

The remarkable palm that forms the subject of this paper was first collected by the botanists van Royen and Sleumer on the Cyclops Mountains near Jayapura in Irian Jaya. Their specimen, deposited in Leiden Herbarium, was originally labelled *Korthalsia*, and the specimen thus remained mislaid in among the unidentified species of the rattan genus from New Guinea, until one of us (JD) realized it was a species of *Caryota*. However, JD, concerned at the time only with *Korthalsia*, did not examine the specimen in detail. Independently and much later in 1992, another of us (GGH) saw it in cultivation, realized the palm was undescribed and gave it the informal name "*Caryota zebrina*," by which it has become well known to palm growers (Fig. 1). Shortly after this, John Dowe discovered what appeared to be the same species in Vanuatu and described his Vanuatu palm as *Caryota ophiopellis* J. Dowe (Dowe & Cabalion 1996). Although the palm from New Guinea shares with *C. ophiopellis* some characters very unusual in the genus (Uhl & Dransfield 1987), they are indeed distinct. It is quite remarkable that two such strange and beautiful *Caryota* species should have remained undescribed for so long. Knowing that "*Caryota zebrina*" had been seen by GGH in the Cyclops Mountains, two of us (RAM and CH) made field trips to collect good complete herbarium collections, the first by CH in August 1998 and the second by RAM in September 1998, thus providing the necessary material for finalizing a description and to act as a type. The following paper is thus the result of a joint effort to provide a validly published name by which this now widely cultivated and highly desirable palm can be referred. The palm also occurs in Papua New Guinea (see Ferrero 1997) where it has been collected in the Torricelli Mountains.

Caryota zebrina G. Hambali, R. Maturbongs, C. Heatubun & J. Dransfield **sp. nov.**

inflorescentia in 2–3 ordines ramificanti, endospermio homoganeo, petalis floris femineae grandibus et petiolis fasciatis *C. ophiopellidi* Dowe similis sed fructu majore depresso-globoso, petalis floris staminati apice rotundatis staminibus 28 differt. Typus: Indonesia, Irian Jaya, Jayapura, Cyclops Mt Nature Reserve, Doyo Village Maturbongs RAM586 (Holotypus K; isotypi BO, MAN).

Solitary monoecious hapaxanthic tree palm; stems 6–16 m tall, ca. 20–40 cm diam., bare near the base, distally covered with sheaths; internodes 30–40 cm long, nodal scars ca. 2 cm wide, internode surface cracking longitudinally and covered with a thick layer of dirty brown tomentum. Leaves 5–7 m long, ca. 1.5 m wide,

young leaves pale green, older leaves dirty blackish green; sheath 1–2 m long, ca. 15 cm wide, markedly fibrous along margins, in mature leaves covered in dull brown tomentum, in juveniles strikingly tiger-striped with bands of pale and dark tomentum; ligule to ca. 25–60 cm long, covered in a dense layer of dirty brown tomentum, the ligule and sheath margins disintegrating into thin long black fibres; petiole ca. 1–2 m long, 2–6 × 2–3 cm in cross section, in young leaves tiger-striped with bands of pale and dark indumentum as the sheath, in older leaves dark olive green; rachis to 5 m long, to 20 × 28 mm in section in mid-leaf, adaxially with a strong flange ca. 8 × 5 mm, abaxially convex, covered in dense caducous dark brown tomentum; primary pinnae about 20 on each side if the rachis, up to ca. 20 cm apart, the basal primary pinnae ca. 80 cm long, the mid-leaf primary pinnae ca. 150 cm long, the distal to 100 cm long; secondary pinnae drying pale coloured, ca. 7–11 on each side of the secondary rachis, up to ca. 26 × 7 cm, irregularly wedge-shaped, leathery, veins radiating from the base, adaxially glabrous, abaxially with broad bands of caducous brown scales; transverse veinlets obscure. Inflorescences 1–2.5 m long, branching to 3 orders (always?); peduncle to 30 × 40 mm diam., the surface densely covered in dull brown tomentum; distal bracts tubular, circumscissile and leaving a low collar, splitting distally to form a triangular limb to 22 × 12 cm, edged with dark brown fibres and covered in caducous brown tomentum; basal first order branches with a conspicuous pulvinus to ca. 5 cm wide; rachillae of various lengths, the longest to at least 1 m, 3–4 mm diam., covered in dark brown indumentum; triads ca. 8–10 mm distant; rachilla bracts low, crescentic. Staminate flower at anthesis ca. 14 × 7 mm; sepals 3, dark green, strongly imbricate, irregularly gibbous, broad, rounded, entire or emarginate, the outermost 5 × 8 mm, the middle 5 × 7 mm, the innermost 5 × 7 mm, the three slightly connate basally; petals 3, free to the base, 12.0 × 4.5 mm, glabrous, smooth, almost spatulate with rounded triangular tips; stamens ca. 28, filaments 3.0 × 0.3 mm, anthers orange 5–7 × 0.6 mm, connective dark tanniferous, projecting beyond the anthers as a short bifid tip to 0.5 mm; pollen monosulcate, exine semitectate with anastomosed clavae forming irregular islets of tectum (Harley, pers. comm.); pistillode absent. Pistillate flower in bud (*van Royen & Sleumer 6129*) superficially similar to staminate flower but narrower, ca. 10.0 × 3.5 mm except at base where 6 mm wide; sepals 3, rounded, broadly imbricate, irregularly gibbous, the outer 4 × 7 mm, the middle 4 × 7 mm, the innermost 3.5 × 6.0 mm; petals 3, free in bud, 9.0 × 2.8 mm; staminodes 3, antesealous, filaments

to 4 x 0.3 mm; gynoecium conical, 2 x 3 mm with 2 stigmas to 1.2 x 0.5 mm, ovules 2. Pistillate flower (*Maturbongs RAM586*) post anthesis with petals basally connate for 2 mm with narrow triangular lobes to 7 x 5 mm; ovary 6 x 6 mm with 2 ovules. Fruit ripening white and then red, globose to depressed globose, to 15 x 25 mm, with apical stigmatic remains; epicarp minutely papillate. Seeds 2, hemispherical, ca. 12 x 15 x 8 mm, surface smooth, with scattered veins, with basal corky mass; endosperm homogenous; embryo lateral. (Fig. 2).

