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ENCEPHALARTOS TEGULANEUS SUBSP. *POWYSII* (ZAMIACEAE): A NEW CYCAD IN CENTRAL KENYA

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ABSTRACT

A new cycad taxon, *Encephalartos tegulaneus* subsp. *powysii*, is described from Central Kenya. Taxonomic characteristics unique to this taxon in relation to the other subspecies are discussed. Its habitat preference, population and conservation status are also discussed.

INTRODUCTION

This taxon was first observed by a local administration officer in the 1950s but remained unknown to the scientific community until 1989, when one of us made the first incomplete collections. It took until 1996 before our collections were complete enough to allow a description. The taxon is named after Gilfrid Powys, a former District Officer of the area and avid plantsman, who took the second author up to the hill to show him the plants.

While there are considerable similarities with *Encephalartos tegulaneus* Melville *sensu stricto*, the difference in leaflet and male cone structure warrant, in our opinion, subspecific status. The description of this population means a considerable range extension for the species as a whole.

DESCRIPTION

Encephalartos tegulaneus *Melville* **subsp. powysii** *Miringu & Beentje* **subsp. nov.** a typo foliorum margine revoluto, dentatiore, dentibus conspicuis, microsporophyllis deflexioribus, e basi fertilibus, dorso uniangulus megastrobilo aurantiaco-brunneo differt. Typus: Kenya, Meru District, 23 Nov. 1995, *Miringu* 1 (holotypus EA, isotypus K) (figure 1).

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Tree up to 8 m tall, solitary or clustered with up to five trunks.

Trunk erect or procumbent, unbranched or rarely with basal branching, 34–60 cm across at breast height, covered with rhomboidal pale brown scars 9.5 cm wide and 4 cm high, which become indistinct towards the base of the trunk.

