

# A new cycad subspecies from Nigeria

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A new subspecies of the West African *Encephalartos barteri* is described from plants on the Jos Plateau of northern Nigeria.

KEY WORDS:—*Encephalartos barteri*—cycads—West Africa.

## CONTENTS

Account . . . . .	125
Nomenclature . . . . .	128
References . . . . .	129

## ACCOUNT

Only one cycad species has been recorded in West Tropical Africa, viz. *Encephalartos barteri* Carruthers (Keay, 1954). Records in the literature give a distribution range for this species from Ghana to Uganda, with localities reported in Ghana, Togo, Benin, Nigeria and Uganda, though Heenan (1977) casts doubt on its occurrence in Uganda. In the hills of the Jos Plateau, in northern Nigeria, there occur some populations of cycad plants which differ in some ways from *E. barteri* plants known to me elsewhere in West Africa.

The populations reported here occur in a range of hills to the north-west of Pankshin, near the village of Tokkos (9°30' N, 9°22' E). Observations on two of these populations form the basis of this paper, and for convenience in the discussion below they are referred to as the Tokkos plants. In the course of some correspondence on other matters, S. H. Wimbush, formerly a horticulturalist in Jos, mentioned that he had collected material from another locality in the same area some years earlier, but I have not visited this locality. A small plant collected by Wimbush is still growing in a garden at Jos Museum, and some dried material was sent by him to Kew.

To one familiar with *E. barteri* the most striking feature of the Tokkos plants is their size (Figs 1, 2). In each of the two populations visited there are many plants with trunks well over one metre in length, and the longest measured was 2.6 m long and 0.3 m in diameter. The literature agrees that in West Africa the trunk of



Figures 1, 2. *Encephalartos barteri* subsp. *allochrous* on Kaldo Peak, Nigeria. Old plants, with long trunks and basal branches (at right). Pick length=71 cm. Fig. 1 Trunk 1.5 m long, supported by rock. Fig. 2 Trunk 2.0 m long.

*E. barteri* rarely exceeds about 0.3 m in length (Prain, 1917; Keay, 1954; Hall & Jenik, 1967), and strong contractile roots pull down the trunks so that much of this length is often below ground. Melville (1958) gives a trunk height of 0.3–1.5 m for *E. barteri* in Uganda. However, Heenan (1977) reports that no trace of this species was found during an intensive search in north-east Uganda, and suggests that *E. barteri* is restricted to West Africa. In his discussion Heenan mentions only one of the two records cited by Melville, but both were from the same general area in which the search was conducted.

When the Tokkos plants reach a height of 1–1.5 m, the trunks become decumbent. At about the same time, branches appear from the base of the trunk. Many large plants were found to consist of a long decumbent trunk with a few erect trunks arising from the base (Figs 1, 2). Branching is not a conspicuous feature of *E. barteri*, except on plants which have been damaged, and the species is generally described as remaining simple. However, Hall & Jenik (1967) report a case of branching occurring below ground, unsuspected before digging, and suggest that branching might be more frequent than is generally thought to be the case.

Leaves of the Tokkos plants are mostly 1–2 m in length, as in *E. barteri*, but are a little wider than those of *E. barteri*. The difference in width results from the slightly larger size, on average, of individual leaflets, though leaflet size is quite variable (Fig. 3). Data for leaflet size are shown in Table 1, together with data from two populations of *E. barteri*. Some other leaflet characters were investigated, as also shown in Table 1, but in these characters no distinction was seen between the Tokkos plants and *E. barteri*.

Cones, both male and female, were found to be indistinguishable from those

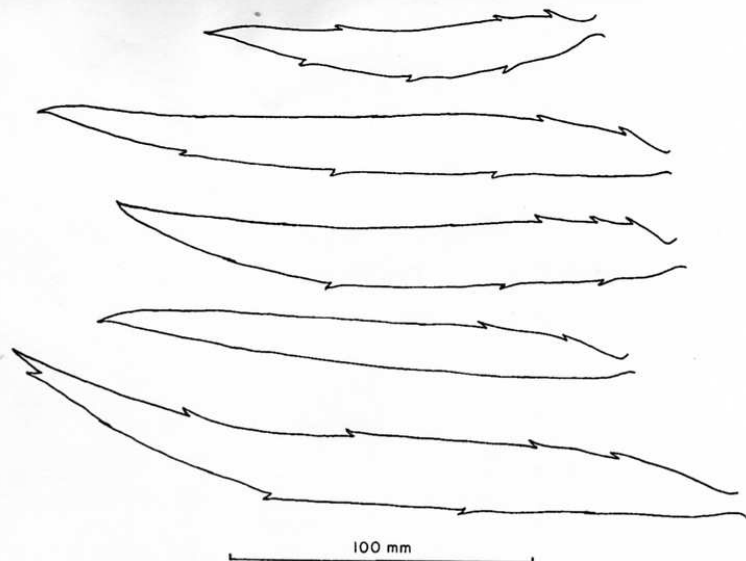


Figure 3. Median leaflets from different mature plants at type locality.

of *E. barteri*. The largest male cones measured on the Tokkos plants were 250 mm long and 78 mm in diameter, but a number of smaller cones were also seen. The range for *E. barteri* given in the literature is 80–230 mm long and 30–50 mm in diameter. Only a few female cones were seen on the Tokkos plants. The largest measured was 290 mm long and 155 mm in diameter when fresh, and this shrunk to about 250 × 130 mm when dry. This is a little further outside the range reported for *E. barteri*, which is 120–200 mm long and 80–120 mm diameter, but two smaller cones within this range were also seen on the Tokkos plants, and I have seen cones up to 300 mm long (when fresh) on *E. barteri* in Ghana. An examination of individual cone scales revealed no differences from *E. barteri*, in

