phology, both species having stout glaucous and sparsely scaly branches, glossy-brown buds and unequal bracteoles, the inner one sepal-like, but they differ markedly in flower shape and structure, leaf shape, and indument. The two species occur about 50 air kilometers apart.

4. Kentiopsis pyriformis Pintaud & Hodel **sp. nov.** (Figs. 6–9)

Kentiopsis oliviformi (Brongn. & Gris) Brongn. affinis sed foliorum vaginis glabrescentibus ceraceis cupreis vel vinosis, inflorescentiis effusis ramis principalibus angulatis, floribus masculis symmetricalibus, staminibus 11–20 differt. Typus: New Caledonia, Goro, mouth of Kuebini River, 50 m elev., 22° 16′ S, 167° E, 6 Dec. 1995, *J-C Pintaud & D. R. Hodel 303* (holotypus P; isotypi BH, BRI, K, NOU, NY).

Subcanopy to emergent palm. Trunk 10–18 m tall, 10–22 cm dbh, brown becoming gray, sometimes enlarged or bulging at the base, adventitious roots visible. Leaves 7–12, ascending to spreading, moderately recurved or nearly straight; leaf sheath 70–130 cm long, copper-colored or purplish red, with a thin cover of glaucous-white wax and minutely puncticulate with tiny brown lacerate scales abaxially, splitting in the distal 1/4–1/3 opposite petiole and there bearing small auricles 1 cm long or terminating on petiole with two wings 10 cm long; petiole 20–45 cm long (sometimes to 2.6 m long in trunkless juveniles), glabrescent, green or reddish to purplish; rachis 2.5–3 m long, petiole and rachis variously covered initially by thin feltlike indument of brown-centered, white-margined scales; pinnae 40–58 on each side, median ones 110–130 × 5–8 cm, proximal two pairs continuing into lorae, all acute, coriaceous, one-ribbed, ascending and held in open V or borne in one plane and flat to slightly pendulous, green and glossy adaxially, midrib and sometimes secondary ribs bearing abaxially membranous, medifixed ramenta in groups of 2–20. Inflorescences 1–2, 60–100 cm wide, spreading, branched to four orders; peduncle 6–10 cm long; prophyll 40–50 × 20 cm, splitting into two halves; first peduncular bract 50–60 × 15–18 cm, beaked, slightly exceeding the prophyll, both bracts pale green or dark purple, glabrescent to variously tomentose abaxially; rachis 30–40 cm long with 10 main branches 2–10 cm long, 1–4 cm wide, sharply angled, dorsiventrally flattened, brownish green to bright purple; peduncle and rachis with thin indument of brown-centered, white-margined minute scales; bracts subtending branches small, triangular-obtuse to acuminate and finally reduced to a ridge; rachillae 100–400, slender, 20–30 cm long, 0.5 cm diameter, folded and mucilaginous in inflorescence bud, rounded, glabrescent, very pale green to cream-colored in bud, becoming brown or dark purple. Flowers in horizontal triads of a central pistillate flower flanked by two median-lateral earlier-opening staminate flowers; triads in proximal 2/3 and sometimes nearly to apex of rachillae, paired staminate flowers only distally, or sometimes paired staminate flowers on unisexual rachillae; bracts subtending triads a thin, rounded, sharp-edged lip to 1 mm high; staminate flowers in bud 6 × 3.5–4 mm, glossy brown, almost symmetrical; calyx 2.5 mm high and 3.5 mm in diameter, cupular, sepals keel-like, truncate or broadly rounded apically; petals ovate, boat-shaped, spreading at anthesis, adnate to the receptacle basally and with a swollen pulvinus just above, pinkish adaxially; stamens 11–20, just exceeding petals, filaments free or nearly so, 2.5 mm long, slender, slightly fluted, white, straight, and not attenuate apically, anthers 2–2.5 mm long, slender, dorsifixed 1/3 up from base, connective white, not tanniniferous; pistillode 1–1.5 mm high, much shorter than filaments and petals, conical to columnar and fluted or rarely spindle-shaped; outer bracteole surrounding pistillate flower 1–2.5 mm high, sepal-like or not, inner bracteole 2.75 mm high, always sepal-like, sometimes forming a tube with the outer bracteole; pistillate flowers 5–6 × 3–4.5 mm, rhomboid and laterally compressed or globose-ovoid; calyx 4–4.5 × 4–4.5 mm, cupular, sepals strongly bowl-like to cup-shaped; petals bowl-like to cup-shaped, scarcely exceeding or much exceeding sepals; staminodes 3, 0.5–0.9 mm high, toothlike, thin, membranous; gynoecium 4–5.5 × 2.5–3 mm, stigmatic lobes recurved, angled, laying between corolla lobes or short, erect; ovule laterally attached or pendulous. Fruits to 17 × 7 mm, oblong, purplish pink, fruiting perianth 6 × 8 mm, stigmatic residue subapical; mesocarp with abundant, mostly elongate, but at times wandering or reticulate fibers not adherent to endocarp, tannin cells in a thick layer between fibers and endocarp; endocarp whitish, fragile. Seeds 10–12 × 5–6 mm, pyriform, rarely ± ellipsoid,

hilum elongate, lateral, raphe branches mostly longitudinal, anastomosing little, slightly embedded. Bifid leaves 5–6 before first pinnate leaf; trunkless juvenile individuals with distichously arranged leaves, becoming spirally arranged with age, petioles glabrous, glossy reddish to dark purple; "saxophone" growth present.

