ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTH AFRICA

TYDSKRIF VAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA

NO. 74 JUNE / JUNIE 2003 ISSN 1012-9987

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ENCEPHALARTOS

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COVER / VOORBLAD : ***Encephalartos ghellinckii*: male cones; in a garden in Noordhoek, Cape, R.S.A., 10 December 2002 / *Encephalartos ghellinckii*: manlike keëls; in 'n tuin in Noordhoek, Kaap, R.S.A., 10 Desember 2002.**

Photo / Foto: Bill Liltved

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CONTENTS / INHOUD (continued / vervolg)

FROM THE PRESIDENT

Gereëlde lesers van hierdie kolom sal weet hoe belangrik ons dit beskou dat lede moet skryf en vertel van hulle ondervindings en probleme. Hierdie uitgawe bevat verskeie sulke berigte, waarvan sommiges verstommend is. Dit sluit in stories (bl. 12 en 15) oor hoe vinnig *Cycas panzhihuaensis, Encephalartos inopinus,* en *E. laevifolius* gegroei het in 'n Pretoriase tuin. Ek moet erken dat ek ernstig jaloers is op hierdie resultate, want vir my groei aldrie hierdie soorte baie stadig. Op bl. 23 vertel Ruan en Wirna Harris van hulle besoek aan die tuiste van *E. lanatus* en *E. middelburgensis*, met pragtige fotos; en op bl. 41 vertel Bill Litlved van sy *E. ghellinckii* wat gekeël het by Noordhoek naby Kaapstad.

Op bl. 5 word 'n nuwe species, *Encephalartos mackenziei*, vermeld. Dit is gevind in die suide van Sudan, 'n gebied wat vir solank as wat ek kan onthou onderhewig is aan burgerlike onrus. Dit beteken dat veldwerk baie moeilik en gevaarlik is. Inderdaad is die beskrywing gemaak vanaf gekweekte plante in Kenya. Ons is egter gelukkig dat daar reeds voorheen by twee geleenthede mooi kleurfotos van hierdie species verskyn het, naamlik in Heibloem se *Cycads of Central Africa* bl. V18–21 en S42–45onder die naam "*Encephalartos* sp. Sudan"; en meer onlangs in Goode se *Cycads of Africa*, vol. 1 bladsye 278 tot 281 onder die hoof "*A possible new species from the Didinga Hills in southern Sudan*". Enkele mense was ook so gelukkig om 'n paar sade te kry. *E. mackenziei* is skynbaar verwant aan die plante by Moyo wat bekendstaan onder die naam *E. septentrionalis*, asook aan *E. macrostrobilis*. Van *E. septentrionalis* word dit onderskei deur sy stam (tot 10 per plant en tot 3.5 m lank teenoor 2 tot 3 per plant en tot 2 m lank); en die pinnae (groen, tot 35 mm breed, met dorinkies slegs op die distale (boonste) rand naby die vashegtingspunt , teenoor gryserig blou, tot ?30 mm breed, met dorinkies aan beide rande. Die manlike keëls is digbehaar eerder as haarloos. *E. macrostrobilis* verskil deurdat dit gewoonlik enkelstammig is, met smaller pinae(tot 25 mm breed), en groter vroulike keëls (tot 80 cm teenoor tot 40 cm lank by *E, mackenziei*).

Ook in hierdie uitgawe is ons nuutste ledelys. Gaan asb. u besonderhede na, en laat weet vir ons as dit nie reg is nie. As u 'n E-pos of fax. adres het, stuur dit gerus vir ons vir moontlike insluiting in die volgende ledelys.

Graag herinner ek u daaraan om u nominasies vir die volgende Raad aan ons sekretaris, Guillaume Theron te stuur; of, nog beter, om uself beskikbaar te stel.

Piet Vorster

Piet Vorster

VAN DIE PRESIDENT

Regular readers of this column will know how important we deem it that members should write an tell about their experiencesd and problems. This issue contains several such reports, of which some as astounding. These include stories (pages 12 and 15) of how fast *Cycas panzhihuaensis, Encephalartos inopinus*, and *E. laevifolius* grew in a Pretoria garden. I must confess being very jealous of these results, because for me al three these species grow very slowly. On page 23 Ruan and Wirna Harris tell about their visit to the habitat of *E. lanatus* and *E. middelburgensis*, with beautiful photographs; and on page 41 Bill Liltved tells of his *E. ghellinckii* which coned at Noordhoek near Cape Town.

Om page 5 a new species, *Encephalartos mackenziei*, is mentioned. It was found in southern Sudan, a region subject to civil unrest for as long as I can remember. This means that fieldwork is very difficult and dangerous. Indeed, the description was made from plants cuiltivated in Kenya. We are lucky in that fine colour photographs of this species have been published in the recent past, namely in Heibloem's *Cycads of central Africa* pages V18–21 en S42–45 under the name "*Encephalartos* sp. Sudan"; and more recently in Goode's *Cycads of Africa*, vol. 1 pages 278 to 281 under the heading "*A possible new species from the Didinga Hills in southern Sudan*". A few collectors were also lucky enough te get a few seeds. *E. mackenziei* seems to be related to the plants at Moyo going under the name *E. septentrionalis*, as well as to *E. macrostrobilis*. From *E. septentrionalis* it is distinguished by its trunk (up to 10 per plant and up to 3.5 m long compared to 2 to 3 per plant and up to 2 m long); as well as its leaflets (green, up to 35 mm wide, with teeth only on the distal (upper) margin near the point of attachment, versus greyish blue, up to ?30 mm wide, with teeth on both margins. The male cones are densely hairy rather than hairless. *E. macrostrobilis* differs in being usually single-stemmed, with narrower leaflets (up to 25 mm wide), and larger female cones (up to 80 cm long against up to 40 cm long in *E. mackenziei*).

Also in this issue is our latest members' list. Please check your particulars, and let us know id it is not correct. If you have an E-mail or fax. address, feel free to send it to us for possible inclusion in our next directory.

I wish to remind you to send your nominations for the next Board to our secretary, Guillaume Theron; or, still better, to make yourself availlable.

Piet Vorster

Piet Vorster

FROM COUNCIL / VAN DIE RAAD

BACK COPIES OF OUR JOURNAL / VORIGE UITGAWES VAN ONS TYDSKRIF

New members receive all issues of magazine for current year. Back copies of magazine available from **Guillaume Theron, P.O. Box 1790, 0027 Groenkloof, South Africa** at **R26** (with colour) or **R15** (black and white) per copy locally to members, and **R32** (with colour) or **R20** (black and white) to non-members; and **R60, US$9** and **A$16** (with colour) or **R50, US$7** and **A$13** (black and white) a copy to foreign members and **R75, US$11** and **A$20** (with colour) or **R55, US$8** and **A$14** (black and white) to foreign non-members (airmail delivery); and **R48, US$7** and **A$13** (with colour) or **R39, US$6** and **A$10** (black and white) a copy to foreign members and **R54, US$8** and **A$14** (with colour) or **R50, US$7** and **A$13** (black and white) to foreign non-members (surface mail delivery).

Nuwe lede ontvang 'n eksemplaar van al die uitgawes van die tydskrif "*Encephalartos*" wat kwartaalliks verskyn vir die jaar waarin hulle aansluit. Vorige uitgawes van die tydskrif kan afsonderlik bestel word van **Guillaume Theron, Posbus 1790, 0027 Groenkloof (Pretoria) [Suid-Afrika]** teen **R26** (met kleur) of **R15** (swart en wit) per eksemplaar vir lede, en **R32** (met kleur) of **R20** (swart en wit) vir nie-lede.

CORRECTION

RE: PROPAGATION OF *ENCEPHALARTOS WOODII* FROM LEAF/STEM CUTTINGS – REPORT BACK ON A PROJECT AT THE DURBAN BOTANIC GARDENS (*Encephalartos* **73**: 31–33, March 2003)

The article as it appeared in our journal unfortunately left out the fact that **Roy Osborne** was one of the authors. I wish to apologize to Mark Mattson, Christopher Dalzell and Roy Osborne that this error crept in. I re-typed the article but I can't explain how it happened that I left out Roy's name and address, but I can assure you that it wasn't intentionally. **– Editor.**

CALL FOR VOLUNTEER: LIBRARIAN

The Society needs a librarian to collect and curate reprints, newspaper clippings, photocopies of articles, and books on cycads; and to make these available to members through photocopies. The librarian should have access to photocopy facilities. It would be ideal, but not necessary, to have E-mail and fax facilities.

Please offer your services to Guillaume Theron, our secretary, at P.O. Box 1790, 0027 Groenkloof; E-mail: **GTheron@nsnper1.up.ac.za;** fax: (012) 347 7807; or tel: (012) 329 2054 (only between 17h00 and 19h00.

NEW CYCAD PUBLICATIONS

BROOME, T., SCHUTZMAN, B. & BONTA, M. 2003. ***Dioon mejiae***. *The Cycad Newsletter* 26(1): 6.

[In this composite article, Broome briefly writes about the cultivation of *D. mejiae*. This is followed by an equally brief note by Schutzman on the distribution of *D. mejiae* and its relatives. Bonta's section of six pages has the sub-title Teocinte, "Ear of God". Teocinte is the popular name of *D. mejiae* in eastern Honduras, the home of *D. mejiae* which is the only *Dioon* species that does not occur in Mexico. The local inhabitants use the various organs of *D. mejiae* for many purposes including the preparation of tortillas, tamales and other breadlike foods as well as for the preparation of beverages such as atol and chicha.]

Author's addresses: P.O. Box 325, Polk City, FL33868-0325, U.S.A.; University of Florida, Environmental horticulture Department, 1525 Fifield Hall, Gainesville, FL 32611-0670, U.S.A.; Division of Social Sciences, Delta State University, Cleveland, MS, U.S.A.

KRAA, W. 2002. **Unusual cones in *Cycas rumphii*.** *Palms & Cycads* No. 72: 26–29.

[The author reports on plants that were grown from seed that was sold to him as *Cycas circinalis* but which he now suspects to be *C. rumphii*. Ordinary foliage leaves developed from the male cone on one of the plants. The plant's stem continued its vertical growth with a normal flush of new foliage leaves whilst pushing the peduncle of the male cone to a lateral position on the main stem. After the sporophylls of the male cone died and shrivelled the cone axis developed into a normal stem with foliage leaves.]

Author's address: Queensland, Australia!

NEWTON, L.E.. 2002. **A new species of *Encephalartos* (Zamiaceae) in Sudan.** *Botanical Journal of the Linnean Society* 140: 187–192.

[*Encephalartos mackenziei* Newton is described as a new cycad species occurring in south-east Sudan. It is characterized by its branching at the base to produce up to ten trunks per plant and by its broad leaflets, as well as some details of the cone scales. The population is large and widespread, and the presence of small seedlings indicates successful regeneration.]

Author's address: Department of Botany, Kenyatta University, P.O. Box 43844, Nairobi, Kenya.

NORSTOG, K. 2002. **Exploring for *Zamia wallisii*.** *The Cycad Newsletter* 25(5): 3–7.

[This paper was originally published in the Fairchild Tropical Garden Bulletin of January 1985 on pp. 5–17. It describes the expedition into Colombia during which *Z. wallisii* was rediscovered.]

Author's address: 4598 Spade Road, Sagle, ID 83860, U.S.A.

OSBORNE, R. 2002. **New research initiative in *Macrozamia*.** *Palms & Cycads* No. 72: 14–15.

[Attention is drawn to the work that is being done by Dr. Goro Kokubugata of Japan. He is currently studying certain Australian cycads by means of chromosomal DNA studies to establish their possible hybrid status.]

Author's address: P.O. Box 244, Burpengary, Queensland 4505, Australia.

TANG, W., CHIU, W-L. & PU, H. 2001. **The bamboo *Cycas* and its relatives: taxonomy and distribution.** *Palms & Cycads* No. 72: 3–11.

[The article focuses on one subgroup of *Cycas*, namely those rainforest species that are classified under the section *Stangerioides*. The plants are confined to Southeast Asia and occur in areas in the south and north of Vietnam, the southwest of China along the Vietnam border as well as in northern Thailand, eastern Myanmar (Burma) and the western part of Laos. This group of cycads includes *C. micholitzii* with its forked pinnae as well as *C. debaoensis* and *C. multipinnata* with its bipinnate leaves of which the pinnules are also forked. Other species that occur in these areas but which have the more conventional pinnate leaves include *C.* "haobinensis", *C. parvulus, C. sexsemnifera, C. shiwandashanica, C. simplicipinna* and *C. tanqingii*. DNA studies produced three unexpected results: (1) It is revealed that the *C. micholitzii* from three different regions are closely related. The closest relatives of the southern Vietnamese *C. micholitzii* are *C.* "haobinensis", *C. parvulus* and *C. tanqingii*. The northern *C. micholitzii* can be divided into two distinct groups, the western form in Yunnan, China, which has been given the new name *C. multifrondis*, and the eastern form which occurs in Guangxi, China and adjacent northern Vietnam, which is now recognised as *C. bifida*. (2) It was found that *C. multipinnata* and *C. multifrondis* are nearly identical genetically. Examination of the wild populations have shown plants of these two growing side by side with a gradation of leaf shape between the two opposite extremes. These results suggest that either *C. multifrondis* and *C. multipinnata* are merely variants of the same species, or that this mixed population is a hybrid zone between *C. micholitzii* and *C. debaoensis*. In this second scenario *C. multipinnata* would be a hybrid between the two. (3) It would seem that divided leaflets and undivided leaflets is not a good character in subdividing this *Cycas* group.]