Table 1. Variation in characters of median leaflets

	Tokkos	<i>E. barteri</i>	
	plants	Jebba (Nigeria)	Atonso (Ghana)
Length (mm)	130–263 ( $\bar{x}$ 195)	117–192 ( $\bar{x}$ 150)	101–175 ( $\bar{x}$ 135)
Width (mm)	13–22 ( $\bar{x}$ 18)	13–15 ( $\bar{x}$ 14)	10–18 ( $\bar{x}$ 14)
Width at base (mm)	4–8 ( $\bar{x}$ 5.8)	2–4 ( $\bar{x}$ 3.1)	3–5 ( $\bar{x}$ 3.9)
Number of veins	17–29 ( $\bar{x}$ 23)	18–24 ( $\bar{x}$ 21)	15–25 ( $\bar{x}$ 20)
No. of spines on distal margin	2–6 ( $\bar{x}$ 4)	1–7 ( $\bar{x}$ 4)	0–5 ( $\bar{x}$ 3)
No. of spines on proximal margin	0–4 ( $\bar{x}$ 3)	2–5 ( $\bar{x}$ 3)	0–3 ( $\bar{x}$ 1)
Angle with rachis	50–76° ( $\bar{x}$ 63.9)	63–83° ( $\bar{x}$ 74.1)	48–83° ( $\bar{x}$ 65.5)
Sample size	21	10	23

either male or female.

Several small plants were collected for further study, and when these started to grow in cultivation yet another difference was seen. When the young leaves emerged they were seen to be brown in colour. As they grew the colour changed to an olive green, and finally to the pure dark green of the mature leaves. All the collected plants displayed this colour change in the new leaves. On the second visit to Tokkos a number of plants were seen to have young leaves just emerging, and in all cases the new leaves had the distinctive colouration seen on the plants in cultivation. Young leaves have been observed on plants in three populations of *E. barteri* in Ghana, as well as on two plants collected near Jebba, in Nigeria, and brought back to Ghana for cultivation. In all these cases the young leaves were light green in colour as they emerged, and gradually became darker as they matured.

The habitat conditions of the Tokkos plants are generally similar to those of *E. barteri* populations known to me. All grow on rocky slopes, in a woodland savanna vegetation consisting of scattered trees and a ground flora dominated by grasses. The Tokkos plants are on granite, whilst *E. barteri* occurs on both granite and sandstone outcrops. The one outstanding difference is in altitude. The two Tokkos populations visited had an altitudinal range of 1220–1370 m, whilst known localities of *E. barteri* are below 400 m.

The Jos Plateau is a large area of land above 1200 m altitude, with peaks rising to 1781 m, and is quite isolated from other highland areas in West Africa. Several endemic species are recorded from the Plateau, as well as a number of species which are otherwise known only from the Cameroon highlands or from East Africa. Most of the land above 1220 m forms a roughly L-shaped area, from Jos at the northern end to the Sha Falls in the south-west corner, and to just beyond Pankshin at the eastern end. The range of hills in which the cycad was found is isolated from this main area by some 15–20 km of flat land at slightly lower altitude, and is not so easily accessible. There is a dirt road as far as Tokkos, but from there one must walk the remaining 8–10 km to reach the hills.

The cycad plants were plentiful in both localities visited, and the occurrence of a number of seedlings and young plants indicates that both populations are regenerating successfully. The localities are not disturbed by people from the few nearby villages since the steep rocky slopes are useless for farming. A villager at Gilli warned me of lions in the area, and on Kaldo Peak a troop of baboons barked a warning when I arrived. Although much of the Jos Plateau has been severely affected by farming, grazing and tin mining, the cycad populations appear to be in no danger of disturbance.

The similarity of the cones suggests that the Tokkos plants are closely related to the dwarf *E. barteri* of lower altitudes, and they key out to *E. barteri* in both of the keys (for male and female plants) presented by Melville (1958). It is concluded, therefore, that the Tokkos plants are conspecific with *E. barteri*, but in view of their distinctive vegetative features and their altitudinal isolation they should be recognized at the rank of subspecies.

#### NOMENCLATURE

*Encephalartos barteri* Carruthers subsp. *allochrous* L. E. Newton, subsp. nov.

A subspecies typica truncis longioribus, foliis juvenibus brunneis, foliolis majoribus differt.

TRUNCI ad 2.6 m longi, aetate proevecta decumbentes, e basi ramosa. FOLIA initio brunneae, postea olivaceae, maturitate atroviridia. FOLIOLA medianae ad 260 mm longa, ad 22 mm lata, basi 4–8 mm lata. HABITAT supra 1220 m supra mare.

TYPE: *L. E. Newton 1209*, Gilli, Nigeria (Holotype: K).

TRUNKS larger than in subsp. *barteri*, reaching 2.6 m long, becoming decumbent with age, and branching at the base. LEAVES brown at first, changing to olive-green, and finally to dark green as they mature. LEAFLETS larger, the median leaflets up to 260 mm long, 22 mm wide and 8 mm wide at base. HABITAT at altitudes above 1220 m.

NIGERIA. Plateau Province: steep-sided valley on north side of peak near Gilli Village, c. 10 km NNW of Tokkos, alt. 1370 m, 6 Apr. 1972, *Newton 1209* (♀), 1209a (♂ cone) (K, holo., GC, FHI, P. MO); north and north-west slopes of Kaldo Peak, c. 8 km north of Tokkos, alt. 1220 m, 23 Dec. 1977, *Newton 2271* (♀), 2271a (♂ cone) (K); valley below Kadun Peak, c. 8 km NE of Tokkos, *Wimbush* s.n. (K).

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