Additional specimens examined. NEW CALEDONIA. Coastal locations: Touaourou, edge of the rain forest, 10 m elev., 22° 12′ S, 166° 58′ E, 26 Apr. 1995 (ster.), *J.-C. Pintaud 174* (leg. *T. Tonnelier, M. Dumas & R. Lavoix*), (NOU); Goro, mouth of Kuebini River, 50 m elev., 22° 16′ S, 167° E, 5 May 1995 (fr.), *J.-C. Pintaud & M. Dumas 190* (NOU, NY); id. 26 May 1995 (juv.), *J.-C. Pintaud & C. Pierson 203* (NOU), 204 (P); id. 10 Sept. 1995 (buds), *J.-C. Pintaud & M. Dumas 265* (BH NOU, P); id. 6 Dec. 1995 (stam. fl.), *J.-C. Pintaud & D. R. Hodel 304* (BH, BRI, K, NOU, NY, P); id. 4 Jan. 1996 (pist. fl.), *J.-C. Pintaud, T. Jaffré & J.-M. Veillon 310* (BH, K, NY); id. 4 May 1996 (fr.), *J.-C. Pintaud & M. Dumas 348* (BH, BRI, K, NOU, NY, P); Kaa Drumia south of Goro, 50 m elev., 22° 19′ S, 167° E, 26 Jun. 1996 (old infru.), *J.-C. Pintaud 374* (leg. J-M Veillon), (NOU); Inland location: South of Mts Nengone, near Port Boisé, 200 m elev., 22° 20′ S, 166° 55′ E, 26 May 1995 (juv.), *J.-C. Pintaud & C. Pierson 200 & 201* (P), *202* (K, NY); id. 10 Dec. 1995 (buds & pist. fl.), *J.-C. Pintaud & D. R. Hodel 306* (BH, BRI, K, NOU, NY, P); id. 13 Jan. 1996 (juv.), *J.-C. Pintaud & M. Dumas 316* (P); id. 12 Feb. 1996 (seeds), *J.-C. Pintaud 325* (*leg. R. Lavoix*) (NOU).

Distribution. *Kentiopsis pyriformis* ranges from along the east coast of New Caledonia south of Yaté, where it occurs in a fringe of forest 20 km long and 100–500 m wide from Touaourou to Goro villages at 5–100 m elevation, inland to the southwest about 11.5 air kilometers distant in remnant patches of forest at about 200 m elevation, at the southern end of Monts Nengone, near Port Boisé. The main population is at Goro on a steep, unstable, rocky slope above the mouth of Kuebini River.

Ecology. A more or less gregarious, subcanopy to canopy species, *Kentiopsis pyriformis* is found in lowland rain forest on ultramafic rocks, both on oxydic colluvium on flat land and steep, rocky, eroded slopes of peridotitic mountains and hills. The largest and more gregarious population at the Kuebini River near Goro grows with other palms including *Actinokentia divaricata, Basselinia pancheri, Clinosperma bracteale,* and *Cyphokentia macrostachya.* The population near Port Boisé is much smaller and the individuals more scattered. Associated palms there include *A. divaricata, B. gracilis, B. pancheri, Chambeyronia macrocarpa.*

Phenology. Flowers usually occur from November through February with a 15-day delay between anthesis of staminate and pistillate flowers in the same triad; fruits mature from April through June (Fig. 2).

Conservation status. Status is critically endangered (proposed). Occupying less than 2 ha, the main population of *K. pyriformis* at the Kuebini River is unprotected and consists of less than a hundred trunked individuals. Fire severely affected the entire population about 1980, destroying nearly all saplings and damaging trunks of many mature individuals. Despite an abundant and regular production of readily germinating seeds, regeneration remains extremely low due to the difficulty of seedling establishment in an unusually steep, rocky, unstable habitat. In March 1996, Cyclone Beti caused the fall of at least 25% of the adults, nearly all of them more windprone since the earlier fire destroyed protective vegetation and damaged trunks. In one group of eight adults, the cyclone felled seven of them.