First author's address: Fairchild Tropical Garden, 11935 Old Cutler Road, Miami, FL 33156374, U.S.A.

VOVIDES, A.P., IGLESIAS, C., PÉREZ-FARRERA, M.A., ASTORGA, J.G. & SCHIPPMANN, U. 2002. **Peasant nurseries: an effort to conserve cycads in Mexico.** *The Cycad Newsletter* 25(4): 4–7.

[Efforts are made at various centres in Mexico to get the local inhabitants to conserve the indigenous cycads by cultivating them in nurseries and marketing the products. The article provides a review of the problems and successes that have so far been achieved.]

First author's adress: Instituto Ecologia, Apdo Costal 63, Xalapa, Veracruz 91000, Mexico.

Compiled by ***Nat Grobbelaar,*** *P.O. Box 156357, 0039 Lynn East, South Africa.*

FOCUS ON ...

In each edition of ENCEPHALARTOS, we focus on one cycad species, in the form of an in-depth article in layman's language. In this edition the spotlight falls on:

FOKUS OP ...

In elke uitgawe van *ENCEPHALARTOS* fokus ons op een broodboomsoort, in die vorm van 'n in-diepte-artikel in leketaal. In hierdie uitgawe val die kollig op:

MACROZAMIA DOUGLASII W. Hill ex F.M. Bailey

Roy Osborne
P.O. Box 244, Burpengary, Queensland 4505, Australia

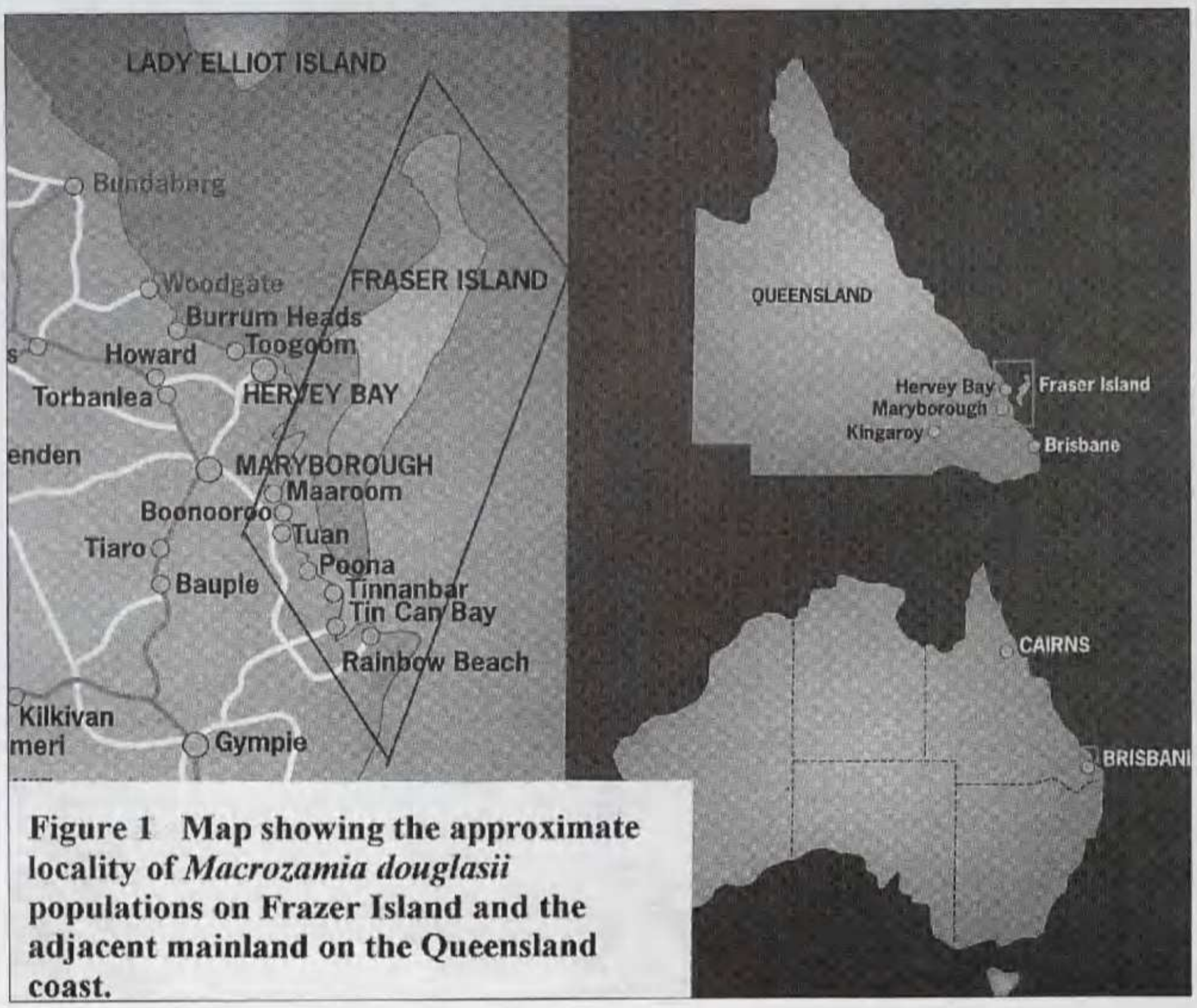


Figure 1 Map showing the approximate locality of *Macrozamia douglasii* populations on Frazer Island and the adjacent mainland on the Queensland coast.

Figure 1 Map showing the approximate locality of *Macrozamia douglasii* populations on Fraser Island and the adjacent mainland on the Queensland coast.

INTRODUCTION*

Queensland's Fraser Island, the world's largest sand island, and the adjacent mainland Cooloola area (Figure 1), together comprise the 1992 World Heritage listed "Great Sandy Region", a 213,420 hectare wilderness of sand dunes up to 240 m in height. But it is much more than a giant sculptured sand dump: this wild, beautiful and ecologically fragile region encompasses 45 crystal-clear perched and barrage lakes and is clothed by pristine simple and mixed subtropical rainforests, tall and low sclerophyll forests, grassy wood-lands, heaths, mangrove swamps and more. The fascinating flora in these various communities includes tall columnar kauri pines (*Agathis robusta*), shaggy-barked satinays (*Syncarpia hillii*), hoop pines (*Araucaria cunning-hamiana*), brush box (*Lophostemon confertus*), many *Eucalyptus* species, carrol trees (*Backhousia myrtifolia*), piccabeen palms (*Archontophoenix cunning-hamii*), coastal screw pines (*Pandanus*), she-oaks (*Casuarina*), the proteaceous "wallums" (*Banksia* species), gnarled *Melaleuca* paper-backs, the curious "grass trees" (*Xanthorrhoea*), epiphytic *Platycerium* ferns, giant *Angiopteris evecta* tree ferns and a profusion of orchids, vines and mosses. The diverse fauna includes an outstanding 230 species of birds, swamp wallabies, eastern grey kangaroos, false water rats, yellow-bellied gliders, goannas, echidnas, snakes, frogs and bats, all living in relative harmony with some 200–300 feral dingoes (wild dogs) and brumbies (wild horses). The marine life is also "special" and includes the endangered dugong (*Dugong dugon*), dolphins, turtles, prawns, mudcrabs, the annual whale migrations and an abundance of fish.

The Great Sandy Region is geologically fairly recent, having been formed over the past 500,000–700,000 years as the sand-laden north-flowing ocean current along Australia's eastern coast has deposited its mineral load, this being the erosion product from the ancient mountains of the Great Dividing Range in the country's interior. Fraser Island has been variously inhabited by three groups of Australian aboriginal people (the Ngulgbara, the Badjala and the Dulingbara) for at least 2500 years; their very appropriate name for the area is "K'gari" meaning paradise. European contact has been much more recent, the island being named in the 1770's by Captain James Cook in memory of Eliza Fraser, marooned on the island after a shipwreck and supposedly suffering an ordeal of many years in captivity by the Aboriginals before her ultimate rescue.

It is this environment that is the exclusive home of our feature cycad, *Macrozamia douglasii*. Because this species occurs only in this area of such recent geological age (less than 1 million years), I believe that this plant (and possibly its relatives in the *M. miquelii* complex) must be amongst the "newest" of all cycads in the great evolution process that started with a *Cycas revoluta* look-a-like some 250 million years earlier.

*Information for the introduction to this article is largely derived from "Australia's Wilderness Heritage" by Penelope Figgis and Geoff Mosley, Volumes 1 and 2, Lansdowne Publishing, Sydney, 1993.

DISCOVERY

The Fraser Island cycads were known – and the seeds used as an emergency foodstuff – by island inhabitants for many years before their "discovery" in western terms; Aboriginal names for the plant are given as "goulbine" and "coobine". In the late 1870s plant material was collected by Walter Hill who used – but did not officially publish – the present name in recognition of British-born Australian pioneer and amateur botanist John Douglas (1828–1904) who became Governer of Queensland (1877–1880). (The town of Port Douglas in north Queensland is also named for him.) In notes from the Brisbane Botanic Garden, Walter Hill (1879) writes:

> Frazer's Island. During my visit to the above island, in April last, I took the opportunity of making a collection of various seeds and plants flourishing there, and I am glad to say that I was enabled to secure a number of very interesting specimens including *Macrozamia douglasii*.

Collectors of this species in the 1880s included A. McDowall (district surveyor of Maryborough) and a Mr Sheridan (a customs official of Maryborough), who sent vegetative and cone material, and at least one photograph, to the herbaria at Melbourne and Kew. In 1883, Mueller named the species *Encephalartos douglasii* while in the same year F.M. Bailey named it as *Macrozamia douglasii*. Following the genus name *Macrozamia*, the latter takes precedence and the authorship is correctly cited as W. Hill ex F.M. Bailey. [Detailed discussion of the somewhat complicated typification for the two species names is presented by Jones *et al.* (2001); the type specimen for *Macrozamia douglasii* comprises a portion of a single pressed leaf collected by Sheridan on Fraser Island and forwarded to Thiselton-Dyer at Kew by James Pink of Brisbane Botanic Gardens in 1882.] Matters do not rest there. The much-criticised monograph of Schuster (1932) renamed our candidate species as a variety, *Macrozamia tridentata* var. *douglasii* while the more authoritative work of L.A.S. Johnson (1959) "lumped" our taxon into *M. miquelii*. However, all recent works on the genus (e.g. Jones 1993, 2002; Jones *et al.* 2001; Hill 1998; Hill & Osborne 2001) treat *M. douglasii* as a species in its own right.

DISTRIBUTION AND ECOLOGY*

Macrozamia douglasii is found in fairly dense but scattered populations on Fraser Island and the adjacent Cooloola region on the mainland, all localities falling in Queensland's Wide Bay District (Colour Figure 1 on p. 9). The plants occur at altitudes from 10–80 m usually in open forests but occasionally within the rainforests, on stabilised sand dunes generally near under-ground water sources. Rainfall averages an impressive (by Australian standards) 2000 mm annually falling mainly in summer. Hot humid

summer days typically rise from 20 (min.) to 31 (max.) C in temperature while the mild winter days rise from 8 (min.) to 22 (max.) C.

Visits by the author over the past 8 years have shown the plants in both the island and the mainland populations to be abundant, in good vegetative condition and with large numbers of seedlings of different age profiles indicating effective regeneration. Vigorous development of coralloid roots is often noticed, even on young seedlings; the cyanobacterial symbiosis in these structures may provide an important nitrogen source in the nutrient-deficient sand environment.

The putative pollinator is a *Tranes* weevel (Curculionidae) which swarms over the male cones during pollen shedding in November; "the huge congregations and feeding activity ..... result in the male cones totally disintegrating within two weeks of the pollen being shed" (Forster *et al.* 1994). The possibility of a second pollinator in the form of a thrips insect has not been reported but cannot be ruled out. Female cones shed their seeds over the March–April months and small animals are probably involved with seed dispersal. Little else is presently known of the ecology of this cycad, but in common with its relatives in the *M. miquelii* complex, one may anticipate at least a loose association with fire cycles.

*For a convenient site to see good examples of *Macrozamia douglasii*: travel from Brisbane on the Bruce Highway to Gympie, then take the Tin Can Bay Road and later the Rainbow Beach turnoff to enter Cooloola National Park at the Freshwater Road/Bymien picnic site access road. An impressive population surrounds Poona Lake, which is a well sign-posted and enjoyable 2.2 km walk from the parking area.

