

Encephalartos ituriensis (Zamiaceae): an emended description

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ABSTRACT

The original description of *Encephalartos ituriensis* (Zamiaceae) is incomplete, to some extent inaccurate and based in part on immature material. Based on subsequently collected material and on observations in situ, an emended description with illustrations of the fronds and mature female cones is provided.

KEY WORDS

Encephalartos ituriensis,
Zamiaceae,
D.R. Congo

RÉSUMÉ

La description originale d'*Encephalartos ituriensis* (Zamiaceae) est incomplète, parfois inexacte, et en partie fondée sur un matériel immature. Grâce à des échantillons récoltés postérieurement et aux observations de terrain, une description amendée, avec des dessins de frondes et de cônes femelles mûrs, est présentée.

MOTS CLÉS

Encephalartos ituriensis,
Zamiaceae,
R.D. Congo

The original description of *Encephalartos ituriensis* Bamps & Lisowski (BAMPS & LISOWSKI 1990) was fairly detailed, but many of the data presented there were ambiguous or incomplete, to the extent that when the second author saw plants in nature, he thought that they could represent a different species. The size of the female cone given in the protologue is incorrect and the information given concerning the surface

sculpturing of the exposed faces of the sporophylls is ambiguous. No information was given concerning the color of male and female cones, the presence or absence of a petiole, the indumentum of the cones, the texture of the leaflets, and the distribution of teeth on the leaflets, all characters considered diagnostic by VORSTER (1990 and in press). No illustrations of any part of the mature frond were given; only a line draw-

ing was provided of a seedling plant with two leaves. GOODE (1989: 229-231) published detailed color plates of a whole plant, leaflets, cones, and sporophylls, purportedly of *E. ituriensis*, in the year before the valid publication of the binomial. However, the provenance of the material illustrated cannot be established. GOODE's habit illustration was based on a photograph of a cultivated plant growing on the shore of Lake Kivu and said to be from the Ituri Forest. The cones that he illustrated are from a different plant and were received from a collector in Zimbabwe without any locality data. GOODE (1989: 230) provided no scale of magnification for the illustrations of the leaflets, and the dimensions of 20 × 12 cm given for the female cone (GOODE 1989: 231) are obviously incorrect considering the relative size of the stem apex and frond bases attached.

The type material as well as the additional specimens cited by BAMP & LISOWSKI (1990) all come from near Nduye in the northeastern Democratic Republic of Congo. After consideration of the original description, allowance for missing and possibly inaccurate information, and study of *Lisowski 41057* (BR) and herbarium specimens and photographs of *Gereau et al. 5413* (Democratic Republic of Congo, near Nzaro, ca. 30 km northwest of Nduye; EA, epu [reference collection at Epulu], MO, PRE), we conclude that all of these specimens are conspecific. Therefore, it is clear that the markedly small female cones reported for *E. ituriensis* by BAMP & LISOWSKI (1990) were either depauperate or not fully developed and that the circumscription of the species in the protologue is inadequate. Accordingly we supply the following emended description:

***Encephalartos ituriensis* Bamps & Lisowski
emend. Vorster & Gereau**

Plant arborescent, palm-like in shape, unbranched but sometimes suckering from base; stem to 6 m long and 40-50 cm thick, usually procumbent with apical portion erect when more than 2 m long, covered with leaf base remains in a regular pattern, the apex glabrous except for

