***Schinus terebinthifolius* Raddi** Brazilian pepper tree
ANACARDIACEAE

Synonyms: *Sarcotheca bahiensis* Turcz.
Schinus antiarthriticus Mart. ex Marchand
Schinus mellisii Engl.
Schinus mucronulatus Mart.
Rhus terebinthifolia Schlecht. & Cham.

General Description.—Brazilian pepper tree, also known as Christmas berry, Florida holly, pimienta de Brazil, copal, chichita, and aroeira pimenteira, is a multiple-stemmed evergreen shrub or small tree, usually 2 to 6 m in height and 3 to 12 cm in stem diameter. A few individuals of the species develop large central stems and a dense growth of low limbs and basal sprouts. The bark is smooth and gray. Wounds in the stem and twigs exude a resinous sap that turns black on exposure to air. The alternate, compound leaves have a rachis 3 to 14 cm long, often winged, with five to nine leaflets. The leaflets are 1.5 to 7.5 cm long, lanceolate to elliptic, pointed at each end, with entire to serrate edges. The midribs, rachis, and petiole are often reddish, especially when young. Crushed foliage smells like turpentine. The inflorescences (panicles) are mostly born in the leaf axils near the twig ends and contain many small white flowers. Male and female flowers are borne on different plants (dioecious). The fruits are bright-red, fleshy drupes 4 to 6.5 mm in diameter with an aromatic brown pulp and an elliptic light-brown stone (Liogier 1988, Long and Lakela 1976, National Parks Service 2002).

Range.—Brazilian pepper tree is a native of Brazil, Argentina, and Paraguay (Liogier 1988). It was introduced into Florida in 1898 and has since been distributed widely. The species has escaped cultivation and occupies huge areas in natural stands (Nelson 1996). It has also naturalized in Arizona, California, Hawaii, Puerto Rico, the U.S. Virgin Islands, and many tropical and subtropical countries (Little and others 1974, National Parks Service 2002).

Ecology.—Brazilian pepper tree is an aggressive pioneer species that quickly colonizes disturbed areas. The species has an intermediate tolerance of shade and can survive and grow slowly under forest canopies until disturbance releases it. Although seedlings are quickly killed by inundation, large plants can withstand up to 6 months of flooding. It is very drought resistant. Brazilian pepper tree also survives fire well and can withstand high winds without significant damage. It is apparently at home in tropical, Mediterranean, and desert climates (National Parks Service 2002). In Puerto Rico, the species is most common in low-elevation, moist limestone areas and nearby coastal plains. In Florida, it grows in mangrove associations, hammocks, pinelands, old fields, and disturbed areas (Long and Lakela 1976).

Reproduction.—Brazilian pepper tree flowers most prolifically in the spring in Florida (Nelson 1996). It flowers and fruits intermittently throughout the year in Puerto Rico (Little and others 1974). In Florida, the flowers are pollinated by a native syrphid fly (Fire Sciences Laboratory 2002). Seeds from Brazil were reported to average 80,600 seeds/kg (Instituto de Pesquisas e Estudos Florestais 2002). Germination of intact fruits

(without the exocarp digested or manually removed) is minimal, and seeds do not remain viable in the soil bank more than 9 months (Panetta and Mckee 1997). Birds, particularly robins, mockingbirds, and cedar waxwings, are the chief dispersers of seeds in Florida (Fire Sciences Laboratory 2002). Brazilian pepper tree is propagated from both seeds and cuttings (Little and others 1974). It readily sprouts when cut.

Growth and Management.—Brazilian pepper tree is fast growing and in certain circumstances is capable of growing to large diameters. The U.S. Champion tree in Florida measures 134 cm in diameter at breast height and 10.7 m in height (American Forests 2002). Brazilian pepper tree has shown large growth responses to inoculation with mycorrhizal fungi and superphosphate (Carneiro and others 1996). Hand pulling, bulldozing, prescribed fire, and spraying with herbicides have all been used with varying degrees of success to control Brazilian pepper tree. So far, biological control methods have failed (National Parks Service 2002).

Benefits and Detriments.—Widely introduced as an ornamental, Brazilian pepper tree was popular for its red berries and bright green foliage. It is still used for Christmas decorations. Because it and the species growing in its understory do not burn readily (Fire Sciences Laboratory 2002), Brazilian pepper tree has been recommended for planting as fire resistant barriers (Castronovo 1997). Goats browse on the foliage with no ill effects (National Parks Service 2002). The species is a honey plant (Little and others 1974) and the wood has been used for fuel, lumber, stakes, posts, and railway sleepers (Fire Sciences Laboratory 2002). The dried fruits are marketed in Brazil as a substitute for black pepper (*Piper nigrum*) (personal communication with J.A. Parrotta, USDA Forest service, Washington, DC). A decoction of bark is used in baths to relieve rhumatisum and back pain (Liogier 1990). The essential oils from leaves and flowers are made up of a mixture of a large number of chemicals, the most important of which are alpha-pinene (24 percent), limonene (12 percent), and p-cymene (14 percent) (Singh and others 1998). Extracts of Brazilian pepper tree were shown to be the most effective of a number aromatic and medicinal plant species in suppressing several important pathogenic bacteria (Martínez and others 1996, Siddiqui and others 1995). Despite these benefits, Brazilian pepper tree is often undesirable outside its native range. It is so well adapted and aggressive in Florida and Hawaii that it suppresses and replaces native vegetation, including endangered species. For this reason it is banned from cultivation there (Fire Sciences Laboratory 2002, Nelson 1996). Brazilian pepper tree is reported to have an allelopathic effect on competing plants (National Parks Service 2002). The plant causes skin irritation similar to poison ivy (*Toxicodendron radicans* Linn.) and respiratory difficulties in some people when it is in bloom (Nelson 1996). It is a host of the black twig borer of coffee, *Xylosandrus compactus* (Eichoff) (College of Tropical Agriculture and Human Resources 2002). The fruits are eaten by mammals and birds, but excessive feeding has been blamed for massive bird kills in Florida (National Parks Service 2002), and the unripe fruits can be fatal to horses (Fire Sciences Laboratory 2002).

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