DESCRIPTION*

1. STEM

Macrozamia douglasii plants have mostly subterranean unbranched trunks typically about 40 cm (up to 70 cm) in diameter (Colour Figures 2 and 3 on. p. 9). The stem apex is tomentose with coarse brown wool although this is usually hidden by accumulated decaying leaf litter. Occasional large old specimens have trunks extending up to a metre above ground level but this is uncommon (Colour Figure 4 on p. 9) and may simply be due to erosion of the surrounding soil.

2. LEAVES AND LEAFLETS

Mature *Macrozamia douglasii* plants bear about 30–90 erect to arching leaves, the emergent central ones of which are often in a tightly-packed "shuttlecock" pattern. Leaves are 2–3.5 m long with 60–100 pairs of glossy, bright green to deep green leaflets inserted at about 40° to the leaf axis, lying in a flat plane, closely-packed towards the apex but well-spread out towards the leaf base. Median leaflets are typically 250–350 mm long by 8–12 mm wide, thin in texture, with entire margins tapering to a sharp apical point, and with stomata on the lower surface only. Each leaflet has a prominent white to off-white callous swelling at the point of insertion onto the rachis and these give a characteristic overall pattern to the foliage (Colour Figure 5 on p. 10). The lower leaflets are reduced in size, sometimes ultimately to 1–2 leaflike spines (pinnacanths). Petioles are 40–60 cm long, 12–20 mm wide, flattened in cross section and 12–18 mm wide.

3. REPRODUCTIVE STRUCTURES

Male plants of *Macrozamia douglasii* bear 1–3 cylindrical green cones about 200–350 mm long by 50–70 mm wide on a 200–350 extended peduncle (Colour Figure 6 on p. 10). Each microsporophyll terminates in a stiff, sharply-pointed spine 5–40 mm long, the longer ones towards the cone apex. Pollen shedding occurs typically in mid- to late-October each year.

Female plants of *Macrozamia douglasii* bear 1–3 comparatively large, cylindrical to barrel-shaped green cones, 350–450 mm long by 100–180 mm wide, supported on a short, thick peduncle (Colour Figures 7 and 8 on p. 10) Each sporophyll face bears a stiff, sharply-pointed apical spine 10–40 mm long, these increasing in length towards the cone apex. Pollination occurs in mid- to late-October each year.

Seeds of this species are fully developed by mid- to late-January each year, some three months after pollination. They are large in size, oblong, orange to deep red in colour, and measure about 28–40 mm by 18–25 mm.

*Quantitative measurements quoted in the plant description are taken mainly from the recent publication by Jones *et al.* (2001).

AFFINITIES

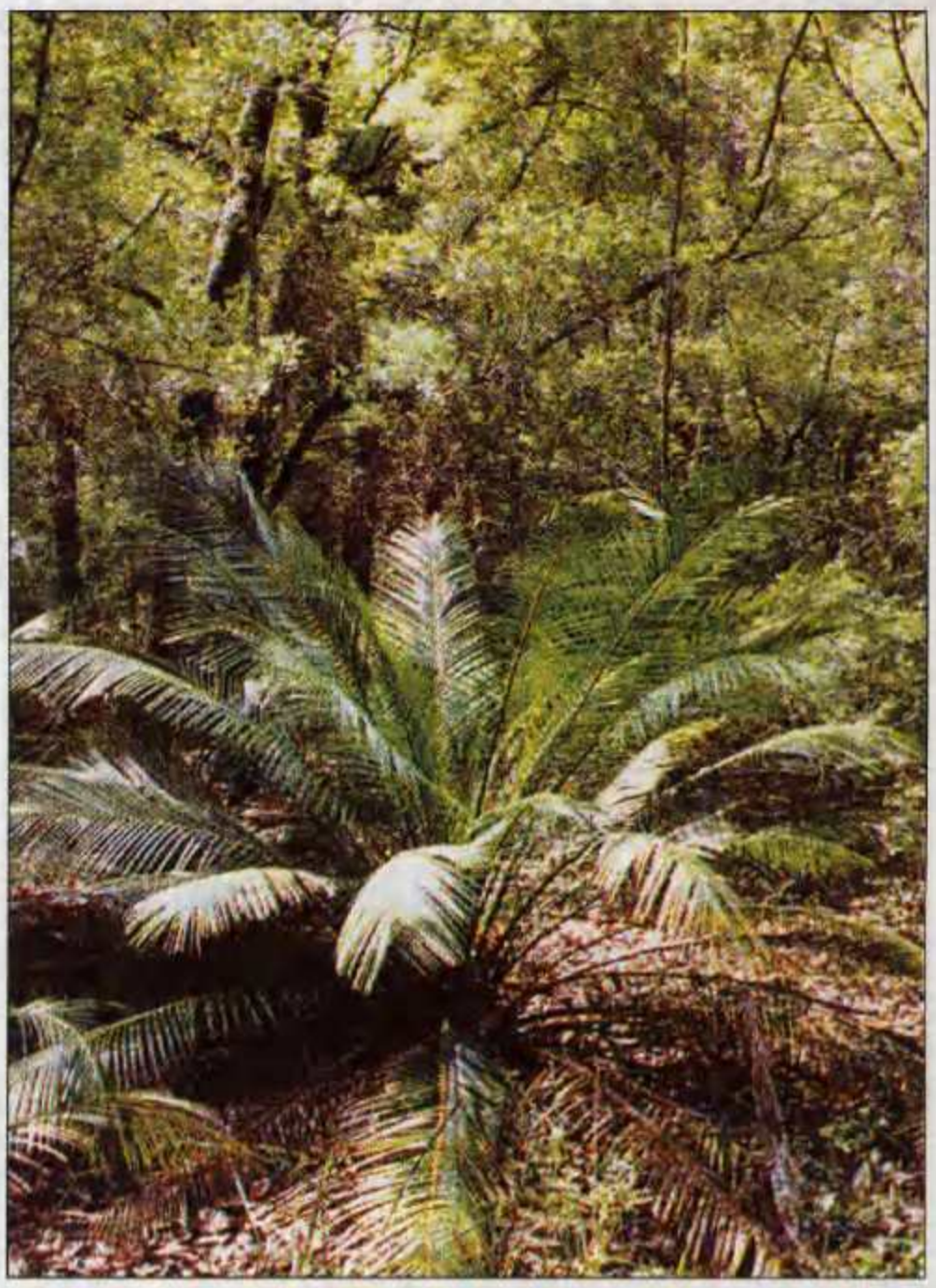
The affinities of this species lie clearly with the other six members of the closely-related "*Macrozamia miquelii* group" in section *Macrozamia, viz: M. cardiacensis, M. longispina, M. macleayi, M. miquelii, M. mountperriensis* and *M. serpentina*. The pricipal characters separating *M. douglasii* from its cohorts are its somewhat larger stature, usually darker foliage, prominent white swollen callous bases at leaflet bases, and the relatively large size of the male and female cones. The species is probably most closely related to *M. longispina* [dealt with as a Focus on ... article in *Encephalartos* **66** (Forster & Osborne 2001)] and *M. cardiacensis*, both these species being located some 100 km inland to the west.

Reproduced below (see p. 11) is a key to the species of the *Macrozamia miquelii* group, as recently published by Jones *et al.* (2001):

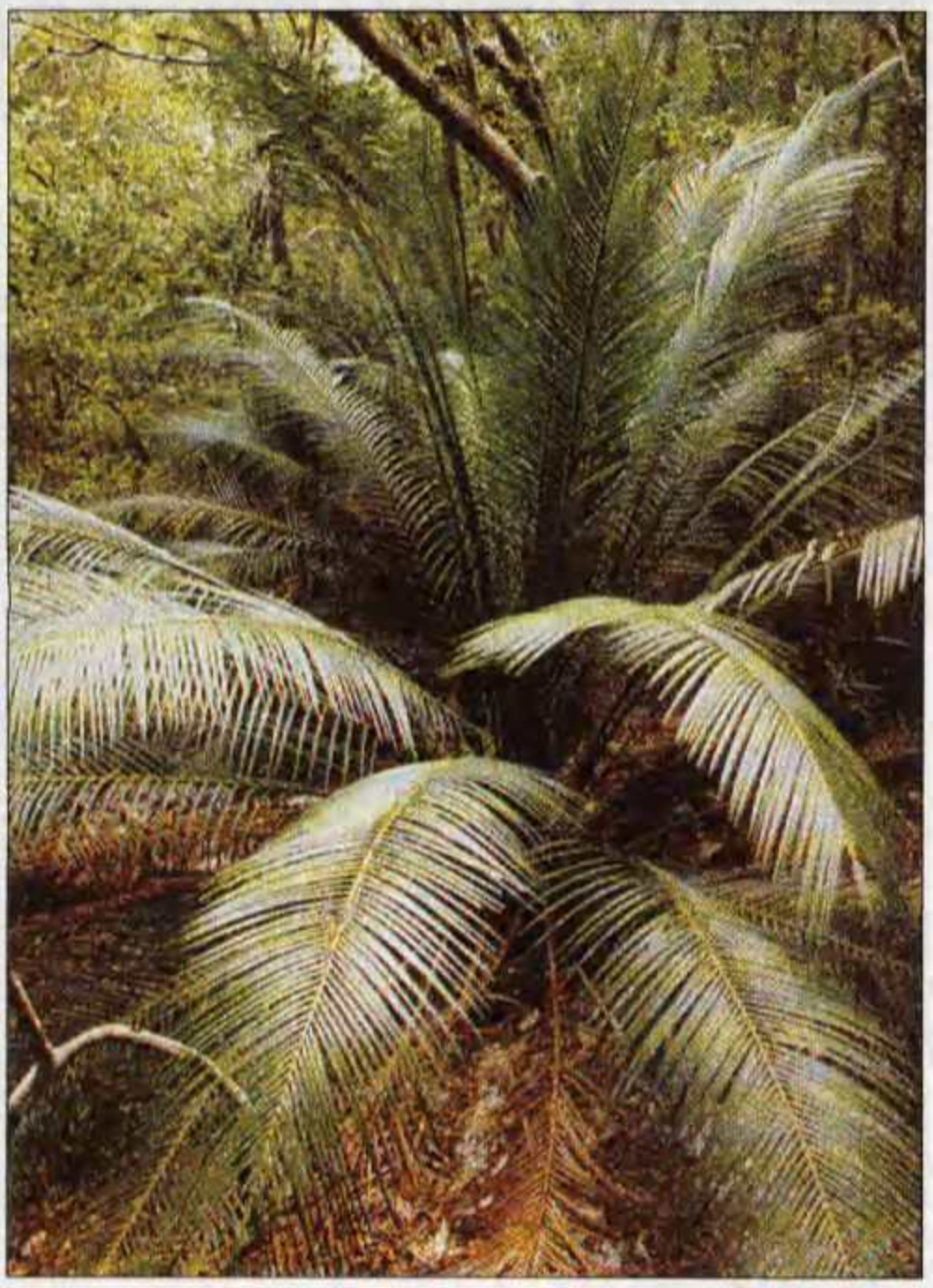
CONSERVATION AND CULTIVATION

Although restricted in its occurrence, *Macrozamia*

Colour Figure 1 Poona Lake, Cooloola, one of the many freshwater lakes trapped in stabilised sand dunes in the Great Sandy National Park. Large numbers of *Macrozamia douglasii* plants are understorey to forest vegetation surrounding this and similar lakes and benefit from the permanent underground water supply.



<u>Above right</u>: **Colour Figure 2** *M. douglasii* in typical dappled shade of a well-developed mixed forest on stabilised sand dunes near Poona Lake. Photo: Lou Randall.



Colour Figure 3 Arching leaves with close-packed evenly spaced leaflets give *M. douglasii* a graceful palm-like appearance.

<u>Below right</u>: **Colour Figure 4** The exposed trunk of this *M. douglasii* specimen is atypical; in most plants the trunk is entirely subterranean. Note also the long petioles below the lowermost leaflets on each leaf. Photo: Lou Randall.

Colour Figure 5 The white callous swellings at the point of insertion of each leaflet are characteristic of *M. douglasii* and show up particularly in deep shade (top area of photo). This pattern may be some sort of guiding signal to insect pollinators.

Colour Figure 6 Male cones of *M. douglasii* in mid-October, just prior to pollen shedding. Note the short thick cone peduncles and long clear leaf petioles.

Colour Figure 7 Female cones of *M. douglasii* in mid-October, just prior to fertilization. Note the short thick peduncles and the prominent sharp spines on the uppermost sporophylls.

Colour Figure 8 Female cones of *M. douglasii* in mid-January, three months after fertilization and just before the seeds are shed. The fully developed seeds with their orange sarcotestae force the spirally arranged sporophylls apart.