floccose tawny indumentum on cataphylls. Fronds numerous, spreading-ascending in a hemispheric crown, straight, dark glossy green, 2-3 m long, sessile; base of rachis covered with short tawny floccose indumentum; leaflets ca. 80 pairs, gradually reduced to a series of prickles toward base of frond; median leaflets in plane view oriented at angle of ca. 60° with rachis and pointing toward frond apex, opposing leaflets set at angle of slightly less than 180° to each other on circumference of rachis, narrowly oblong-lanceolate and tapering to acute but not pungent apices, not or slightly falcate, with (3-)4-6(-9) teeth rather evenly distributed along both margins and ca. 3 teeth crowded near base of distal margin, in dried specimens finely corrugated on abaxial surface and margins (including margins of teeth), revolute, not or only slightly overlapping, somewhat soft-textured, 19-30 × 2-3 cm (excluding teeth). Male cone [not seen, description from BAMP & LISOWSKI (1990)] number unknown, narrowly ellipsoid, borne on a stout peduncle to 16 cm long and 1.8 cm thick, color not recorded but presumed similar to female cone (see below), glabrous, [in dried state] ca. 26 × 7 cm; exposed faces of male sporophylls moderately projecting, slightly drooping at maturity, ca. 2.5 mm wide, the terminal facet differentiated, rhombic, its diameter ca. 60% of total horizontal diameter of exposed face; female cones 1-4, ovoid-cylindrical at maturity, borne on a peduncle ca. 10 cm long, initially glaucous-green becoming yellow-green at maturity, glabrous, ca. 55 × 20 cm; exposed faces of female sporophylls raised, somewhat pyramidal, ca. 7 × 4.5 cm, the terminal facet off-center toward base of cone, its diameter 25-33% of total horizontal diameter of exposed face, the median facet differentiated, with ridges separating facets clearly differentiated; facets smooth on faces when fresh, tuberculate when dry, margin of exposed face of fresh sporophyll tuberculate. Seed with sarcotesta red when fresh, brown when dry, 37-39 × 21-28 mm with dried sarcotesta intact, 36-38 × 20-25 mm with sarcotesta removed.—Fig. 1, 2.

GEOGRAPHICAL DISTRIBUTION AND HABITAT

Encephalartos ituriensis is known with certainty only from the Ituri Forest in the Democratic

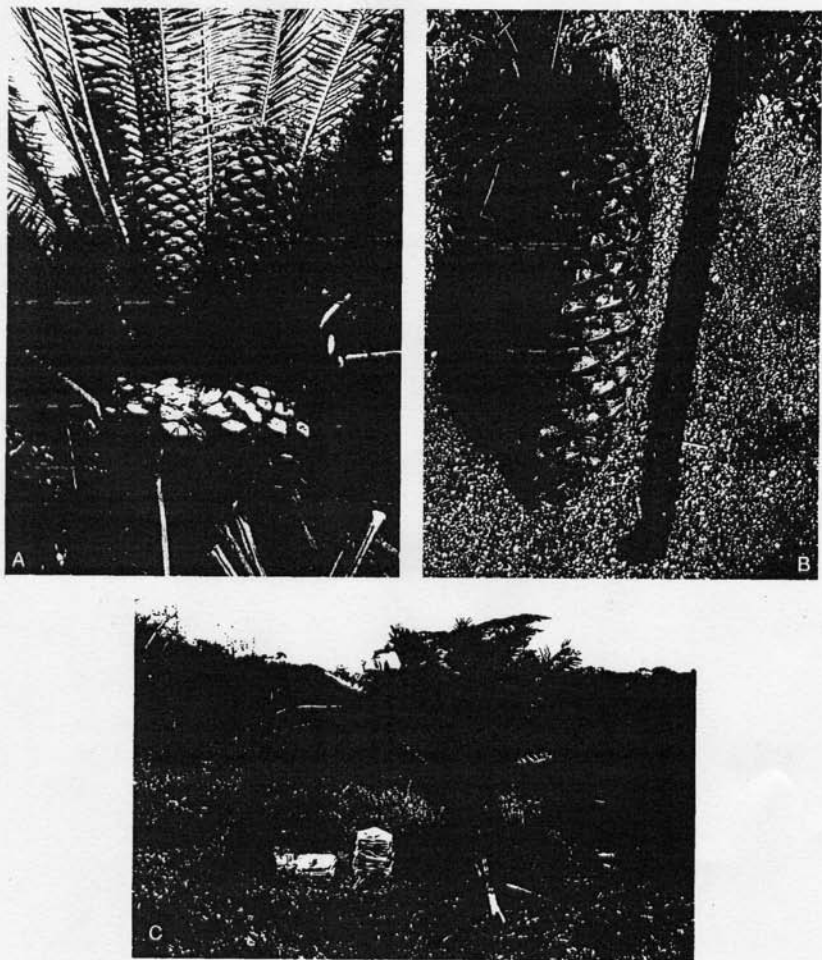


Fig. 1.—*Encephalartos ituriensis*: A, mature female cones in situ; B, mature female cone; C, plant in habitat.—All from Gereau *et al.* 5413.

