

Washingtonia filifera (L. Linden) H. Wendl.

California washingtonia

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Synonyms. *Washingtonia filamentosa* (Frenzi) Kuntze, *Neowashingtonia filimentosa* (Frenzi) Sudworth.

Other common names. California Washington-palm, desert-palm, California fan-palm, California-palm.

Growth habit, occurrence, and use. The California washingtonia—the only palm native to California—is the largest of the native palms in the United States (Bomhard 1950). Its sturdy, massive, cylindrical trunk grows to a height of 18 to 23 m and tapers very gradually from a diameter of 51 to 91 cm at the base to slightly less at the top. It has a broad open crown with as many as 50 fan-shaped, much-folded leaves with petioles as long as 1.5 m. Dead leaves may remain on the trunk for many years, forming a dense, thatch-like shroud or skirt about the trunk down to within a few feet of the ground (Sudworth 1908). This species is native to rocky streambeds and edges of other sources of water bordering the Colorado Desert in southeastern California and in Yuma County, Arizona, and northern Baja California, Mexico (Bomhard 1950). It is now widely planted in southern California, Arizona, Texas, and the Gulf States for ornamental and environmental forestry purposes along roads or in small stands.

Geographic races. Studies employing electrophoretic techniques suggest that the current populations in southern California are either relicts or recent recolonizations from seed dispersal from a refugium population in Baja California, Mexico (McClenaghan and Beauchamp 1986).

Flowering and fruiting. In August, small but showy clusters of white, vase-shaped flowers are borne, enclosed initially by a spathe (Jepsen 1910). The mature flower stalk may average 3.7 m in length and extend almost horizontally in the crown (Bomhard 1950). The flowers are perfect and occur annually in great abundance once the tree reaches reproductive maturity. The calyx is tubular and the corolla is funnel-shaped, with the stamens inserted in its tube (Jepsen 1910).

The fruit and seeds mature during December and January. The ripe fruit is a spherical or elongated black berry about 10 to 13 mm long, with thin flesh surrounding a single hemispherical seed (DeMason 1988; Jepsen 1910; Sudworth 1908). The seed is pale chestnut in color and measures about 6 to 8 mm long by 3 mm thick; there are about 2,300 to 2,700 seeds/kg (1,040 to 1,225/lb) (Sudworth 1908). It is flattened somewhat on the ventral side (figure 1). The lance-shaped embryo is located on the round side of the seed near the raphe (DeMason 1988). There is a large

cotyledon, an epicotyl, a small root apex, a horny endosperm, and a thin seedcoat (DeMason 1988; Jepsen 1910). The seeds are mature at the time of fruit drop.

Extraction and storage of seeds. The fleshy covering on the seeds should be removed in a macerator. The cleaned seeds then may be stored or sown immediately. Seeds should not be permitted to dry out (DeLeon 1958). Seeds of this species have been stored successfully in sealed containers at 5 °C for up to 6 years (Quick 1968), but long-term storage is not recommended.

Germination and nursery practice. Fresh seeds with no treatment before sowing have germinated between 80 and 100% in 4 to 15 weeks (Emery 1969; McCurrach 1960). Seeds stored as long as 5 years also germinated well, 87% without a pretreatment. However, the time to reach maximum germination was reduced when stored seeds were stratified at 5 °C for 12 weeks before sowing (Quick 1968). Fresh or stratified seeds can be sown directly in a well-drained seedbed outdoors or in flats or other containers. Many growers prefer to sow the seed in a mixture of peat moss and sand or in just sand. Depth of cover has been 6 to 13 mm (¼ to ½ in), or a depth equivalent to the thickness of the seed (McCurrach 1960). Bottom heat for the containers has been recommended to speed germination and is also recommended during periods when cold nights can occur (Loomis 1950; Muirhead 1961). It should be noted that there is an allelopathic potential of the dry fruit of this species. Substances that inhibit germination were found in the pericarp (Khan 1982).

Germination is hypogeal (Tomlinson 1960). When a seed germinates, the shoot grows but the seed remains underground. With the appearance of an elongated second leaf, seedlings should be transplanted to individual containers containing soil mix enriched with leaf mold (Muirhead 1961). The transplants should be grown in partial shade to prevent excessive drying of the seedlings. During the subsequent growing period, the seedlings should be acclimated to heat by gradually removing the shade.

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Figure 1—*Washingtonia filifera*, California washingtonia: longitudinal section through the embryo of a seed, × 10.