Key to the species of the *Macrozamia miquelii* group

1. Lower 8 or more leaflets reduced to pinnacanths 2
   Lower 4 or less leaflets reduced to pinnacanths, or pinnacanths absent 5

2. Female cones narrowly ovoid; male cones 35–40 cm long ..... ***M. cardiacensis***
   Female cones cylindrical to barrel-shaped; male cones 12–28 cm long 3

3. Male cones 2.5–3.5 cm in diameter; microsporophylls 8–12 x 4–8 mm ..... ***M. serpentina***
   Male cones 3.5–6.5 cm in diameter; microsporophylls 12–25 x 8–15 mm 4

4. Leaves glossy above, thin-textured; female cones 7–10 cm in diameter ..... ***M. macleayi***
   Leaves dull to slightly glossy above, thick-textured; female cones 10–25 cm in diameter ..... ***M. miquelii***

5. 1–4 leaflets reduced to pinnacanths ..... ***M. douglasii***
   Pinnacanths absent 6

6. Leaflets 50–110, 6–9 mm wide; male cones 12–25 x 3–4 cm; distal megasporophylls with spines 2.5–4 cm long ..... ***M. mountperriensis***
   Leaflets 100–140, 3–6 mm wide; male cones 8–15 x 2.5–4 cm; distal megasporophylls with Spines 4.5–7 cm long ..... ***M. longispina***

douglasii is abundant in its localities and the species is not presently at risk, especially as most populations lie within the borders of National Parks and State Forests. The species is protected under the Queensland Nature Conservation Act, falling under the category "common protected wildlife".

There are not many specimen plants of this cycad known to be in cultivation in Australian or overseas gardens. We assume that *M. douglasii* would respond to cultivation in much the same way as other species in the *Macrozamia miquelii* complex, i.e. it would make an attractive garden or container plant requiring minimum maintenance and probably be reasonably cold-hardy once established. Its occurrence on deep very sandy soils in wooded areas indicates that a very well-drained medium is important for its *ex situ* survival and that some degree of shade is preferred.

ACKNOWLEDGEMENTS

I am grateful to Paul Forster and Lou Randall for comments on the first draft of this article. Photographs are by the author unless otherwise stated.

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SHORT COMMUNICATIONS AND ARTICLES
KORT MEDEDELINGS EN ARTIKELS

DOORNKOP: HOME OF *ENCEPHALARTOS MIDDELBURGENSIS* AND *E. LANATUS*

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Received 17 December 2002

On 1 August 2002 Wirna and I were very privileged to visit Doornkop, the training area of 4 South African Infantry Battalion (4 SAI BN) in Middelburg, Mpumalanga.

The South African National Defence Force is one of the largest land users in South Africa and thus uses training areas like Doornkop to train soldiers in various disciplines. Doornkop is the only training area in Mpumalanga Province. 4 SAI BN started utilising Doornkop as a training area back in 1964.

Doornkop is one of a few Defence Force areas that have been declared as National Green Heritage Areas. The area is approximately 2862 hectares in size. During 1997 the area was declared as a National Green Heritage Area due to the fact that *Encephalartos middelburgensis* (Middelburg cycad) and *Encephalartos lanatus* (Olifants River cycad) occur on the terrain. *Encephalartos middelburgensis* has also been adopted as the official emblem of 4 SAI BN (Colour Figure 12 on p. 13).

It was a cool and overcast morning when Wirna and I arrived at 4 SAI BN. We were met by Corporal Eddie Oltman who acts as the environmental services official for 4 SAI BN as well as the Doornkop Training Area. Eddie studied towards a National Diploma in Nature Conservation and we found him to be extremely knowledgeable with regard to all conservation principles practiced on the base as well as the training area. We were soon on our way to Doornkop Training Area that is adjacent to Botshabello Nature Reserve.

First of all Eddie showed us a colony of *E. lanatus* (Colour Figure 9 on p. 13) which comprised thousands of specimens. This specific colony is situated on the south side of koppies or "small mountain range" on the terrain. We found little to no fire damage within the colony. Eddie stated that this was due to infrequent fires occurring in the area. Unfortunately we did not have enough time to visit all the colonies situated on Doornkop. The largest specimen of *E. lanatus* we could locate in the specific colony was approximately 1.8 metres in height (Colour Figure 11 on p. 13). Coning of various plants was evident and a large number of seedlings were evident within the colony. Eddie told us that baboons were responsible for cone damage in a large number of plants.

After visiting the enormous *E. lanatus* colony we set off to visit various *E. middelburgensis* plants scattered throughout the terrain (Colour Figures 10, 13–16 on p. 13). It was interesting to observe that most of the plants were situated on top of the koppies or mountain range and not against the slopes as I expected. Fire damage was evident in most of the plants (Colour Figure 14 on p. 13). The climbing surely indicated that this was a mountain and not a koppie!!! It was unfortunate to see that some suckers had been illegally removed from various *E. middelburgensis* plants on the terrain. At one location suckers were removed causing the main stem to fall over (Colour Figure 15 on p. 13).

There are male and female plants situated on the terrain and a successful pollination programme was conducted by the NBI in Pretoria. This programme enabled Eddie to reintroduce seedlings to the terrain at Doornkop. Sadly none of the seedlings were evident due to annual fires occurring on the training area.

We would like to take the opportunity to extend our heartfelt thanks to the Officer Commanding of 4 SAI BN and to Corporal Eddie Oltman who made the visit to Doornkop possible.

STUKKIES EN BROKKIES / BITS AND PIECES

Ontvang/Received 24 January 2003

Cycas panzhihuaensis (Kleurfiguur 17 op p. 14): Hierdie immigrant van China verkies blykbaar Pretoria, R.S.A., se toestande bo sy natuurlike habitat aangesien sy stamdeursnee 37 cm is teenoor die beskeie 15–25 cm

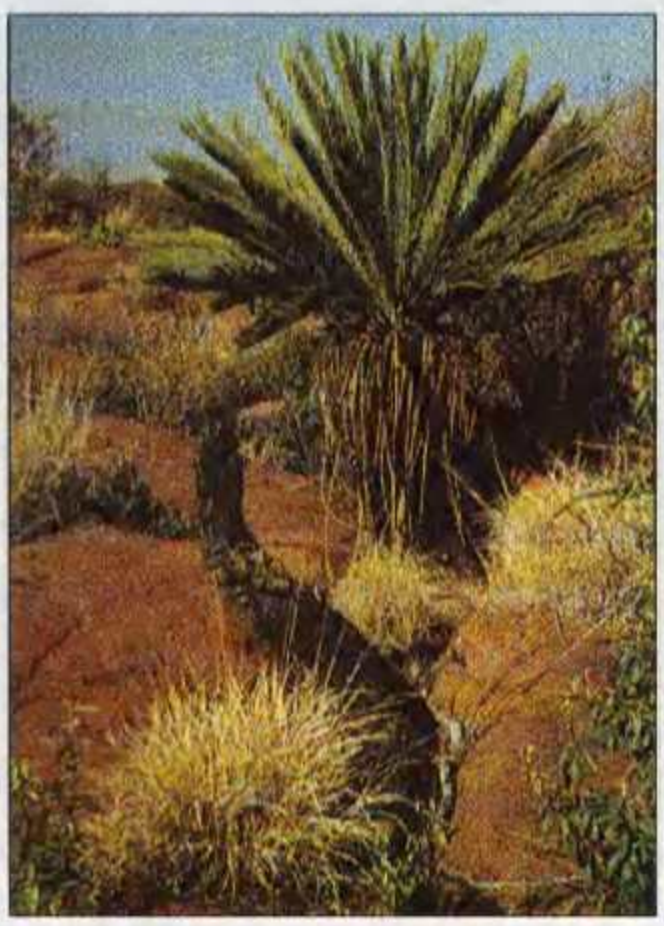
Colour Figure 9 *Encephalartos lanatus* **colony at Doornkop.**

Colour Figure 10 A very large multi-stemmed *E. middelburgensis* **plant. Excessive sucker removal was observed.**

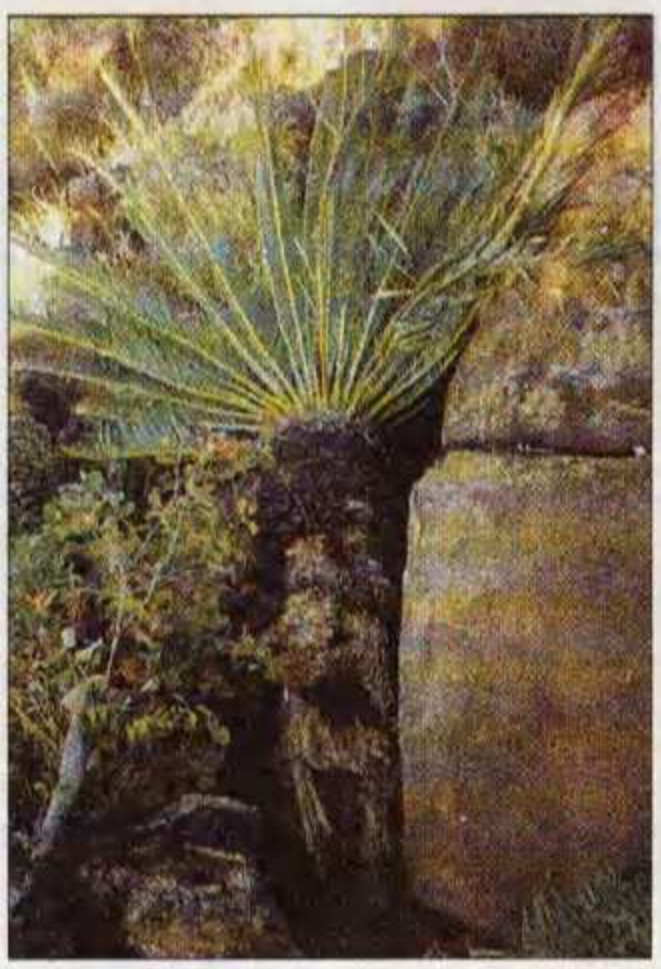
Colour Figure 11 Corporal Oltman next to a 1.8 m *E. lanatus* **plant.**

Colour Figure 12 The logo of 4 South African Infantry Battalion is *E. middelburgensis*.

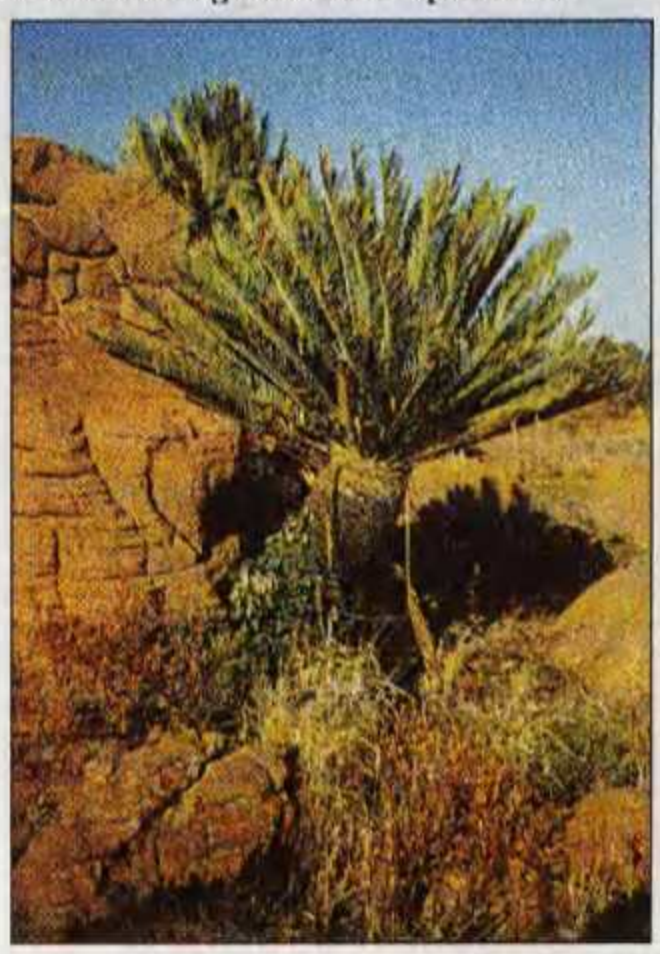
Colour Figure 13 Corporal Eddie Oltman (1.83 m tall) with three enormous *E. middelburgensis* **male specimens**



Colour Figure 14 *E. middelburgensis*: **a dead plant in the foreground. Both plants suffered severe fire damage.**

