

Cyphosperma naboutinense, a New Species from Fiji

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1. *Cyphosperma naboutinense* is a solitary, slender, understory palm in the rain forest near Naboutini, Viti Levu, Fiji.

A new species of *Cyphosperma*, *C. naboutinense*, is described and illustrated.

This new species of *Cyphosperma*, long recognized by palm enthusiasts and others as likely to be distinct, is restricted to a small area along the southern coast of Viti Levu, Fiji's

largest island. Marcus has grown it in his nursery in Hawaii for several years where it has flowered and fruited regularly. Because he has widely distributed seedlings since 2009, it



2. In areas disturbed by logging near Naboutini, Viti Levu, Fiji, *Cyphosperma naboutinense* is often exposed to higher light or full sun and has a more compact canopy.

is named and described here as a new species. This paper, part of a larger, long-term project on Pacific Island palms that Hodel is leading, is based on the examination of wild-growing plants in Fiji, cultivated plants in Hawaii, and herbarium specimens in Fiji and California.

Cyphosperma naboutinense Hodel & J. Marcus, **sp. nov.** *C. tanga* affinis sed foliis pinnatis differt; *C. trichospadici* affinis sed

fructibus minoribus (13 × 8 mm vs. 21 × 18 mm) differt. Typus: Fiji. Viti Levu. Serua Prov.: ca. 6 km north of Naboutini along main logging road, *Fuller et al.* 302, 17 November 1995 (Holotypus CAS!, Isotypus SUVA!). Figs. 1–7.

Solitary, slender, unarmed, pleoanthic, monoecious, understory tree palm to 12 m tall (Figs. 1 & 2). Stems 10–12 cm diam., green

aging to brown or gray, with slightly raised, irregular leaf scars, these 1 cm wide, internodes 6 cm (Fig. 3). Leaves 15–18, pinnate, ascending to mostly spreading, to 2.8 m long, canopy typically with several persistent, dead, brown leaves hanging below the green ones (Fig. 5); leaf bases to 30 cm long, deeply split opposite petiole and not forming a crownshaft (Fig. 4), green distally, dark brown proximally, persistent on the distal 75–100 cm of stem below the leaves; petiole to 75 cm long, green, convex abaxially, concave adaxially; rachis to 2 m long; pinnae 25–30 on each side of rachis, mid- and proximal mid-blade pinnae largest, these 75 × 4.5 cm, lanceolate, sigmoid, long-acuminate, opposite to subopposite, midrib prominent adaxially, lacking scales, 1 primary nerve and 1 or 2 secondary nerves on either side of midrib, proximal pinnae subopposite, to 40 × 2.5 cm, most distal pinnae to 35 × 4 cm, all nerves slightly more conspicuous abaxially with midrib having 10–15, slender, reddish brown, medifixed raementa 5–10 mm long in proximal 20 cm. Inflorescences several, interfoliar in flower, interfoliar or infrafoliar in fruit, exceeding petiole but much shorter than leaves, to 1.6 m long, laxly branched to 3 orders (Fig. 6); peduncle to 75 cm long, 11 cm wide at attachment, 6 cm wide at prophyll scar, narrowing to 2 × 1.2 cm at 1st peduncular bract; prophyll not seen but attached 3 cm distal of base and incompletely encircling peduncle at attachment, 1st peduncular bract attached 3 cm distal of prophyll attachment, to 75 cm long, tattered, long-acuminate, 2nd peduncular bract attached 28 cm distal of prophyll, to 3 cm long, tattered, 3rd peduncular bract not seen but attached 37 cm distal of prophyll; rachis to 85 cm long with up to 9 branches and 6 unbranched rachillae, branches attached at right angles to rachis, proximal 1st-order branches with up to 5 2nd-order branches and 5 rachillae each, peduncle of 1st-order branches to 35 cm long, rachis of 1st-order branches to 30 cm long, peduncle of 2nd-order branches to 18 cm long, rachis of 2nd-order branches to 7 cm long, 3rd-order braches simple rachillae, bracts subtending large, proximal branches to 35 cm long, long-acuminate, bracts subtending smaller branches and rachillae to 5 cm long, short-acute to long-acuminate; up to 70 rachillae, these to 45 cm long, 1.5 mm diam. at base, 1 mm diam. at apex; peduncle, rachis, and rachillae with reddish brown tomentum. Flowers in triads of later-opening, central pistillate flower flanked on each of two sides by earlier-opening