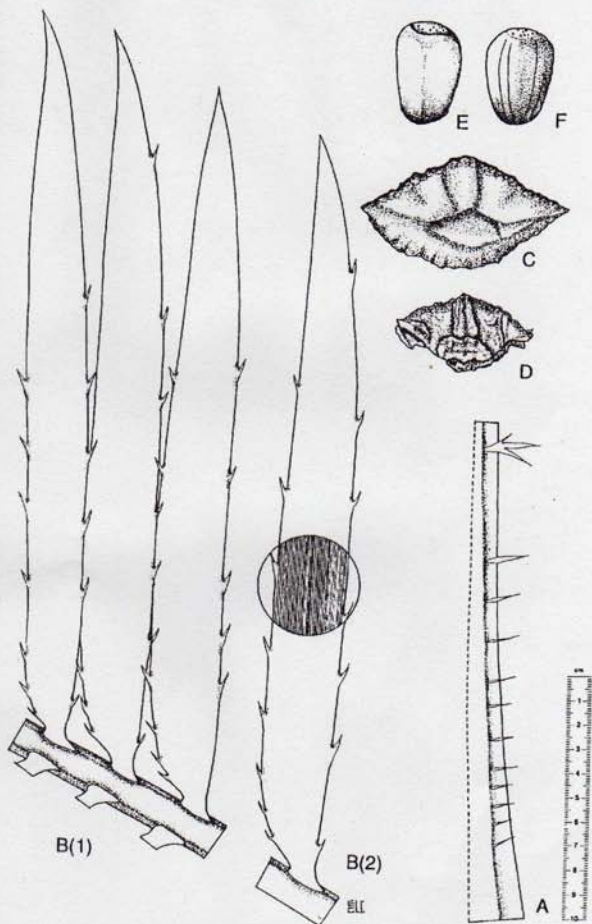


Fig. 2.—*Encephalartos ituriensis*: A, basal part of rachis showing leaflets reduced to a series of prickles; B, median leaflets in (1) adaxial and (2) abaxial view; C, exposed face of fresh female sporophyll, showing well-defined and smooth facets; D, exposed face of dried female sporophyll, presenting a tuberculate aspect; E, seed with sarcotesta intact; F, seed with sarcotesta removed (scale bar = 10 cm).—All from Gereau *et al.* 5413.

Republic of Congo at altitudes of 1100-1200 m, from five localities forming an arc over a distance of some 160 km from near Nzaro south-eastwards to near Nyankunde, with coordinates 1-2°N-28-30°E. For considerations of conservation we do not publicize the localities in greater detail. While most of the surrounding area supports a mosaic of mixed moist and single-dominant moist semi-evergreen Guineo-Congolian rain forest (WHITE 1983), the habitat of *Encephalartos ituriensis* lies outside the forest at somewhat higher elevations on exposed granitic domes that support a xerophytic flora with a number of disjunct and possibly endemic elements (LISOWSKI 1992). At one locality *E. ituriensis* grows among grass in savanna-like vegetation, but this is apparently a degraded secondary formation that has been altered by grazing of domestic livestock.

PHENOLOGY

Male cones are known only from April (Lisowski 42234), and female cones only from March (Gereau *et al.* 5413) and April (Lisowski 42909). The strong seasonality of the annual rainfall regime in the Ituri Forest (HART *et al.* 1996: 547), and additionally the edaphic dryness of the extremely well-drained sites within this formation on which *Encephalartos ituriensis* occurs, make it probable that growth and seed production are regulated by precipitation patterns. The months of March and April correspond to the end of the single dry season and the beginning of the rains.

DIAGNOSTIC FEATURES AND AFFINITIES

Geographically *Encephalartos ituriensis* occurs closest to *E. whitelockii* P.J.H. Hurter of western Uganda, but these species are separated by the Rift Valley, which probably represents a strong isolating factor. They share glaucous-green cones that at least sometimes turn yellow at maturity (HURTER 1995), long-peduncled male cones, more or less smooth and glabrous exposed faces of female sporophylls, and leaflets that overlap little or not at all (VORSTER & HEIBLOEM 1995, as *E. succisibus* Vorster). *Encephalartos whitelockii* differs from *E. ituriensis* in its hard- instead of soft-textured leaflets without a concentration

of teeth near the base of the distal margin of each leaflet, and more numerous male cones, up to 8 borne together.