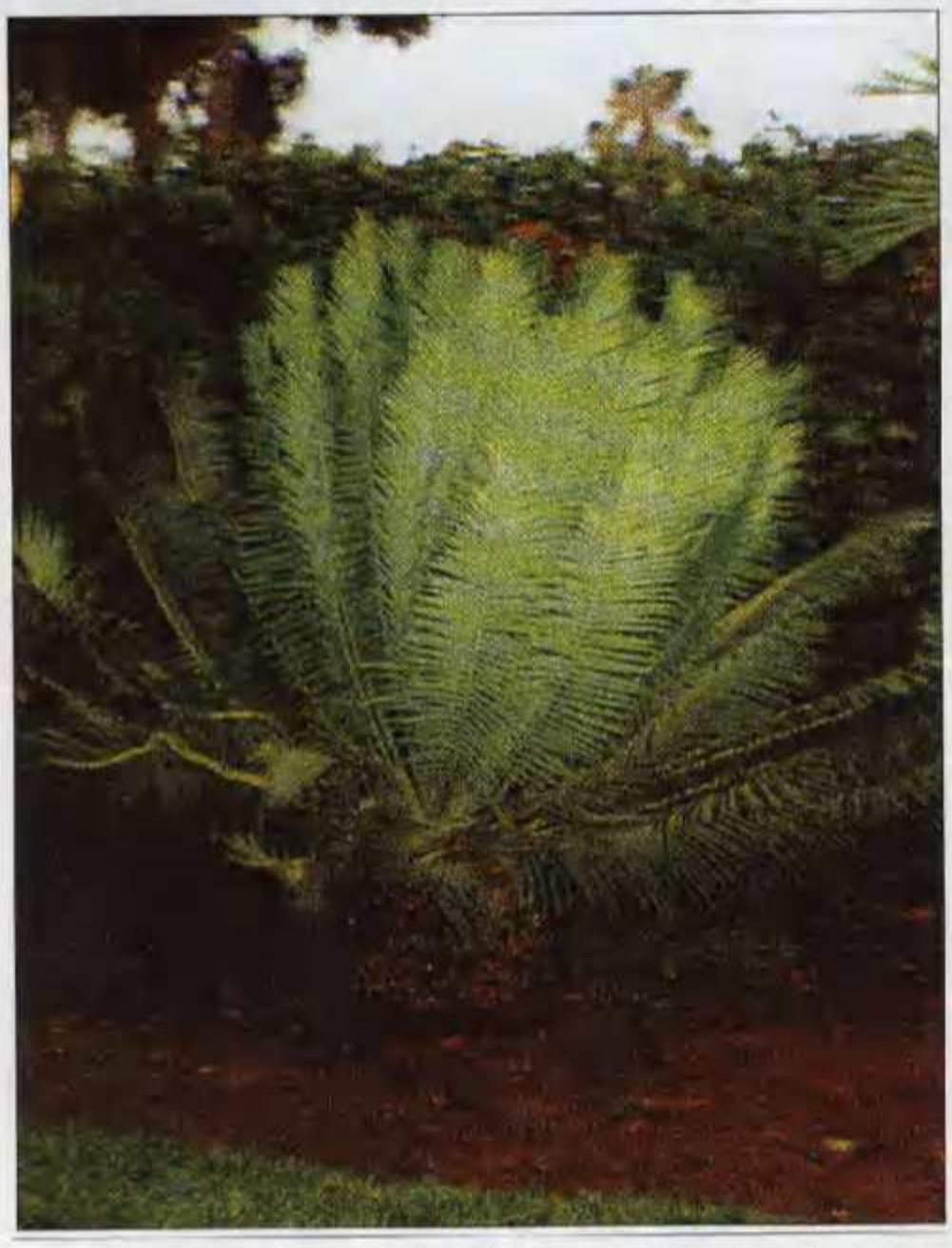


Colour Figure 15 This *E. middelburgensis* **has fallen over due to the removal of suckers.**



Colour Figure 16 A female *E. middelburgensis* **plant.**

Kleurfiguur / Colour Figure 17 *Cycas panzhihuaensis*.



Kleurfiguur / Colour Figure 18 *Encephalartos inopinus*.

deursnee wat dit in sy natuurlike habitat bereik. Die stam se lengte is 35 cm en die blaarlengte meer as 140 cm. Vergelyk ook hierdie plant se ryke blaredos met die van foto's van plante wat in die literatuur verskyn.

Dit is 'n vroulike plant wat ongelukkig nie bestuif kon word nie (2001–2002 seisoen) aangesien geen *C. panzhihuaensis* stuifmeel bekom kon word nie. Ten spyte daarvan het dit 12 bevrugte sade voortgebring moontlik as gevolg van stuifmeel afkomstig van *C. revoluta* of *C. taitungensis* wat aangrensend dieselfde seisoen gekeël het. Wie sê wind speel tog nie 'n rol by die bestuiwing van die genus *Cycas* nie? Indien die twee manlike keëls nie op 'n baie vroeë stadium verwyder was nie kon daar moontlik meer bevrugte

Kleurfiguur / Colour Figure 19 *Encephalartos humilus*.

Kleurfiguur / Colour Figure 20 ***Encephalartos laevifolius*; die groenblaar vorm van die ou Transkei / the green-leaved form of the old Transkei.**

sade gewees het.

Die huidige eienaar het die plant as 'n klein saailing in die laat tagtiger jare bekom.

[*Cycas panzhihuaensis* (Colour Figure 17 on p. 14): Apparently this immigrant from China prefers Pretoria's climate to that of its natural habitat since the diameter of its stem is 37 cm compared to the 15–25 cm that it obtains in its natural habitat. Also compare its magnificent foliage with that on photos in literature.

It was not possible to pollinate the cone of this female plant (2001–2002 season) because pollen of the species could not be obtained. However, cross-pollination apparently occurred between this species and either *C. revoluta* or *C. taitungensis* that coned nearby in that season because it produced 12 fertile seeds. Could it be that wind-pollination occurred?

The present owner obtained the plant as a small seedling in the 1980's.]

Encephalartos humilis (Kleurfiguur 19 op p. 14): Hierdie plant is alreeds ±15 jaar in die huidige eienaar se tuin in Pretoria. Soos dit maar met byna alle *E. humilis*-plante in Pretoria die geval is, het dit slegs elke derde of vierde jaar blare gestoot en dan ook slegs twee tot vier op 'n keer. Hierdie seisoen het die eienaar besluit om die plant te brand. Koerantpapier is in balle gefrommel en bo-op die plant se blare geplaas en aan die brand gesteek. Vier weke later het die plant hierdie mooi blaardos van 9 individuele blare gestoot. Elke individuele blaar is langer en weliger as enige blaar wat hierdie plant in die verlede gehad het. Blykbaar is dit voordelig om plante wat in die natuur aan brand onderhewig is te brand om meer gereeld nuwe blare, en mooier blare, te kry. Dieselfde eienaar het dergelike positiewe resultate met *E. schmitzii, E. lanatus* en *E. ghellinckii* behaal.

[*Encephalartos humilis* (Colour Figure 19 on p. 14): It is well-known that this species produces new leaves only every 4–5 years in Pretoria. This season the owner decided to burn this plant, which he planted about 15 years ago in his garden. He placed some crumpled up newspaper on the leaves of the plant and set them on fire. Four weeks later the plant pushed this flush of 9 leaves, each leaf being longer and more luxuriant than previous leaves. The owner obtained similar positive results with *E. schmitzii, E. lanatus* and *E. ghellinckii*.]

Encephalartos inopinus (Kleurfiguur 18 op p. 14): Hierdie plant, in 'n tuin in Pretoria, is deur die eienaar in 1983 as 'n saailing met 'n stamdeursnee van minder as 10 cm bekom. Tans is die deursnee 47 cm (in die natuur word hulle volgens die amptelike beskrywing nooit meer as 35 cm in deursnee nie). Hierdie plant stoot slegs elke tweede jaar blare (blaarlengte meer as 140 cm) dog die stam het tot twee jaar gelede konstant jaarliks bly verdik. Die hoogte van die stam is tans 55 cm. Ten spyte van die stam en blare se robuustheid het die plant nog nooit gekeël nie. Is daar dalk iemand met 'n *E. inopinus* met 'n groter stam-deursnee?

[*Encephalartos inopinus* (Colour Figure 18 on p. 14): The owner obtained this plant as a seedling with a stem diameter of less than 10 cm in 1983. At present the diameter of the stem is 47 cm (according to formal descriptions in literature the stem diameter does not exceed 35 cm). This plant pushed leaves only every second year (length of leaves more than 140 cm) but the stem increased its girth constantly until two years ago. This plant hasn't coned as yet. Do someone own an *E. inopinus* with a larger stem diameter?]

Encephalartos laevifolius (Kleurfiguur 20 op p. 14): Dit is 'n eksemplaar van die uiters skaars groen vorm wat op die grens van KwaZulu-Natal en die Oos Kaap voorgekom het. Die huidige eienaar het die plant in 1991 as 'n saailing/suier, met 'n stamdeursnee van ongeveer 10 cm, bekom. Tans is die stam 40 cm hoog met 'n deursnee van 40 cm. Die blare is 140 cm lank. Hierdie manlike plant het in die 2001–2002 seisoen vir die eerste keer gekeël en ses keëls voortgebring.

Blykbaar is hierdie vorm net so robuust soos die ander groen vorm van Tugela Ferry.

[*Encephalartos laevifolius* (Colour Figure 20 on p. 14): This plant is one of the rare green-leaved specimens wich grew on the border between KwaZulu-Natal and the Eastern Province. The present owner obtained the plant in 1991 as a seedling/sucker with a stem diameter of about 10 cm. At present the stem height is 40 cm and the diameter is 40 cm. The leaves are 140 cm long. This male plant coned for the first time during the 2001–2002 season and produced six cones.

Apparently this form is just as robust as the green-leaved form from Tugela Ferry.]

(Short communications and articles: continued on p. 29)
(Kort mededelings en artikels: vervolg op p. 29)

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0616	BUHR, Mr E W	P O Box 2, PORT SHEPSTONE, 4240
1776	BURDEN, I & S	Killaloe, P O Box 9, KEI ROAD, 4920
2862	BURGER, Mev W J	Posbus 1263, VRYHEID, 3100
2800	BURGOFFER, A M M	Posbus 9076, BRENTWOODPARK, 1505
0595	BURSEY Mrs J	Lowlands Nursery, P O Box 9, KEI ROAD, 4920
2576	BYLEVELDT, Mr G	P O Box 7274, PETIT, 1512
9014	CAPE NATURE COSERVATION: Scientific Services	The Librarian, Private Bag X5014, STELLENBOSCH, 7599
2595	CAPE TECHNIKON LIBRARY	The Librarian, P O Box 652, CAPE TOWN, 8000
2690	CARDOSO, Mr E G	P O Box 40330, CLEVELAND, 2022
2509	CARRICK, Mr A H	Postnet Suite 214, Private Bag X7, TYGERVALLEY, 7536
2087	CAVANAGH, Mr K R	Indigeflora, P O Box 1258, EDENVALE, 1610
2766	CAVE, Mr E D	P O Box 2384, PRETORIA, 0001
2414	CAWOOD, Mnr Richard	Posbus 32561, TOTIUSDAL, 0134
2763,	CHALMERS, Mev Whelmi	Posbus 1237, PIETERSBURG, 0700
2497	CHERRYWOOD NURSERY	P O Box 345, KENTON ON SEA, 6191
0949	CHRISTIE, Mr A N R	36 Murray Street, Waverley, JOHANNESBURG, 2090
0228	CHRISTOPULO, Mr G	P O Box 168, MTUNZINI, 3867
0488	CIAN, Mr G	7 Chelsea Road, Athlone Park, AMANZIMTOTI, 4126
2200	CILLIERS, Dr André	P O Box 351, POTCHEFSTROOM, 2520
0156	CLAASSEN, Dr M I	Posbus 25688, MONUMENTPARK, 0105
2478	CLARKSON, Dr Keith	Posbus 34281, GLENSTANTIA, 0010
1436	CLARKSON, Mr S P	P O Box 29231, Melville, JOHANNESBURG, 2109
2737	COCKBURN, Mr Bruce	P O Box 209, MAGALIESSIG, 2067
2806	COETZEE, Carl	Posbus 309, QUEENSTOWN, 5320
2312	COETZEE, Dr Derrick F	Posbus 1271, BALLITO, 4420
1409	COETZEE, Mrs H M	P O Box 596, GROBLERSDAL, 0470
2038	COETZEE, Mnr K N	Posbus 435, RANDFONTEIN, 1760
2477	COETZEE, Mnr R J	Posbus 6610, RUSTENBURG, 0300
1206	COETZEE, Mnr S D	Windmeulstraat 21, BRACKENFELL, 7560
2807	COETZEE, Mr W E	P O Box 26, MONTANA PARK, 0159
2182	COETZER, A P S	Posbus 20285, PROTEAPARK, 0305
2389	COETZER, Ed & Jossie	Sussexlaan 413, LYNNWOOD, 0081
2833	COETZER, Prof I A	Dept of Educational Studies, P O Box 392, UNISA, 0003
2735	COMBRINK, Mr & Mrs H J	P O Box 1844, RICHARDS BAY, 3900
2778	COOPER, Mr H A B	19 Bosonia Street, KUILS RIVER, 7580