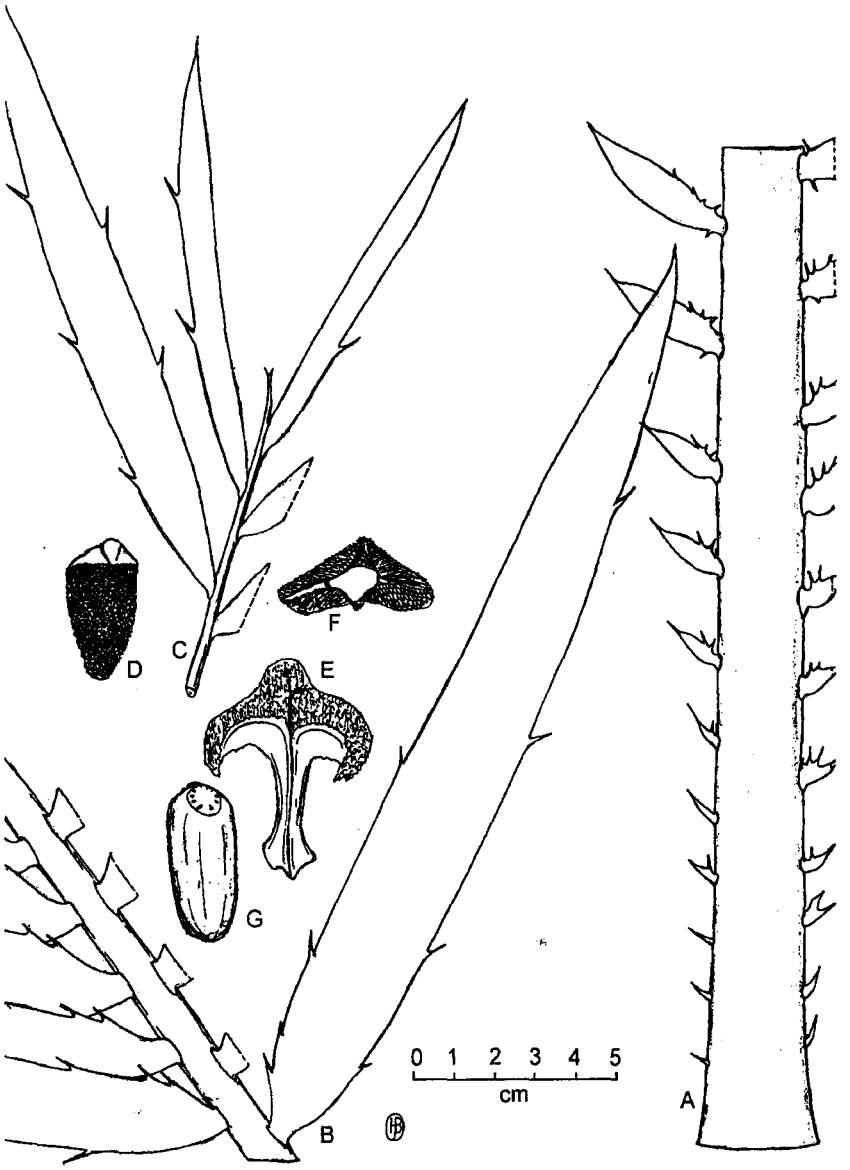

Figure 1 Encephalartos tegulaneus *subsp.* powysii, *A–proximal leaf section, B–middle section, C–distal part, D–microsporophyll abaxial surface, E–female cone scale abaxial, F–female cone scale, terminal facet, G–seed. All drawn from the type collection by Henk Beentje.*

Leaves 48–59 per trunk, suberect to spreading with some older leaves marcescent, 2–3.6 m long and 40–60 cm wide, pale green and white-pilose when young, glabrous when

mature; petiole absent; rachis 280–290 cm long, proximally slightly pilose, 5–8 cm across and thick, glabrous between the leaflets; leaflets opposite or alternate, arranged at an angle of 180° between opposing rows, in 65–95 pairs inserted on the adaxial side of the rachis, proximal leaflets gradually reduced to prickles towards the base of the leaf, 2–4 cm apart in mid-leaf, overlapping, narrowly elliptic, ± straight but slightly falcate near apex, 18–31 cm long, 2.5–3.3 cm wide, proximal margins with (2–)3–4(–5) evenly spaced teeth, on the distal margin with (1–)2–3 teeth crowded near the base of the leaflet and 1 further towards the apex, the margins slightly revolute but the teeth clearly visible; distal leaflets decreasing in size, the terminal pair about 10 cm long and 0.8 cm wide. Cataphylls (scale leaves) confined to apex of trunk, c. 60, narrowly triangular, 8–19 cm long, to 2 cm wide, attenuate, coriaceous, pale brown-tomentose.

Megastrobili 1–3(–4) per trunk, apparently sessile but with peduncle 6–16 cm long and 7–9 cm in diameter, hidden among the cataphylls; cones cylindrical or ellipsoid, 42–68 cm long, 16–22 cm in diameter, apricot orange; megasporophylls (cone scales) with pedicel acutely angled and 3 cm long, glabrous, the angle bulla/pedicel ± 60 degrees, the bulla 55 mm wide, 28–30 mm high, projecting 20–25 mm, the terminal face ± central and 1/2 to 1/3 of the horizontal diameter of the bulla, terminal facet smooth and slightly concave or flat, other facets rugose to tuberculate at the margins, the tubercles flattened and triangular, 1–4 mm long.

Microstrobili (1–)3–5 per trunk, stalked with peduncles 11–22 cm long and 4–4.5(–9) cm thick, cylindrical or narrowly ovoid, 40–52 cm long, 9–12 cm in diameter, orange-yellow; bracts similar to those of megastrobili; median microsphorophylls spreading and angled, 38–44 mm long, 21–24 mm wide, 5–7 mm thick, bulla 8–9 mm wide, 5–6 mm high, projecting for up to 2 mm, smooth, glabrous, terminal facet slightly raised and about 1/3 the horizontal diameter of the bulla.

Seeds covered with orange to mandarin-red sarcotesta, angled-obovoid, 30–43 mm long, 18–30 mm in diameter, with the sarcotesta removed 28–36 mm long, 16–24 mm in diameter.