The only other near-equatorial African species with soft-textured leaflets is *Encephalartos laurentianus* De Wild., from the Kwango River valley bordering the Democratic Republic of Congo and Angola. This is a larger species, which can be distinguished by its larger leaflets (up to 50 × 5 cm), long-peduncled female cones, and a reddish indumentum on the cones of both sexes (DE WILDEMAN 1903: 10; 1904: 392; BOIS 1907; GENTIL 1904a,b; LEBRUN 1930).

DISCUSSION

Our emended circumscription of *Encephalartos ituriensis* excludes the illustrations by GOODE (1989: 229-231) for the reasons given above. We extend the diagnostic characters used to recognize the species, and include a larger range of morphological variation than originally described by BAMPS & LISOWSKI (1990). Much of the additional morphological variation is due to the plants from Nzaro (cf. Gereau *et al.* 5413), which are larger and more luxuriant than those at Nduye (cf. Lisowski 41057). The Nzaro plants have longer median leaflets with more acute apices and much larger female cones, but the morphological differences between the populations appear insufficient to justify separate taxonomic status.

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REFERENCES

- BAMPS P. & LISOWSKI S. 1990.—A new species of *Encephalartos* (Zamiaceae) from northeastern Zaire. *Mem. New York Bot. Gard.* 57: 152-155.
 BOIS D. 1907.—Les *Encephalartos Lemarinellianus* et *Laurentianus*. *Rev. Hort.* 79: 177-179.
 DE WILDEMAN E. 1903.—Études de systématique et de géographie botaniques sur la Flore du Bas- et du

- Moyen-Congo. *Ann. Mus. Congo*, sér. 5, Bot. 1: 1-80.
- DE WILDEMAN É. 1904.—Les *Encephalartos* congolais: 386-396, in *Notices sur des plantes utiles ou intéressantes de la flore du Congo*, vol. 1. Veuve Monnom, Bruxelles.
- GENTIL L. 1904a.—*Encephalartos* from the Congo. *Gard. Chron.*, sér. 3, 35: 370-371.
- GENTIL L. 1904b.—Les cycadées au Congo. *Rev. Hort. Belge Étrangère* 30: 7-9.
- GOODE D. 1989.—*Cycads of Africa*. Struik Winchester, Cape Town.
- HART T.B., DECHAMPS R., FORNIER M. & ATAHOLO M. 1996.—Changes in forest composition over the last 4000 years in the Ituri basin, Zaïre: 545-563, in VAN DER MAESEN L.J.G., VAN DER BURGT X.M. & VAN MEDENBACH DE ROOY J.M.(eds.), *The Biodiversity of African Plants, Proceedings of the XIVth AETFAT Congress*. Kluwer, Dordrecht.
- HURTER P.J.H. 1995.—Two newly described cycads from Africa. *Phytologia* 78: 409-416.
- LEBRUN J. 1930.—Note sur l' *Encephalartos laurentianus* De Wild., de la vallée du Kwango. *Rev. Zool. Bot. Africaines* 19: 384-390.
- LISOWSKI S. 1992.—Note floristique de l'Ituri (Haut-Zaïre). *Fragm. Florist. Geobot.* 37: 215-220.
- VORSTER P. 1990.—*Encephalartos aemulans* (Zamiaceae), a new species from northern Natal. *S. African J. Bot.* 56: 239-243.
- VORSTER P. (in press).—A review of the arborescent tropical species of *Encephalartos*: in CHEN C.J. (ed.), *Proceedings of the Fourth International Conference on Cycad Biology*. Chinese Academy of Sciences, Beijing.
- VORSTER P. & HEIBLOEM P. 1995.—*Encephalartos successibus* (Zamiaceae): a new species from Uganda. *S. African J. Bot.* 61: 347-351.
- WHITE F. 1983.—*The vegetation of Africa: a descriptive memoir to accompany the UNESCO/AETFAT/UNSO vegetation map of Africa*. UNESCO, Paris.

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