1681	COOPER, Mr Simon G	P O Box 38892, GARSFONTEIN, Pretoria, 0042
1302	CORBETT, Mrs F J	P O Box 6310, ANSFRERE, 1711
2449	CORNELIUS, Mnr A H P D	Wilsostraat 67, Hazelpark, GERMISTON, 1401
1910	COWLEY, Mr V W (Cape Flora)	P O Box 10556, LINTON GRANGE, 6015, Port Elizabeth
2023	CROFT WILD BULB NURSERY, THE	Cameron & Rhoda McMaster,The Croft Enterprises, P O Box 1053, STUTTERHEIM, 4930
2789	CROUS, Mrs H	9 Mamre Avenue, SUNWARD PARK, Boksburg, 1459
1546	CURACH Mr S	Private Bag X 1022, HILLCREST, 3650
2583	CURLE, A I	P O Box 477, JUKSKEI PARK, 2153
2429	CURLING, Mrs C A	P O Box 12422, BENORYN, 1504
2212	DALZELL, Mr C G M	Durban Botanical Gardens, P O Box 3740, DURBAN, 4000
2612	DANIEL, Ms A N	P O Box 101195, MEER EN SEE, Richards Bay, 3901
0192	DAVIDSON, Mr I A	30 Liza Street, Kilner Park Extention, PRETORIA, 0186
2247	DAY, Mnr G L	Posbus 2043, ROODEPOORT, 1725
2233	DE ANDRADE, Mr A G	P O Box 1586, ALBERTON, 1450
2267	DE BEER, Mr C M	P O Box 1107, WHITE RIVER, 1240
1956	DE BEER, Mnr H J	Posbus 32085, Fichardtpark, BLOEMFONTEIN, 9317
2494	DE BEER, Wouter & Retha	Franzinastraat 272, ELOFFSDAL, Pretoria, 0084
2704	DE BEER, Adv Z H & C	Posbus 68561, BRYANSTON, 2021
2760	DE BRUIN, Mnr C	Posbus 2013, ROOIHUISKRAAL, Centurion, 0154
0410	DE HAAS, Dr G N	Posbus 1897, PIETERSBURG, 0700
1675	DE JAGER, Prof F J	Posbus 524, AUCKLANDPARK, 2006
2241	DE JAGER, Mnr Lourens	Posbus 52011, DORANDIA, 0188
1962	DE JAGER, Mnr S	Posbus 1092, HILTON, 3245
0080	DE JONG, J J	P O BOX 934, NORTH RIDING, 2162
2095	DE JONGE, Mr H	P O Box 374, MOOINOOI, 0325
1838	DEKKER, Ds D J M	Posbus 4036, WITRIVIER, 1240
2801	DE KLERK, Dr B J	Posbus 18, DENDRON, 0715
0664	DE KLERK, Dr J A	Posbus 2234, PIETERSBURG, 0700
2034	DE KLERK, Mr J C	P O Box 90458, GARSFONTEIN X4, 0042
0452	DE KOCK, Mnr C V	Posbus 7222, TZANENG MALL, 0855
2622	DE KOCK, Dr G C	Posbus 4677, PIETERSBURG, 0700
0404	DE KOCK, Prof G de V	Posbus 5836, WALMER, 6065
2621	DE KOCK, Mnr G L	Posbus 74367, LYNNWOODRIF, 0040
0851	DE KOCK, Dr J A	Posbus 21, FAUNA PARK, 0787
2758	DE LANGE, Allon & Petro	Posbus 11597, BENDOR PARK, 0699
1062	DE LA REY, Mnr A le R	27 ste Laan 318, VILLIERIA, Pretoria, 0186
2288	DELPORT, Mr J L	P O Box 842, DURBANVILLE, 7551
2355	DE MUNNIK, Dr A	Posbus 4816, MIDDELBURG, 1050
2017	DE RIDDER, Mr Gerard	P O Box 783148, SANDTON, 2146
2472	DE VILLIERS, Mnr Tielman	Posbus 73400, LYNNWOODRIF, 0040
2592	DE VOS, Mev M E	Posbus 14724, NELSPRUIT, 1200
2039	DIEDERICKS, Mnr W J	p/a G K Theron, Posbus 1790, GROENKLOOF, 0027
2828	DI RAGO, Mrs Lynn	Private Bag 10015, SANDTON, 2146
0085	DIXON, Mr Ian	20 Varley Road, Hayfields, PIETERMARITZBURG, 3201
1649	DOEPEL, Mr W R	P O Box 1127, HONEYDEW, 2040
1464	DONALDSON, Dr J S	NBI, Private Bag X7, CLAREMONT, 7735
2824	DOUWES, Errol	P O Box 50327, Musgrave, 4062
2227	DROTSKY, Mnr Buch	Posbus 1202, CARLETONVILLE, 2500
2881	DUFFIELD, Denise	P O Box 64, KENTON ON SEA, 6191
0806	DUNCAN, Mrs Lorraine	10 7th Street, Linden, JOHANNESBURG, 2195
SPES	DU PLESSIS, Mej A	Engelbertusstraat3, Uitbreiding 12, DORANDIA, 0182
1298	DU PLESSIS, Mnr André	Essenhoutweg 9, Wilkoppies, KLERKSDORP, 2570
2619	DU PLESSIS, Chris H	Roosstraat 16, MONUMENT, Krugersdorp, 1739
2664	DU PLESSIS, Dr C J	Departement CACS, Privaatsak X04, ONDERSTEPOORT, 0110
2290	DU PLESSIS, Dr G J	Wychwoodlaan 31, Linkside, PORT ELIZABETH, 6001
2377	DU PLESSIS, Mnr Johan P	Posbus 3173, PRETORIA, 0001
2826	DU PLESSIS, Mnr L M	Posbus 3388, MONTANAPARK, 0159
2682	DU PLESSIS, Mnr R F	Posbus 3946, THE REEDS, 0154
2819	DU PLESSIS, Mr R J	P O Box 300, NGODWANA, 1209
2845	DU PLESSIS, Mnr Shane	Posbus 3305, DURBANVILLE,7551, Kaapstad
2578	DU PLESSIS, Mev S C	Rigellaan 337 A, WATERKLOOFRIF, 0181
6335	DU PREEZ, Mnr D vdM	Posbus 31, Patensie, 6335
2218	DU PREEZ, Mnr H K	Dikbaslaan 59, WONDERBOOM, 0182
2703	DU PREEZ, Jaco	Posbus 828, GROBLERSDAL, 0470
1577	DU PREEZ, Mnr J C	Posbus 5452, Onverwacht, ELLISRAS, 0557
1428	DU RAND, Mr L	P O Box 44153, Linden, 2104
1810	DU TOIT, Mnr Biem	Posbus 3942, PIETERSBURG, 0700
2716	DU TOIT, Mnr Cornelis G	Posbus 4404, RIETVALLEIRAND, 0174
2358	DU TOIT, Mnr C L	Terblanchstraat 5, De Zoete Inval, SUIDER PAARL, 7646
2730	DU TOIT, G S	Posbus 2730, MARIKANA, 0284
1064	DU TOIT, Mev H J	Wydgelegen BREDASDORP, 7282
1271	DU TOIT, Mnr H X N	Posbus 22, BREDASDORP, 7280
0971	DU TOIT, Mnr K P	Posbus 15, BURGERSFORT, 1150
0082	DU TOIT, Neethling & Erica	Posbus 3922, NELSPRUIT, 1200
2040	DU TOIT, Mnr P J & VAN DER WESTHUIZEN, Mnr P	Posbus 5856, DORINGKRUIN, 2576
2873	DU TOIT, Mnr Richter	Posbus 1536, HERMANUS, 7200
1040	EALES, Mr L E	263 Lewisham Road, BLACKHEATH, Johannesburg, 2195
2671	EASTERN, Dr A	P O Box 16385, DOWERGLEN, 1612
2650	ECONOMAKIS, Mr Ari	Wimpy Shop 5, Alberton Mall, Clinton Road, NEW REDRUTH, 1449
2571	EDWARDS, A J	P O Box 10431, MEERENSEE, 3901

2788	EHLERS, Pieter J	Posbus 1401, WITBANK, 1035
2785	EKSTEEN, C D	P O Box 252, FAERIE GLEN, 0043
1630	EKSTEEN, Mnr L J	Posbus 4496, EMPANGENI, 3880
2148	ELLIOTT, Mr V	45 Grenville Avenue, SAVOY ESTATE, 2090
2011	ELOFF, Mnr Frits	Posbus 12609, CLUBVIEW, 0014
2722	EMERICH, Rian	Posbus 6419, WELTEVREDENPARK, 1715
2460	ENGELBRECHT, Mev Antoinette	Posbus 257, GERMISTON, 1400
2426	ENGELBRECHT, Mev A W	Posbus 424, GROBLERSDAL, 0470
0817	ERASMUS, Dr C S	77 Rustenburg Road, EMMARENTIA, Johannesburg, 2195
2132	ERASMUS, Mnr H J	Posbus 180, DUIWELSKLOOF, 0835
1863	ERASMUS, Mnr P M S J	Posbus 31231, TOTIUSDAL, 0134
2847	ESTERHUIZEN, Mnr W G	Posbus 151, ALEXANDRIA, 6185
2638	EVERT, Mnr John G	Posbus 13170, LERAATSFONTEIN, 1038
2739	EVERETT, Mr Sean D	P O Box 2216, BRAMLEY, Johannesburg, 2018
0793	EVERETT, Mr W A	P O Box 238, CONSTANTIA, 7848
2360	EXLEY, Mnr Schalk	Posbus 1913, RICHARDSBAAI, 3900
2787	FARRIMOND, Mr Michael	29 Ada Avenus, ADAMAYVIEW, Klerksdorp, 2571
2504	FERREIRA, Mnr M P	Weirstraat 413, PRETORIA-TUINE, Pretoria, 0082
2637	FEY, Mnr Joggie N	Maskewstraat 21, VANDERBIJLPARK, 1911
2695	FLETT, Dr Brad C	25 Maree Street, POTCHEFSTROOM, 2520
9015	FLORA CONSERVATION COMMITTEE	Botanical Society of SA, Kirstenbosch, CLAREMONT, 7735
1963	FOKKENS, Mr J F	P O Box 14504, NELSPRUIT, 1200
2721	FOUCHE, Leon	Posbus 102, ROOIHUISKRAAL, 0152
2662	FOURIE, Mnr Joop	Posbus 41498, MORELETAPARK, 0044
2044	FOURIE, Mnr J J A	Posbus 908541, MONTANA, 0151
0689	FOURIE, Mnr M J	Hobsonstraat 9, STILFONTEIN, 2551
0542	FRITZ, Mnr G	Posbus 139, HEIDELBERG, 1438
1632	FUGLISTER, Mr F J	P O Box 121, HALFWAY HOUSE, 1685
2875	GALLOWAY, Elmarie	Posbus 445, MENLYN, 0063
2238	GARRATT, Dr P J V	71 Myro Drive, Glenmore, DURBAN, 4001
2795	GELDENHUYS, Mnr Renier A	Posbus 12391, QUEENSWOOD, Pretoria, 0121
0200	GERBER, Mr Harry	45 Anleno Road, Montclair, DURBAN, 4001
2113	GIELINK, Mr C C	P O Box 3786, DURBAN, 4000
1614	GNEITING, C F H	P O Box 72188, LYNNWOOD RIDGE, 0040
1466	GOLDSCHMIDT, Dr R P	P O Box 68332, BRYANSTON, 2021
0046	GOODE, Douglas	10 Hudson Bennett Crescent, GILLITS, 3610
2665	GOOSEN, Mnr R N	Posbus 25426, GEZINA, 0031
2273	GOSSMANN, J F	Sultanastraat, Uitsig, WELLINGTON, 7655
1335	GOULD, Mr & Mrs T	P O Box 132, PENNINGTON, 4184
2844	GREENAWAY, Neill	P O Box 2806, PINETOWN, KZN, 3600
2781	GREYLING, Dr J H	Posbus 199, PIETERSBURG, 0700
1789	GREYLING, Mnr J J	21ste Laan 760, RIETFONTEIN, 0084
1720	GRIESEL, Mnr C L B	Queens Crescent 427, LYNNWOOD, Pretoria, 0081
1400	GROBBELAAR, Mev Hanneke	Tarentaalkloof, Posbus 15357, LYNN-OOS, 0039
0097	GROBBELAAR, Prof N (Erelid)	Tarentaalkloof, Posbus 15357, LYNN-OOS, 0039
2633	GROBLER, J	P O Box 8024, SONPARK, 1211
2719	GROBLER, Mnr Johan H	Posbus 892, MOOINOOI, 0325
2285	GROBLER, Mnr Phil	Posbus 236, PIETERSBURG, 0700
2502	GROENEWALD, Mnr D M	Willsonstraat 161, FAIRLAND, 2195
2563	GROENEWALD, Willem L	Posbus 84571, GREENSIDE, 2034
0420	HANACZECK, Mr H W	P O Box 44, DUIWELSKLOOF, 0835
2864	HANEKOM, A C	Posbus 12380, BENDORPARK, Pietersburg, 0699
1178	HARRIS, Mr M V	64 Robertson Road, WARMBARTHS, 0480
1600	HARRIS, Mnr R	Posbus 16514, VERWOERDBURG, 0140
0510	HARRISON, E R	P O Box 104, MTUBATUBA, 3935
0296	HARRY MOLTENO LLIBRARY	The Librarian, Kirstenbosch, Private Bag X7, CLAREMONT, 7735
0601	HART, Mr G B	P O Box 72727, LYNNWOOD RIDGE, 0040
2794	HART, Mrs M	65 Kompensasie Street, PIETERSBURG, 0699
0130	HARTZENBERG, Louw	Posbus 4, NORTH RIDING, 2162
2271	HATTINGH, Mev Elza	Posbus 797, HONEYDEW, 2040
2318	HATTINGH, Mnr J F	Posbus 13717, SINOVILLE, 0129
2863	HATTINGH, Michelle	Postnet Suite #28, Privaatsak X5091, BRITS, 0250
2678	HECKL, Wolfram	P O Box 1383, HONEYDEW, 2040
2326	HELM, Marius	Posbus 9612, QUEENSTOWN, 5320
0115	HENMAN, Mr Enrico	12 Dhlinza Street, ESHOWE, 3815
2096	HENNING, Dr J C	Posbus 1168, ELLISRAS, 0555
0433	HENNING, Dr N G C	Cantonmentsweg 80, LYTTELTON MANOR, Centurion, 0157
2806	HILL, Mnr M	Kiepersolstraat 19, NORTHVILLA, Benoni, 1501
2417	HILLS, Mnr G	Posbus 64, HENNEMAN, 9445
2846	HOLDEN, Mr Alex	P O Box 267, BALLITO, 4420
1711	HOLLANDER, Prof W J	RAU, Posbus 524, AUCKLANDPARK, 2006
2556	HOLZTRÄGER, Dr F A	P O Box 29561, SUNNYSIDE, 0132
9002	HOOFDIREKTORAAT NATUURBEWARING	Privaatsak X209, PRETORIA, 0001
1794	HOOG, Mr R J L	22 Douglas Road, KLOOF, 3610
0086	HOOLE, Mr James	P O Box 7958, NEWTON PARK, Port Elizabeth, 6055
2741	HOPLEY, Mr Rowland & Mrs Michelle	6 Waaiboom Street, FREEWAY PARK, Boksburg, 1459
0295	HORNE, Mnr C	P O Box 6819, WELGEMOED, 7530
1983	HORSTHEMKE, Mr R E	P O Box 365, FERNDALE, 2160
2121	HORTUS BOTANICUS	Jam M Visser, Plantage Middenlaan 2A, 1018DD AMSTERDAM
2236	HOWES, Cobie & Julie	55 Homestead Avenue, HILLCREST, 3610
0498	HULSHOF, Mr A	P O Box 1526, KLERKSDORP, 2570