AFFINITIES

E. tegulaneus subsp. *powysii* resembles *E. tegulaneus* subsp. *tegulaneus* in many characters but differs in the number and position of spines on the leaflet margins. In both taxa the leaflet margins are revolute, but in subsp. *tegulaneus* this causes the teeth to be hidden, while in subsp. *powysii* they are pronounced. The number of teeth/spines also differs: subsp. *tegulaneus* has 1–2 teeth on the proximal leaflet edge (Melville, 1957, 1958; Faden & Beentje, 1989), while subsp. *powysii* has (2–)3–4(–5): subsp. *tegulaneus* has 0–2 teeth on the distal leaflets margin with one near the middle and one near the apex, while subsp. *powysii* has (1–)2–3 basal ones and 1 higher up. The female bulla pedicel has 4 sharp angles, and while the peduncle is described as irregularly dentate in subsp. *tegulaneus* (Goode, 1989), this is certainly not the case in all specimens of the latter. The colour of the female cone is orange-brown, not yellow as in subsp. *tegulaneus,* and the male cones scales are more deflexed than in the latter species.

The male cone scales in subsp. *powysii* have a much shorter sterile lower surface (5–7 mm), with a single angle and are fertile right down to their very base, while those of subsp. *tegulaneus* have a longer sterile part (10–15 mm long), with two angles enclosing a facet, and have a sterile part near their base of 5–6 mm long.

The presence of the groove on the rachis between the leaflets in subsp. *tegulaneus* mentioned in various descriptions (Melville, 1957, 1958) does not hold true for the type of the taxon. We believe this might be an artifact.

One of the referees suggested that specific status would be preferable for this taxon. This was our original idea as well, but upon thorough study of the material we decided that the differences between *E. tegulaneus sensu stricto* and the new taxon were less than those with other species (table 1), and hence we decided on this status. There is a precedent with a Nigerian subspecies described by L. Newton.

Table 1. Taxonomic similarities and differences between subsp. tegulaneus *and subsp.* powysii

Characteristic	Similarities	Differences	
		subsp. *powysii*	subsp. *tegulaneus*
Margins	Revolute	Teeth hidden	Teeth exposed
Spines	Present	2–5	1–2
Proximal	Present	1 near the apex	1 near the apex
Distal	Present	1–3, basal	0–2, near the base, 1 at the middle
Female cone	Same size	Orange-brown	Yellow
Female bulla	Same size	Pedicel with 4 sharp angles	Irregular
Male cone		Less deflexed	Deflexed
Male cone scales		Short (5–7 mm)	Longer (10–15 mm)
		Single angled	2-angled, enclosing a facet
		Fertile to base	Sterile part of 5–6 mm near base

GEOGRAPHICAL DISTRIBUTION

Only known from a single hill in Meru District (K 4). To protect this taxon from collection from the wild, we have deliberately left out the specific locality details in this publication.

HABITAT PREFERENCE

The subspecies occurs in rocky sites in dense bushland/thicket with *Commiphora* sp., *Ochna* sp. and *Teclea* sp. where it is locally common. It is less common in dry forest with *Drypetes natalensis, Croton megalocarpus, Rawsonia lucida, Milletia leucantha, Garcinia volkensii, Uvariodendron anisatum, Strychnos henningsii.* The highest density is found in the altitudinal range of 1,600 m to 1,800 m.

POPULATION AND CONSERVATION STATUS

Sub-populations are found on different parts of the hill at about 1,600–1,800 m altitude. The whole population is estimated to be 500–600 mature individuals. A preliminary sex count done on one of the sub-populations showed a sex distribution of 2/1, male/female.

By the IUCN category (1994) this taxon is 'Critically Endangered', as it is occupying an area of less than 10 km^2. Although this species occurs in a forest reserve, the neighbouring human communities use the forest as a source of fuelwood and construction materials.

Hunting of small mammals and honey gathering are other human activities going on in the forest, and some illegal collecting of seedlings by cycad amateurs has already taken place.

ACKNOWLEDGEMENT

Many thanks to Gilfrid Powys for having reported the existence of this taxon to the scientific community and for taking the second author to see the population. We would also like to thank Prof. Len Newton for his help in drawing up the description of the cones and cone scales. We are most thankful to ODA/NMK Plant Conservation Programme for financial support and providing equipment during the field surveys. Many thanks to the staff of the East African Herbarium, and to the local administrators and communities for their hospitality during the surveys. Two anonymous reviewers are thanked for helpful comments and suggestions.

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