Farther north along the coast at Touaourou, the forest is restricted to a narrow fringe inland from the road and next to the mountains. Here, burning, clearing for gardens and homes, and recent road improvements and rural electrification have all taken a toll on the forest. Also, native inhabitants probably harvested the palms, perhaps for the edible palm heart or cabbage and/or construction, since not one adult tree has been observed there. Some other small groups composed of a few adults and juveniles occur south of Goro where they are affected by landslides and stream erosion.

The Port Boisé population is known from ca. 20 adult trees, less than a hundred juveniles with trunks, and numerous saplings, which locally dominate the understory, and is partly, although marginally, included in a botanical reserve. Felling of trees for construction and edible palm heart has decimated this population. Jean-Marie Veillon (personal communication) reports that as a forestry officer in the 1970s, he cited people for illegal cutting of palms in the Botanical Reserve.

Taxonomic history. Lucien Lavoix, an ardent palm enthusiast, first noticed this palm and brought it into cultivation in the early 1970s, using seedlings removed from the Port Boisé population. Donald R. Hodel saw the species in the forest at Touaourou in 1977, and suspected it might be a new species. However, *Kentiopsis pyriformis* remained undocumented until we made the only collections of mature, flowering trees in 1995–1996, relying on information from Raymond Lavoix, son of Lucien, and several members of Association Chambeyronia, the New Caledonia Palm Society.

Derivation of name. The epithet means pear-shaped, and refers to the unusual and distinctive shape of the seeds.

Since each of the two collected populations of *Kentiopsis pyriformis* (Kuebini River and inland near Port Boisé) has conspicuous differences, some explanation is needed to justify their inclusion in a single, variable species.

The two populations have the same major structural characteristics, both in vegetative and reproductive morphology. Distichous and glabrous juvenile stages associated with saxophone growth, highly branched inflorescences with flattened and sharply angled branches, slender rachillae, symmetrical flowers arranged horizontally in the triad, staminate flowers with sharply costate sepals, rather few stamens with short filaments not attenuate apically, white connectives and short pistillodes, pistillate flowers with three staminodes born within one petal, and pyriform seeds are constant and diagnostic characters. Purplish-pink fruits with subapical stigmatic remains and distinctive, elongate, wandering, reticulate mesocarp fibers may also prove to be good diagnostic characters, although mature fruits are yet unknown from populations near Port Boisé where only pyriform seeds removed from seedlings have been found so far.

The most striking differences in vegetative morphology concern the habit of the palm and characters of the leaf sheath. Individuals from the coastal population have only 7–8 recurved leaves with a copper-colored sheath bearing small auricles at apex, and pinnae held straight in an open V, while individuals of the inland population have 10–12 spreading leaves with attractive, purplish to burgundy sheaths lacking auricles, terminating in wings, and flat to slightly drooping pinnae. However, exploration in July 1996, south of Goro and on the eastern side of Port Boisé mountains not previously visited has uncovered additional populations of *Kentiopsis pyriformis* with a mix of vegetative characters and sometimes intermediate forms, which show that these features are quite variable and, in fact, lead nearly to a continuum between the two collected populations.

In reproductive morphology, the coastal and inland populations differ mainly in the shape of the pistillate flowers (rhomboid or ovoid) and surrounding bracts (forming a tube or not) and other pistillate structures such as stigmas (recurved or straight) and ovule attachment (lateral or pendulous), but we have made only one collection with pistillate flowers at each location, and thus we do not know the possible variability of these structures.

Biogeography

The discovery of two new species enhances our understanding of patterns of evolution and biogeography of *Kentiopsis*. Two species are restricted to the northeastern schistose range derived from the ancient rocks of East Gondwanan origin (Paris 1981). The rich flora of this region has been interpreted as a modified sample of the late Cretaceous East Gondwanan flora (Morat et al. 1986). With two genera and three species, Mt Panié, which is clearly a refuge for rain forest taxa, is not surprisingly rich in Archontophoenicinae, an autochthonous East Gondwanan subtribe supposedly of late Cretaceous origin. In contrast, *Kentiopsis pyriformis* has probably differentiated on more recent ultramafic substrates dating from the late Eocene, 38 million years ago (Jaffré et al. 1987). *Kentiopsis oliviformis* is unique among New Caledonia palms in growing in semihumid transitional forest, a vegetation type of late Tertiary to early Quaternary origin, rather poor in species and dominated by the possibly introduced *Aleurites moluccana* (L.) Willd. (Euphorbiaceae) and containing numerous elements of the dry sclerophyllous flora (Jaffré et al. 1993). *K. oliviformis* is, as presently known, the only endemic plant species of transitional forest. The genus has spread from the northern to the southern ends of the island in very different habitats but, despite efficient reproductive systems and gregarious behavior, the species of *Kentiopsis* remain highly localized, a pattern common to many New Caledonia endemic taxa and one still not clearly explained.