2802	HUMAN, Mnr P G	Posbus 5335, Onverwacht, ELLISRAS, 0557
1766	HUNTER, Dr J J	Nietvoorbij, Privaatsak X5026, STELLENBOSCH, 7599
2718	HURLY, Michael	P O Box 11438, MAROELANA, 0161
1155	ISACKS, Mr G A	8 Medway Road, WESTVILLE, 3630
1168	ISACKS, Mr G R	44 Windham Avenue, HILLARY, 4094
2752	ISMAIL, Mr I S	P O Box 7641, PRETORIA, 0001
2834	JACKSON, Dr A G M	188A Pine Street, ARCADIA, Pretoria, 0083
2178	JANSEN, Mnr Zandberg	Roosweg 8, DAWNVIEW, Germiston, 1401
2593	JANSE VAN RENSBURG, Mev A E	Posbus 39460, MORELETTAPARK, 0044
2764	JANSE VAN RENSBURG, Mnr J	Egretstraat 7, OOSDRIEFONTEIN, Carletonville, 2499
2448	JANSE VAN RENSBURG, Mr J B	Gen E R Snymanslot 3, WELGELEGEN, 7500
1002	JANSE VAN RENSBURG, Mnr J M	Posbus 92, VRYHEID, 3100
1217	JANSE VAN RENSBURG, Mnr J P	Jopie Fouriestraat 374, PRETORIA-NOORD, 0182
2731	JANSE VAN RENSBURG, M E	Posbus 132, ALEXANDRIA, 6185
2732	JANSE VAN RENSBURG, Mnr Rene J	Posbus 26841, LANGENHOVENPARK, Bloemfontein, 9330
0644	JOHANNES, Mrs T A	P O Box 276, PAULPIETERSBURG, 3180
2501	JOHANNESBURG BOTANIC GARDEN FOUNDATION	P O Box 85481, EMMARENTIA, 2029
2815	JOHNSON, Mnr Werner L	Posbus 11264, QUEENSWOOD, 0121
2816	JONKER, C v N	46 Lois Botha Singel, SUMMERSTRAND, Port Elizabeth, 6001
2857	JOOSTE, Mr Roaland	P O Box 3322, BENONI, 1500
1527	JORDAAN, Past Ben	P O Box 55884, PIETERSBURG, 0700
2485	JORDAAN, Mr J A	22 Paradysvink Street, BIRCH ACRES, Kempton Park, 1619
0146	JORDAAN, Sakkie & Anna	Posbus 104, WARRENTON, 6530
2861	LOUBERT, Mnr J D	Posbus 48249, HERCULES, 0030
2880	JOUBERT, Johan (Snr)	Posbus 9, DELMAS, 2210
2292	JOUBERT, J J	Posbus 21991, Helderkruin, ROODEPOORT, 1730
1355	JOUBERT, Mnr W	Posbus 376, WARMBAD, 0480
1462	KABLE, Mr A J	12 Orchid Road, TYGERDAL, Goodwood, 7460
1791	KADWA, Dr M A	Plastic Surgeon, Parklane Clinic, Private Bag X40500, HOUGHTON, 2041
2270	KANONBERG CYCAD FARM	Posbus 2634, DURBANVILLE, 7551
1482	KEMP, J J & A	Posbus 1135, PIETERSBURG, 0700
0010	KEMP, Mev P	51 Constance Road, BROADWOOD, Port Elizabeth, 6070
2151	KENDALL, L	P O Box 11324, HATFIELD, 0028
0081	KENNEDY, Mnr H C	Blok A-E 17, Huis Vergenoegd, Hoofstraat 188, PAARL, 7646
1134	KIRTON, Doug L	P O Box 2550, DURBAN, 4000
0745	KLOPPERS, Mnr John S	Posbus 24, GROBLERSDAL, 0470
1358	KOFMAN Mnr J H	Posbus 1106, Montana Park, PRETORIA, 0159
1939	KORKIE, Mnr E S	Vampirestraat 569, ELARDUSPARK, 0181
1812	KRIEL, Mnr W J	Rupertlaan 34, SOMERSET-WES, 7130
2605	KRUGER, Mnr A P	Posbus 863, PHALABORWA, 1390
2311	KRUGER, Mnr Johasn	Posbus 911343, ROSSLYN, 0200
2547	KRUGER, Mnr J C	Posbus 5552, WINKLESPRUIT, 4145
0853	KRUGER, Dr P W B	Posbus 36766, MENLOPARK, 0102
1140	KRUGER, Mnr S R	Buitestraat 48, La Provance, BETHLEHEM, 9701
1672	KUSCHKE, Mev M M	Posbus 54, HAZYVIEW, 1242
1832	KUUN, Mnr P J C	Posbus 39718, MORELETAPARK, 0044
2692	LABUSCHAGNE, Dieter	Posbus 912464, SILVERTON, 0127
2475	LABUSCHAGNE, D L	Posbus 174, HEILBRON, 9650
2420	LAMBRECHTS, Dr A H D	Amandelweg 51, AMANDA GLEN, Durbanville, 7550
2343	LAMBSON, Mr B	P O Box 411521, CRAIGHALL, 2024
2770	LEE, Craig	10 Avon Road, WOODLEIGH, East London, 5241
2392	LEMMENS, Mnr D R	Posbus 1883, WITRIVIER, 1240
2627	LESLIE, Mr Bruce D	P O Box 11124, SILVERLAKES, 0054
0890	LE ROUX, Cobus	Cerarwood Kompleks No 21, Corneliusstraat, WELTEVREDENPARK,1746
2743	LIEBENBERG, Karl	Posbus 280, TZANEEN, 0850
2776	LIEBENBERG< Mnr W A	12de Laan WONDERBOOM-SUID, 0084
1927	LILTVED, William R	P O Box 372, NOORDHOEK, 7979
2666	LONGMORE, Dr Kevin	6 Rankin Way, EDGEMEAD, 7441
0645	LOTTER, Mnr W J	Posbus 48520, Hercules, PRETORIA, 0030
0159	LOUBSER, Prof J D	Posbus 11315, QUEENSWOOD, 0121
2219	LOURENS, Mnr A J	Posbus 9455, ELSBURG, 1407
2620	LOURENS, D C J	Hansweg 10, VALHALLA, 0185
2491	LOURENS, Mev S	Posbus 68, PONGOLA, 3170
2840	LOUW,. Mnr Daan J	Botterblomstraat 116, VIERLANDEN, Durbanville, 7550
1676	LOUW, Mr J P	P O Box 21433, VALHALLA, 0137
1272	LOUW, Mnr W H	Posbus 1646, FAERIE GLEN, 0250
1324	LOVATT, Mr M	P O Box 338, EMPANGENI, 3880
2209	LOVE, Mr C F M	P O Box 1861, EMPANGENI, 3880
2543	LURIE, Mr Alan	P O Box 1596, PINEGOWRIE, 2123
2814	MALAN, Mnr G M	Posbus 40825, Veld & Vlei, RICHARDS BAY, 3900
2831	MALAN, Mr P F	34 Melsetter Road, LOVEMORE HEIGHTS, 6070
2792	MALAN, Stefan	P O Box 91297, AUCKLANDPARK, 2006
2069	MANGA, Mr Vasan	P O Box 1536, BENONI, 1500
0561	MARAIS, Mnr A J	Posbus 28006, SUNRIDGEPARK, 6008
2376	MARAIS, Dr D D	Posbus 13948, HATFIELD, Pretoria, 0028
0568	MARAIS, Mev Emmerine	Posbus 546, TZANEEN, 0850
2768	MARAIS< Mnr E W	Posbus 38224, GARSFONTEIN, 0060
2473	MARAIS, Mnr M J	Posbus 73400, LYNNWOODRIF, 0040
425	MARITZ, Mnr Faan	Posbus 60539, VAALPARK, 9573
2203	MARITZ, Mnr H P	Posbus 39156, GARSFONTEIN-OOS, 0060, Pretoria

