey 1976). The wood is also used in cabinet work and the twigs, leaves and wood are used to produce camphor (Bailey and Bailey 1976). In Hawai'i, *C. camphora* is planted as an ornamental and forestry tree (Neal 1965, Skolmen 1910-1960) and was cultivated on O'ahu as early as 1927 (Wagner et al. 1999). *C. camphora* can tolerate short periods of temperatures as low as 32 degrees F (0 degrees C) (Brickell and Zuk 1997).

Invasiveness: *C. camphora* naturalizes in places where it is cultivated, including Hawai'i, southern United States, and Australia (Wagner et al. 1999, FLEPPC 2001, PIER 2002). Seed production is high with over 100,000 seeds per tree per year, which are spread by fruit eating birds (Land Protection 2001). *C. camphora* forms monotypic thickets in areas it invades. In Australia, *C. camphora* is considered a pest of agriculture, environmental, and urban areas (Land Protection 2001). In Florida, *C. camphora* is included as a category I invasive plant in north, central, and south Florida, meaning that it is an invasive exotic plant that is altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives (FLEPPC 2001). Some horticulture books warn of the invasive tendencies of *C. camphora*. For instance, Dehgan (1998) reports, "Seedlings resulting from the prolific fruit production can cause a weed problem."

Pollination: Unknown.

Propagation: *C. camphora* can be propagated by seeds as soon as they are ripe, or by semi-ripe cuttings during summer (Brickell and Zuk 1997).

Dispersal: Seeds are dispersed by fruit eating birds and also by water (PIER 2002).

Pests and Diseases: *C. camphora* is susceptible to aphids, scale, canker, root rot, and leaf spots (Brickell and Zuk 1997).

DISTRIBUTION

Native range: *C. camphora* is native to parts of Asia, China, Taiwan, and Japan (Dehgan 1998, Wagner et al. 1999).

Global distribution: *C. camphora* naturalizes in places where it is cultivated, including Hawai'i, the southern United States, and Australia (Wagner et al. 1999, FLEPPC 2001, PIER 2002). In the United States, *C. camphora* is documented as locally common in the

south from Texas to the Carolinas and in the west in southern California (Langeland and Burks 1998). In Florida, *C. camphora* was originally introduced around 1875 and is now fairly widespread throughout the state, especially the northern and central regions, occurring primarily in dry disturbed areas, such as roadsides and fencerows, but also in natural areas, such as mesic hammocks, upland pine woods, and scrubland (Langeland and Burks 1998). It apparently is still sold in Florida as a shade tree and for windbreaks (Langeland and Burks 1998). In Australia, *C. camphora* was originally introduced around 1822 and was widely cultivated throughout Queensland (Land Protection 2001). *C. camphora* has spread along eastern Australia from the Atherton Tablelands south to Victoria where it is now considered a pest, spreading and forming thickets in pastures, fencerows, power lines, water courses, native vegetation, and urban areas (Land Protection 2001).

State of Hawai'i distribution: In Hawai'i, according to forestry records (Skolmen 1910-1960), over 3,600 trees were planted on Kaua'i, O'ahu, and Maui, with the bulk of them on O'ahu. *C. camphora* is still cultivated as an ornamental tree and is naturalized on Kaua'i, O'ahu, Lana'i, and Maui (Wagner et al. 1999).

Island of Maui distribution: On Maui, *C. camphora* is cultivated and naturalized on both West and East Maui mostly from 1,000-4,000 ft (305-1,219 m) elevation, in both wet and dry areas. On West Maui, *C. camphora* is cultivated and escaped in Honokohau and Napili (Hank Oppenheimer pers comm.) Average annual rainfall in this area is about 60-100 in (152-254 cm) (Juvik and Juvik 1998). On East Maui, *C. camphora* is more widespread and can be found spreading from plantings in various areas including Ha'iku, Makawao, Kula, and Ulupalakua. Average annual rainfall varies from relatively wet areas, such as Makawao, with about 60-100 in (152-254 cm), to relatively dry areas, such as Kula, with about 30-40 in (76-102 cm) (Juvik and Juvik 1998). In these areas, *C. camphora* spreads in pastures, forest margins, and other disturbed areas.

CONTROL METHODS

Physical control: Small seedlings of *C. camphora* can be hand pulled or grubbed out. If roots are left in the ground, trees will regrow (Land Protection 2001).

Chemical control:

Foliar: Foliar spray with herbicides on young *C. camphora* trees up to 3 m (10 ft) tall is effective (Land Protection 2001).

Basal bark or cut stump: Basal bark or cut stump herbicide treatments are effective for trees up to 6 m (20 ft), or with a basal stem diameter up to 30 cm (12 in) with no multi stems (Land Protection 2001). For basal bark, spray from ground level up to a height of 30 cm (12 in) or higher than where multi stems branch.

Frill: For trees larger than 6 m (20 ft), a frill and herbicide treatment is recommended (Land Protection 2001).

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

Cultural control: The public could be made aware that *C. camphora* spreads from the garden and be discouraged from further planting, especially near natural areas.

Noxious weed acts: *C. camphora* is not a noxious weed in the United States or Australia, though it is considered a pest in Florida and is recommended for control in Australia (FLEPPC 2001, Land Protection 2001).

MANAGEMENT RECOMMENDATIONS

C. camphora is widely cultivated throughout the world for ornament and in forestry. It produces numerous bird dispersed fruits and has become naturalized in Hawai'i, southern states of the United States, and Australia. In Florida and Australia, *C. camphora* spreads primarily in disturbed areas, but also in natural areas. In Hawai'i, *C. camphora* has long been cultivated and has spread primarily in disturbed areas nearby original plantings. It is uncertain how invasive this species will become in natural areas. *C. camphora* is fairly widespread on East Maui, and less widespread on West Maui. There are currently no control efforts for *C. camphora* on Maui. To avoid infestations in sensitive or natural areas of Maui, it could be discouraged from planting and controlled if detected.

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