staminate flowers, triads 5–15 mm distant proximally becoming more densely placed to nearly contiguous distally where replaced with solitary or paired staminate flowers, triads in clefts 3 mm long, 1.5 mm wide, 0.5 mm deep, subtended proximally by knife-like bracteole 1 mm high, 2 bracteoles subtending pistillate flower 1.75 mm high, 2.25 mm wide, imbricate, nerved abaxially, 1 bracteole subtending each staminate flower 1 mm high. Staminate flowers whitish, 5–6 × 6–8 mm; calyx 1–1.25 × 2 mm, cupular, sepals 1.25 × 2 mm, cup-like, broadly rounded to truncate distally, imbricate nearly to apex; petals 2.75–3 × 1–1.25 mm, boat-like, valvate, prominently nerved abaxially, less so adaxially; stamens 6, 5–6 mm high, exerted beyond petals, attached on a short base 1 mm high, filaments 4–4.5 mm long, slender, spreading, connate basally and there adnate to proximal 0.75–1 mm of pistillode, anthers 1–2 mm long, medifixed dorsally; pistillode 2.75–3.5 mm high, columnar, ± stout, prominently grooved longitudinally when dry and apex enlarged.

3. Stems of *Cyphosperma naboutinense* are green aging to brown or gray, with slightly raised, irregular leaf scars (Naboutini, Viti Levu, Fiji).





4. Like all species in the genus, *Cyphosperma naboutinense* has deeply split leaf bases not forming a crownshaft (Naboutini, Viti Levu, Fiji).

Pistillate flowers in bud 3 × 2 mm; calyx 2.5 mm high, cupular, sepals 2.25–2.5 × 2.25–2.5 mm, cup-like, prominently nerved abaxially, less so adaxially, imbricate nearly to apex; petals 2.5 × 2–2.25 mm, boat-like to cupular, mucronate, prominently nerved abaxially, less so adaxially, imbricate nearly to apex; pistil 2.5 × 1.5 mm, proximal 1.75 mm globose,

pebbled, style 0.75 mm long, smooth; staminodes 0.4 × 0.2 mm, tooth-like. Fruit 13 × 8 mm, dark orange when fresh ripe, conspicuously bumpy when dry (densely covered with small but prominent, rounded protuberances); perianth 3–4 mm high, sepals 2.5–3 mm high, petals 3–4 mm high. Eophyll bifid (Fig. 7).



5 (top). In its natural condition as an understory palm the canopy of *Cyphosperma naboutinense* is composed of gracefully arching and spreading leaves. Note the several, persistent dead, brown leaves hanging below the green leaves (Naboutini, Viti Levu, Fiji). 6 (bottom). Inflorescences of *Cyphosperma naboutinense* are interfoliar in flower but may become infrafoliar in fruit, are longer than petiole but much shorter than leaves, and branched to three orders (Naboutini, Viti Levu, Fiji).

Distribution and Ecology: *Cyphosperma naboutinense* is known only from Naboutini in Serua Province along the southern coast of Viti Levu, Fiji. At the type locality slightly inland

from the coast, it is restricted to several, small populations confined to four adjacent drainages in lowland rain forest at about 300 m elevation.



7. The eophyll and seedlings of *Cyphosperma naboutinense* are bifid (Naboutini, Viti Levu, Fiji).

Additional Specimens Examined: Fiji. Viti Levu. Serua: Naboutini, *Fiji Dept. Agric. 13992* (Koroiveibau & Qoro) (SUVA); ca. 6 km north of Naboutini along main logging road, Fuller *et al.* 181 (CAS, SUVA).

Notes: *Cyphosperma* includes five species of solitary, moderate to large, pinnate-leaved, rain forest palms indigenous to Fiji (three species), Vanuatu (one species), and New Caledonia (one species) in the southwest Pacific. Members of the genus lack a crownshaft and have an incomplete prophyll (initial bract enclosing the inflorescence does not entirely encircle the peduncle at the point of attachment), long-pedunculate, mostly interfoliar inflorescences and conspicuously sculptured seeds. A member of the subtribe Basseliniinae, *Cyphosperma* is likely to be most closely related to *Basselinia*, *Burretiokentia*, *Cyphophoenix* and *Physokentia*.

