

Roystonea borinquena O.F. Cook

K. F. CONNOR and J. K. FRANCIS
Southern Research Station
and International Institute of Tropical Forestry
USDA Forest Service

ARECACEAE (PALM FAMILY)

No synonyms

Mountain-cabbage, palma de costa, palma de yaguas, palma real,
Puerto Rico royal palm, royalpalm

Roystonea borinquena is native to Puerto Rico, the Puerto Rican island of Vieques, St. Croix in the U.S. Virgin Islands, and possibly Tortola in the British Virgin Islands (Francis 1992, Little and Wadsworth 1964). A widely planted ornamental, *R. borinquena* may have naturalized in the British Virgin Islands and in St. Thomas and St. John, U.S. Virgin Islands (Francis 1992).

Roystonea borinquena is a rapidly growing tree with an average height of 12 to 18 m in Puerto Rico, but it can reach 26.4 m (Francis 1992). Young trees can average 1-m height growth annually. Diameters range from 25 to 70 cm; maximum age is 80 to 110 years. The tree has a smooth, gray trunk with a swollen base and gracefully drooping fronds. The upper trunk is encased in a green column of leaf sheaths 1 to 3 m long. The pinnate leaves have short petioles and a sheath and blade 2.4 to 3.7 m long. The youngest leaflet projects as a spire above the others (Little and Wadsworth 1964), and pinnae grow from the rachis in two planes (Bailey and Bailey 1978). In Puerto Rico, natural regeneration is most aggressive on the slopes and valleys of moist limestone hills (Francis 1992). The species regenerates naturally in areas annually receiving 1250 to 2500 mm of precipitation; its native range has a mean annual temperature of 25 °C and is frost free.

Roystonea borinquena is a common sight in the island cities. The species' ability to withstand a polluted atmosphere and to grow well on either moist, well-drained soils or partially compacted fill dirt enhances its value as a landscape plant (Francis 1992). Ultisols, Alfisols, Inceptisols, and Oxisols are important soil order habitats. Roots will not damage sidewalks or curbs even when the trees are planted in constricted spaces. Palm lumber was once widely used in rural construction, and the leaves were used as a roof thatch. Dry leaf sheaths (yaguas)

can be spread out flat to make sides of buildings (Little and Wadsworth 1964). The wood, when used as lumber, is susceptible to attack by the dry-wood termite *Cryptotermes brevis* (Francis 1992, Little and Wadsworth 1964, Wolcott 1946).

Flowering can begin as early as the seventh year, and trees can bloom throughout the year. The length of the inflorescence reaches up to 1 m (Little and Wadsworth 1964). The whitish male and female flowers form on the same panicle, with male flowers of each tree opening and falling before the female flowers to prevent self-fertilization. The twice-branched, drooping panicles of *R. borinquena* develop from large, narrow buds located at the base of the leaves. The panicles develop inside a dark brown sheath 0.9 to 1.5 m long (Francis 1992, Little and Wadsworth 1964). According to Bailey and Bailey (1978) and Braun (1983), there are scales on the axes bearing the flowers (rachillae). Generally, each female flower forms between two male flowers on the panicle (Francis 1992, Little and Wadsworth 1964). The male flowers have three small, broad sepals, three blunt-pointed petals, and six to nine stamens with purple anthers; the females have three small, broad sepals, and a tubular corolla (Little and Wadsworth 1964). The stalkless male flowers measure 13 mm across, while the smaller female flowers measure 3.2 mm across. The greenish-yellow fruit are 13 mm long and about 10 mm in diameter (Little and Wadsworth 1964). Fruits ripen to a brownish-purple color and contain one light brown elliptic seed that is 8 mm long, hard, and oily. The flowers are an important nectar source for honey bees, and the fruits a fat-rich food for birds (Francis 1992, Little and Wadsworth 1964). Seeds are commonly dispersed by birds, rodents, water, and domestic animals.

Fruits are easily collected from the ground beneath open-grown trees. Seeds average 2,980 per kg (Francis and

Rodríguez 1993). Seeds can be stored for 1 to 2 months in sealed containers at room temperature and for longer periods of time under refrigeration at 3 to 4 °C. On a suitable site, natural regeneration may be so abundant that the one- or two-leafed plants may be mistaken for grass. Seeds sowed in trays of sand with no pretreatment and kept at ambient temperatures (24 to 30 °C) averaged 80 percent germination after 14 days. Germination is hypogeous (Francis 1992) and may take up to 2 months after sowing. The radicle emerges first, the shoot about 3 weeks later. Under natural conditions, the first seeds may not germinate for 50 to 60 days, with others delayed for an additional 100 days (Braun 1983).

Seedlings grown in nurseries should be kept in full sunlight (Francis 1992). Seedlings can be transplanted at any size but need protection from weeds and grass until they have formed a stem and have overgrown the competition. *Roystonea borinquena* seedlings kept in full sunlight averaged 30 cm in height after 6 months and 90 cm after 15 months; they can be grown to heights of 1.5 m or more in 4-L containers (Francis 1992). Large trees can be dug up with a backhoe and transplanted. Survival is high as long as trees are braced and frequently watered. High mortality results if young trees with only a few basal leaves or short trunks are moved without a

protective earth ball and left without shade and water (Francis 1992). The tree apparently has no serious insect pests.

ADDITIONAL INFORMATION

Braun (1983) and Little and Wadsworth (1964) note *R. borinquena* heights reaching only 18 m and diameters of 30 to 61 cm for the species, while Bailey and Bailey (1978) report heights reaching at least 15 m. Because of its ability to withstand high, hurricane-force winds, the species sometimes dominates the forest canopy despite its short stature (Francis 1992).

Although trees flower and fruit throughout the year, suppressed and intermediate trees may never bear fruit. Francis (1992) reports that, in a survey of 100 open-grown *R. borinquena* trees, 35 percent bore no fruit while the remainder bore an average of 3.2 panicles, which produced from 6,000 to 12,000 fruits each. Fruits contained, on the average, 6.48 mg per 100 mg starch and 44.38 mg per 100 mg lipid.

Seeds of *R. borinquena* yield 19.65 mg per 100 mg of oil; the oil is made up of 31.8 percent lauric, 27.2 percent oleic, 9.6 percent myristic, 8.4 percent linoleic, 7.8 percent caprylic, 7.8 percent palmitic, 4.8 percent capric, and 2.6 percent stearic fatty acids.