ECOLOGY: Rare tree in mountain forest at 850–1500 m.

SPECIMENS EXAMINED: INDONESIA. Irian Jaya: Jayapura, Cycloop Mountains, path Ifar – Ormoe, north of pass, alt. 1200 m, 1 July 1961, *van Royen & Sleumer* 6129 (A, CANB, L, LAE). Jayapura, Cyclops Mt Nature Reserve, Doyo Village, 1050 m, 23 Sept 1998, *Maturbongs RAM586* (Holotype K, isotypes BO, MAN); Cyclops Mt, 1180 m, 9 Aug 1998, *Heatubun CH273* (BO, K, MAN). PAPUA NEW GUINEA. West Sepik, Miwaute, 142° 07' E, 03° 25' S, 950–1000 m, 19 Nov. 1996, *Barfod et al.* 386 (AAU, K, LAE).

LOCAL NAMES: *Palem belang* (striped palm) or *Palem tokek* (*Tokek* is the large house gecko)

USES: Apart the horticultural uses, the palm is probably too rare to be of much significance.

Caryota zebrina shares several features with *Caryota ophiopellis* Dowe that are unusual in the genus; these include homogeneous endosperm, inflorescences branched to more than one order,

pistillate flowers with large petals similar to those of the staminate flower, unusual pollen and, of course, the extraordinary tiger-striped petioles (Figs 1, 2). At first we thought they might be one and the same. However, there are several clear differences between them. *Caryota ophiopellis* was described originally as having a tear-drop shaped seed but this has been shown more recently to be anomalous, and the seed (of a single-seeded fruit) is rounded, lacking the depression found in *C. zebrina*. There are also subtle differences in leaf texture between the two, with *C. zebrina* having thicker and shinier leaflets than those of *C. ophiopellis*. The pollen grains of the two species are very distinctive but different. Two different intectate pollen types were until recently known in *Caryota* – pollen with small, regular clavae (club-like processes) and pollen with spine-like processes, and, in fact, pollen appears to be of importance in the evolution of the genus as it clearly helps to define two major evolutionary lines (Hahn & Sytsma 1999). *Caryota zebrina* has clavae but they are anastomosed to the extent that the whole grain becomes irregularly semitectate, while in *C. ophiopellis* the clavae are separate or pressed together in smaller or larger groups, often in a loose reticulate pattern and occasionally are anastomosed. Pollen of the two species will be the subject of a more detailed study (Harley, in prep.). The known differences between the two species are summarized in Table 1.

This is the second species of *Caryota* to be recognized in New Guinea, the other being *C. rumphiana*. The latter species is instantly recognizable by larger stature, its inflorescences

Table 1. Comparison of *Caryota zebrina* and *C. ophiopellis*.

Caryota zebrina

Mottling pattern of petioles broken stripes
 Pinnae dry pale green
 Inflorescence branching to 3 orders
 Petals of staminate flower with rounded tips
 Staminate flowers 14 x 7 mm
 Stamens 28
 Pollen semitectate with anastomosed clavae
 Fruit depressed globose
 Stigmatic remains strictly apical
 Seed of 1-seeded fruit hemispherical, 12 x 15 x 8 mm, with a depression

Caryota ophiopellis

Mottling pattern of petioles blotches
 Pinnae dry dull dark green
 Inflorescence branching to 2 orders
 Petals of staminate flower with pointed tips
 Staminate flowers 9 x 6 mm
 Stamens 20–25
 Pollen intectate with grouped or closely adpressed, rarely anastomosed clavae
 Fruit globose-ovoid
 Stigmatic remains eccentrically apical
 Seed of 1-seeded fruit rounded, 9 mm diam.

branched to one order only and its seeds with the ruminant endosperm typical of the genus. Furthermore, juveniles of *C. zebrina* carry the distinct and beautiful banding of different shades of gray and brown indumentum that makes the species such a desirable ornamental.

In the Cyclops Mountains, *Caryota zebrina* appears to be confined to the western part, where it occurs at elevations of 850–1500 m above sea level. Its absence from the eastern part of the mountains is probably related to the fact that this part of the range is not so high. The palm may well occur at elevations higher than 1500 m. Below 850 m elevation scattered seedlings can be found, sometimes intermingled with those of *Caryota rumphiana*, from which *C. zebrina* can be distinguished by the presence of three stripes of brown indumentum on the undersurface of each leaflet, the more leathery texture and the fact that the two leaflets of the eophylls are much more widely divergent. Seeds have been discovered in the droppings of cassowaries, so these majestic birds may be responsible for dispersal. In the wild, the zebra striping of the petioles becomes less and less conspicuous as the plants become older. In cultivation in Bogor, there is considerable variation in the intensity of striping from one individual to the next.

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