Cyphosperma tanga (from Viti Levu) and *C. trichospadix* (from Vanua Levu and Taveuni), the other two Fijian species, differ in their mostly undivided leaf and much larger fruit, respectively. Also, *C. tanga* has scales on the adaxial midrib of the pinnae, a feature lacking in *C. naboutinense*. The species from New Caledonia, *C. balansae*, differs in its much larger habit and size of various organs, the thicker, heavier texture of the leaves, the

peduncle exceeding the petiole and the stem with prominently indented leaf scars. The relatively poorly known species from Vanuatu, *C. voutmelense*, which in gross morphology may be the most similar species to *C. naboutinense*, differs in its much smaller habit and size of various organs, the low, rounded bracts subtending the inflorescence branches and the ramenta on the midrib of the abaxial surface of the pinnae apparently restricted to the very proximal area near the attachment to the rachis.

Cyphosperma naboutinense was first collected in 1964, and Moore (1979), in his treatment of palms for the *Flora Vitiensis Nova*, included this 1964 collection with *C. tanga* although he made note of the differences in leaf division and habitat between the two taxa. However, it was not until the early 1990s that the late Dick Phillips, long a grower and champion of Fiji's amazingly rich and diverse treasure trove of palms, suspected that this taxon from Naboutini was distinct and brought it to the attention of others. Fuller (1997), in his excellent and comprehensive treatment of Fijian palms, and Watling (2005), in his superb and handsomely illustrated account of Fijian palms, referred to this taxon as *Cyphosperma* sp. "Naboutini," also the name under which Marcus has distributed seedlings.

Conservation Status: *Cyphosperma naboutinense* currently has no risk assessment designation (IUCN 2010). However, Fuller (1997) and Watling (2005) contended that it should be considered Critically Endangered according to IUCN criteria because of its small population size of only about 50 mature plants in or near a highly disturbed site that was logged and then replanted with mahogany. Logging has occurred near the site for many years. According to Watling (2005), the first generation of mahogany was logged in 2003, which severely damaged or killed many palms. Watling also reported that local people were aware of the palms and their precarious existence, and they were trying to prevent further logging damage. However, when DH visited the site in October, 2008, active logging operations were underway, and many palms had been recently damaged or destroyed.

The narrow, restricted range of *Cyphosperma naboutinense* increases susceptibility to a single, disruptive event, like a cyclone, and to potential damage from invasive weeds, animals, pests and disease. Low seedling recruitment and small population size suppress regeneration. Because it is readily and easily accessible on Fiji's main island, fruits and/or small plants have been occasionally gathered, and *C. naboutinense* is now cultivated in Fiji, Hawaii and perhaps elsewhere.

Culture: Marcus planted seeds of *Cyphosperma naboutinense* and *C. trichospadix* in 1993 at his nursery near Kurtistown on the island of Hawaii, an area of mild temperatures (19–29°C, 65–85°F) and abundant rain (250 cm, 100 inches annually). Resulting seedlings were sufficiently large to plant out in 1995, and plants of both species began to flower in 2008.

They are perhaps the only fruiting plants of these two species in cultivation.

From flowers to mature fruits takes about one year for *Cyphosperma naboutinense*. Seeds germinate readily, and seedlings are easy to grow. With *C. trichospadix* and *C. balansae*, in contrast, from flowers to mature fruits takes longer, germination is more sporadic and seedlings somewhat trickier to grow. Marcus has less experience with *C. tangae*, but seeds of this species germinate much more slowly and sporadically than the others.

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LITERATURE CITED

- FULLER, D. 1997. Conservation Status, Diversity and Systematics of the Indigenous Palms of Fiji. M.Sc. Thesis. University of the South Pacific, Suva, Fiji.
- IUCN. 2010. Red List of Threatened Species. <http://www.iucnredlist.org/apps/redlist/search> (accessed December 15, 2010).
- MOORE, H.E. 1979. Arecaceae, pp. 392–438 in A.C. SMITH (Ed.), *Flora Vitiensis*, Vol. I. Pacific Tropical botanical Garden, Lawai, Kauai, Hawaii.
- WATLING, D. 2005. Palms of the Fiji Islands. Environmental Consultants, Suva, Fiji.