Palms have been able to exploit many habitats, but possibly one of the most unusual is that associated with stream edges that receive frequent and persistent inundation with rapidly flowing water. A plant occurring in such a habitat is termed a rheophyte. Palm species that behave as rheophytes have been discussed by van Steenis (1981), Galeano-Garces & Skov (1989), Dransfield (1978, 1992), Hodel (1992), Beentje (1993), Barrow (1994), Dowe & Hodel (1994), Dransfield & Beentje (1995) and Baker (1997) who together list less than fifteen species that have adopted this habit.

Adaptation to the rheophytic habit is usually expressed in the morphology of the species, and modes of dispersal and establishment (van Steenis 1981). Stems are often thin and pliable and leaves are finely pinnate, offering little resistance to the forces of flowing water, and lack sclerotic tissues. Fruit and seeds may have structures that aid in dispersal and establishment.

New Guinea has a diversity of habitats in which palms occur. The mountainous topography of most of the island ensures the presence of many permanent fast flowing streams and rivers. Many species in such diverse angiosperm families as Araceae, Araliaceae, Costaceae, Moraceae, Myrtaceae, Pandanaceae and Zingiberaceae, and numerous Pteridophytes are adapted to this niche. Although palms are present in most habitats in New Guinea, few are adapted to an existence on the margins of fast flowing streams. The presence of a rheophytic palm in New Guinea was first noted by Brass (1941) when he collected "the clump palm *Actinophloeus* 13700" at Araucaria Creek on the Idenburg River in Papua (formerly Irian Jaya), as part of "a community of flood-resistant small trees". Subsequently, this palm was illustrated by a photo taken by Brass in "Rheophytes of the World" (van Steenis 1981), where it was named as *Hydriastele* sp. nov., following identification of Brass' specimens conserved in the Herbarium of the Arnold Arboretum by Harold E. Moore.

This species was brought into cultivation during the 1980s in north Queensland by nurseryperson Maria Boggs, who distributed it to botanic gardens and specialist collectors. The exact details of place of origin are not known, but it is known that Boggs had visited parts of Papua New Guinea around this time. The authors were able to locate a number of mature cultivated specimens that enabled a complete description to be made.

Hydriastele rheophytica Dowe & Ferrero, **sp. nov.** Figs 1–3.

Palma caespitosa ad 6 m caulibus flexuosisque, foliolis angustissimis ad 20 mm latis, infra ramentis numerosis, floribus staminatis roseis ad 6 mm longis, staminibus 6, antheris basifixis ad 4 mm longis, floribus pistillatis cremeis globosis ad 2.2 mm altis, stigmate trifido recurvato, fructu rubro, globoso vel late ellipsoideo ad 7 mm longo, endospermio non profunde ruminato bene distincta. Typus: INDONESIA. PAPUA: Snow Mts, Idenburg River, 4 km SW of Bernhard Camp, Araucaria Creek, 850 m alt., March 1939, *Brass 13700* (Holotypus A).

Clustering palm to 6 m tall. Stems up to 30, to 6 m long, laxly pliable, erect to mostly leaning, occasionally decumbent, 2.0–2.5 cm diam., initially cream colored with red patches immediately after leaf fall, becoming green; internodes to 14 cm long, nodes 4–5 mm wide. Leaves 4–12 in the crown, regularly pinnate, 95–120 cm long. Leafsheath tubular, 40–45 cm long, dark green with dense crustose scales becoming deciduous with age; petiole 20–30 x 1.5–2 cm wide, shallowly channeled adaxially, rounded abaxially, dark green with dense crustose scales becoming deciduous with age; lamina regularly pinnate, 75–90 cm long; pinnae 18–32 per side, widely spaced at 2–3 cm intervals in the proximal portion, becoming closer spaced at ca. 1 cm toward the apex; pinnae linear-acute, dark green adaxially, slightly lighter green abaxially, the most basal to 40 cm long, 1.2–2 cm wide, the most distal to 10 cm long, 0.7–2 cm wide; midrib adaxially prominent, with 1 rib per pinna except the apical pair that have 2–3 ribs; ramenta scattered along the abaxial midrib for most of the length of the pinnae. Inflorescence infrafoliar, 16–30 cm long, with 5–8 rachillae, at first erect but pendulous in fruit; prophyll boat-shaped, 2-keeled, laterally compressed, to 20 cm long, fully enclosing the inflorescence in bud; peduncular bract thin, papery, to 18 cm long, fully enclosed within the prophyll; peduncle 6–7 cm long, basally winged, constricted at the points of attachment of the prophyll and peduncular bract, green, glabrous, becoming terete distally; rachis 2–3 cm long, terete, green, glabrous; rachillae to 20 cm long, unbranched, cream-green, glabrous, bearing closely spaced spirally arranged triads throughout the length of the rachilla. Staminate flowers to 6 mm long; calyx tubular, trilobed, to 1 mm high, cream; petals triangular, apically pointed, unequal in length, shortest to ca. 5.2 mm, longest to ca. 6.6 mm, pinkish cream; stamens 6, to 4.5 mm long, anthers sagittate, basifixed, to 4 mm long, slightly twisted; pistillode lacking. Pistillate flower to 2.2 mm high; calyx trilobed, cream; petals slightly larger to1.5 mm long, cream, triangular,

imbricate basally, rounded apically; stigma trifid. Fruit globose to broadly ellipsoid, to 7 mm long, red; epicarp smooth, with slight longitudinal ridges, stigmatic remains apical; mesocarp thin, fibrous; endocarp thin, crustaceous. Seed globose; endosperm shallowly ruminate; embryo basal.

SPECIMENS EXAMINED. INDONESIA. Papua: Snow Mts, Idenburg River, 4 km SW of Bernhard Camp, Araucaria Creek, 850 m alt., March 1939, *Brass 13680* (A)PAPUA NEW GUINEA. West Sepik Prov.: Omasai Creek, tributary of Frieda River, 2.5 km from Wabia village, 04° 44.245′ S, 141° 56.786′ E, 25 Feb. 1998, *M. D. Ferrero 980038* and *980039* (BRI, LAE). CULTIVATED: Australia: Queensland, Babinda, garden of M. Daish, 7 Jan. 1999, *J. L. Dowe 535* (with M. D. Ferrero) (BRI, JCT); Gordonvale, garden of L. Squire, 7 Jan. 1999, *J. L. Dowe 536* (with M. D. Ferrero) (BRI, JCT).

DISTRIBUTION AND ECOLOGY. Known from the Idenburg River and its upper tributaries in Papua, Indonesia and West Sepik Province, Papua New Guinea, growing on rocky river banks where frequently inundated by fast flowing water.

Hydriastele rheophytica represents an unusual dimension to the palm flora of New Guinea. Although other palm species may be found on the banks of fast flowing rivers, they are often also found on adjacent slopes and other non-specific locations. *Hydriastele rheophytica* is known to occur only on stream banks as part of a 'rheophyte community'. Morphologically, it displays some interesting characters: thin pliable stems and petioles, and leaves with numerous thin soft pinnae, all of which can be interpreted as rheophytic characters. These characters are maintained in cultivated plants, and in north Queensland they can grow into elegant though somewhat untidy plants with prostrate stems.

The type, *Brass 13700* (A), collected during the Archbold Expedition of 1938-39, includes a full leaf, flowers and fruits.

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3 Leaf of *Hydriastele rheophytica* on a plant cultivated in the garden of Lyle Squire, Gordonvale, Queensland.