2274	MARTEN, Mr M	32 A G Visser Street, Brackenhurst, ALBERTON, 1450
2709	MARTIN, Adv C H	P O Box 4040, RIVONIA, 2128
2564	MATTHEYS, Harold H	8 Reed Place, NORTHDENE, 4093
2411	McINTOSH, Mev H	Posbus 1327, PIETERSBURG, 0700
2324	McKINLAY, Mr D F	P O Box 31388, WONDERBOOMPOORT, Pretoria, 0033
0205	MEYER, Mnr C C	Ralstonweg 20, FERNGLEN, PORT ELIZABETH, 6045
2351	MEYER, Mnr Danie	Posbus 12116, ELSPARK, 1418
1575	MEYER, Prof J J M	Dept Plantkunde, Universiteit van Pretoria, PRETORIA, 0002
2675	MEYER, Julius O	Posbus 81185, DOORNPOORT, 0017
1107	MIDDELMANN, Mr W J W	402 CPOA, 231 Main Road, RONDEBOSCH, 7700
2048	MILLAR, Mrs R E	P O Box 49300, ROSETTENVILLE, 2130
2607	MINI, Mr M	P O Box 4324, KING WILLIAM'S TOWN, Eastern Cape, 5600
2150	MINNAAR, Dr & Mev D	PostNet Suite 5, Private Bag X8, ELARDUSPARK, 0047
2702	MINNIE, Mr J D	23 Partridge Street, HORISON, Roodepoort, 1724
0006	MINNIE, Dr Ollie J	P O Box 137, MTUBATUBA, 3935
2585	MITCHELL, Ds James R & Thea	Posbus 25256, OOSRAND, 1462
2642	MOLINO, Manlio	12 Adonis Road, EDLEEN, Kempton Park, 1619
1210	MOODIE, Mnr S T	Posbus 72215, LYNNWOODRIF, 0040
2765	MOOITOOI KWEKERY	Posbus 102, CARLETONVILLE, 2500
0489	MORRIS, S F	P O Box 837, RUSTENBURG, 0300
2375	MORRISON, Bruce	P O Box 1560, SPRINGS, 1560
2879	MOSS, Mnr George F	Posbus 9851, ELSBURG, 1407
1957	MOSTERT, Mev Cassandra	Posbus 687, KEMPTONPARK, 1620
2486	MOSTERT, Mnr J I	Deborahstraat 9, WESTERLING, Port Elizabeth, 6025
2086	MOSTERT, Mnr P J	Keeling Place 6, ESCOMBE, Queensburgh, 4093
9019	MPUMALANGA PARKS BOARD	Att J de Beer, Private Bag X113338, NELSPRUIT, 1200
0741	MULDER, Mnr I B	Saffraanlaan 10, Weltevredenpark X9, ROODEPOORT, 1709
1965	MULDER, Mnr H F	Kahlerstyraat 64, Idasvallei, STELLENBOSCH, 7600
2230	MULDER, Theuns	Posbus 1351, DELMAS, 2210
1722	MULLER, Mnr T I	POSBUS 11074, UNIVERSITAS, Bloemfontein, 9321
2550	MULLER, P W J & C J	Posbus 124, MARBLE HALL, 0450
2304	MYBURGH, Dr Jan G	Victorstraat 43, MURRAYFIELD, Pretoria, 0184
2170	MYBURGH, Mnr J L	Posbus 25519, MONUMENTPARK, 0105
0397	MYBURGH, Mej J S	Departement Plantkunde, Universiteit van Pretoria, PRETORIA, 0002
2476	MYBURGH, Mnr L M	Linkstraat 6, TRIOMF, 2092
2848	MYBURGH, Mnr M J	Posbus 100, RANDPARKRIDGE, 2156
1620	MYERS, Mev M M	Posbus 401, WITRIVIER, 1240
9011	NATAL HERBARIUM	The Curator, Botanic Gardens Road, DURBAN, 4001
9001	NATAL PARKS BOARD	The Director (Att Mr R Scott-Shaw), P O Box 662, PIETERMARITZBURG, 3200
9016	NATALSE BIBLIOTEEK	Die Bibliotekaris, (Afd Pligeksemplare), Posbus 415, PIETERMARITZBURG, 3200
2191	NATIONAL BOTANICAL GARDEN NELSPRUIT	The Library, P O Box 1024, NELSPRUIT, 1200
0065	NATIONAL BOTANICAL INSTITUTE	Kirstenbosch National Botanic Garden, Private Bag X7,CLAREMONT, 7735
1232	NATIONAL BOTANICAL INSTITUTE	The Librarian, Private Bag X101, PRETORIA, 0001
1865	NATIONAL BOTANICAL INSTITUTE	THE Curator (Nursery), Private Bag X101, PRETORIA, 0001
9018	NATUURBEWARING NOORDELIKE PROVINSIE	(Riaan de Jager), Posbus 494, PIETERSBURG, 0700
1570	NAUDE, Mnr J J	Posbus 157, TZANEEN, 0850
2220	NAUDE, Mnr L J	Durbanweg 90, MOWBRAY, Kaapstad, 7700
2837	NEAVE, David Michael	25 Philips Road, ESCOMBE, 4093
2725	Nel, Dr Allan M & Mev Jolanda	Posbus 60497, PIERRE VAN RYNEVELD, 0045
0261	NEL, Danie & Avis	P O Box 45, UMLAAS ROAD, 3730
2853	NEL,Mnr Diderik J	Privaatsak X507, HECTORSPRUIT, 1330
1423	NEL, Mnr J J G	Jan van Riebeeckweg 300, OUDTSHOORN, 6625
0227	NEL, Mnr William	Posbus 87, MTUNZINI, 3867
2124	NELL, Dr Johan	Posbus 2787, RANDBURG, 2125
1943	NELL, Mnr J F	Posbus 100386, MORELETTA PLAZA, 0167
0237	NELL, Mnr J.M.	PostNet Suite No 015, Private Bag X1037, GERMISTON, 1428
2452	NELSON, Mr S C	P O Box 614, BELLVILLE, 7535
2780	NIELSEN, Mr D esmond L	P O Box 394, KLOOF, 3640
1194	NIEMAND, Mr & Mrs H & D	50 Judges Avenue, Cresta Extention 1, RANDBURG, 2194
2346	NIENABER, Mev H J	Posbus 20045, RICHARDSBAAI, 3900
2639	NIEUWENHUIS, Mnr M Johan	Posbus 14713, WEST ACRES, 1211
2849	NIEUWOUDT, Mnr C L	Posbus 3388, PAARL, 7620
1503	NIEUWOUDT, J & L	P O Box 292, SKEERPOORT, N W Province, 0232
1968	OBERHOLZER, Niël & Thea	Posbus 44622, LINDEN, 2104
1588	OCHSE, Mr A L	P O Box 310, HONEYDEW, 2040
0094	OLIVIER, Mnr L	Posbus 288, KIRKWOOD, 6120
2832	OLIVIER, Trevor	36 Hillbrow Road, UMGENI PARK, 4051
2779	OOSTHUIZEN, Brenda	Posbus 7823, CENTURION, 0046
0872	OOSTHUIZEN, Mnr J C	Posbus 59911, KARENPARK, 0118
2869	OOSTHUIZEN, Mr R T	96 Begeman Street, HEIDELBERG, 1441
2446	OSMERS, Mev Rita	Posbus 102, TZANEEN, 0850
2843	OTTO, Gerhard	P O Box 1965, NORTHCLIFF, Johannesburg, 2115
2257	PAGE, Mnr & Mev C & A	Posbus 32167, GLENSTANTIA, 0100
2878	PAKENDORF, Dr U W	Posbus 8060, NELSPRUIT, 1200
2589	PANDOR, Mr A M	P O Box 1762, NEWCASTLE, 2940
2643	PAPOLA GARDEN CENTRE & NURSERY	P O Box 88, PUDIMOE, 8581
2215	PARKER, Mr K	Sydneys Hope, Po SIDBURY, 6131
0357	PARSONS, Mr J S	P O Box 41652, CRAIGHALL, 2024

2300	PAUTZ, Mr M J	Cycads for Africa, P O Box 209, KNYSNA, 6570
2854	PAYNE, Peter W	P O Box 2598, NELSPRUIT, 1200
0024	PIENAAR, Mr Leon	626 Jan Visse Avenue, ROSEVILLE, 0084
2606	PIENAAR, Mev Liné	Lusitaniastraat 6, SALDANHA, 7395
2207	PIENAAR, Mnr M G	Posbus 1300, NELSPRUIT, 1200
2287	PIENAAR, Mnr W J	Posbus 2169, MONTANAPARK, 0159
1323	PIETERSE, Mnr Frans P	Emus Erasmuslaan 278, ERASMUSRAND, Pretoria, 0181
2808	PIETERSE, Mnr Gert	Genl Bothaweg 32, ERMELO, 2350
1354	PILLAI, Mr L	55 Maple Crescent, Circle Park, KLOOF, 3610
0078	PINKER, Mr Colin	P O Box 2115, NELSPRUIT, 1200
2859	PINNOY, Kevin K	5 Liebenberg Road, CONSTANTIAKLOOF, Florida, 1709
1152	POULTON LIBRARY	Durban Parks Department, P O Box 3740, DURBAN, 4000
2817	POTGIETER, Yana	P O Box 2228, PIETERSBURG, 0700
2185	POWELL, J B	Dowlingweg 2, Warner Beach, KINGSBURG, 4126
0864	PRANGLEY, Mr P R	P O Box 35245, NORTHWAY, 4065
2652	PRETORIUS, Mnr Charles S	Posbus 37053, FAERIE GLEN, 0043
1843	PRETORIUS, Mnr & Mev J	Posbus 327, LEVUBU, 0929
2409	PRETORIUS, Mnr J J	Posbus 13352, LERAATSFONTEIN, 1038
2307	PRETORIUS, Peet	Posbus 2425, DURBAN, 4000
2523	PRETORIUS, Mnr Sarel J	Posbus 5493, KRUGERSDORP WES, 1742
2674	PRETORIUS, Wikus & Lorraine	Danie Theronstraat 451, PRETORIA-NOORD, 0182
0166	PRINSLOO, Dr G C	Posbus 523, KROONDAL, 0350
1581	PRINSLOO, Mnr J J	Posbus 41090, MORELETAPARK, 0044
2443	PRITCHARD, Mr T	306 Delphinius Street, WATERKLOOF RIDGE, 0181
0631	PROZESKY, Mr J G	P O Box 6172, BIRCHLEIGH, 1621
2395	PURDON, Mrs C J	P O Box 815, PHALABORWA, 1390
1917	QUINN, Peter & Linda	P O Box 77, DURBAN, 4000
2439	RADLEY, Mnr & Mev B	Posbus 1838, FLORIDA HILLS, 1716
2858	RAMOS, Cleto R	Posbus 175, FLORIDA, 1710
1112	RAUTENBACH, Mnr M J	Irving Steynstraat 19, South Crest, ALBERTON, 1449
2413	RAWLINS, Mr Greg K	7 Scouts Place, PINELANDS, Cape Town, 7405
1197	REINACH, Dr Norman	Posbus 1834, GEORGE, 6530
2623	REYNEKE, Dr D J	P O Box 4976, MIDDELBURG, 1050
0759	RIDGE, Mr Bruce	22 EstuaryView, Beacon Bay, EAST LONDON, 5241
2720	RIETJIESBOS BOERDERY	Posbus 24, MONTE VISTA, 7461
1222	RIORDAN, Mr S	Risk Engineering, P O Box 61689, MARSHALLTOWN, 2107
2468	ROBB, Hugh	Posbus 7232, NEWCASTLE, 2940
1654	ROBBERTSE, Prof P J	Astridstraat 167, MEYERSPARK, Pretoria, 0184
1253	ROBINSON, Mr Ken	P O Box 1587, KELVIN, 2054
2696	ROELOFFZE, W Attie	Mainstraat 362, WATERKLOOF, 0181
1699	ROOS, Mr C A	P O Box 7186, ALBEMARLE, 1410
2756	ROOS, G L	Posbus 7800, BONAERO PARK, 1622
2005	ROOS, Mnr P B	Posbus 664, ELLISRAS, 0555
2851	ROSSOUW, Mev A Christine	Posbus 652, POTGIETERSRUS, 0600
2872	ROSSOUW, Mnr H G	Posbus 52810, WIERDA PARK, 0149
0973	ROSSOUW, Mr N B	P O Box 39419, QUEENSBURGH, 4070
2171	ROUSSEAU, Mnr Robert	Posbus 32416, GLENSTANTIA, 0010
0415	RUDMAN, Mr R R	3 Dunn Road, Jansendal Township, UITENHAGE, 6229
2820	SCHEEPERS, T J	197b Venter Street, CAPITAL PARK, 0183
2777	SCHOEMAN, Mnr F S	20ste Laan, VILLIERIA, 0186
1881	SCHOEMAN, Mnr J	Posbus 38448, GARSFONTEIN, 0042
2524	SCHOEMAN, Mnr P J	Posbus 1475, WINGATE PARK, 0153
2868	SCHUTTE, Dewald	Postnmet 75, Privaatsak X82445, RUSTENBURG, 0300
2283	SCHUTTE, Mr H P	P O Box 12596, JACOBS, Durban, 4026
2202	SCHUTTE, Mnr M	Buhrmannstraat 30, Horison, ROODEPOORT, 1724
1077	SCHUTTE, Dr R L	P O Box 650580, BENMORE, 2010
0647	SCHWELLNUS, Mnr M R	Posbus 7045, Newton Park, PORT ELIZABETH, 6055
0477	SCRIBA, Mr J H	P O Box 1708, GEORGE, 6530
2186	SCRIBANTE, Mnr J C E	Christolaan 5, Birchleigh, KEMPTON PARK, 1618
2407	SCRIBANTE, Mr L F	P O Box 15039, WESTMEAD, 3608
1249	SEEDAT, Hassim	P O Box 407, DURBAN, 4000
2774	SHEPPARD, Johannes Magiel	11 Breccia Street, DERSLEY, Springs, 1559
2775	SHEPPARD, Peter John	14 Cruise Crescent, RYNFIELD, Benoni, 1501
2762	SIDERSKY, Mr A I.	P O Box 1152, GALLO MANOR, Sandton, 2052
2256	SIM, Mnr Henry	Posbus 239, KROONSTAD, 9500
2836	SIMPSON, D S	8 Sterkrivier Street, NORKEM PARK, 1618
1650	SLAVIERO, Mr L	P O Box 8513, EDENGLEN, 1613
2796	SLIPPERS, Andre	P O Box 4847, RUSTENBURG, 0300
1959	SMALBERGER, Mnr H C	Posbus 17190, PRETORIA-NOORD, 0116
2572	SMIT, Mev Annatjie	Burensingel 3, STELLENBERG, Durbanville, 7550
2399	SMIT, Mnr C A	Posbus 48114, HERCULES, Pretoria, 0030
2659	SMIT, J K R	Posbus 12, LEVUBU, 0929
2734	SMIT, Mnr W J B	Smooklaan 648, LES MARAIS, Pretoria, 0084
0903	SMITH, Prof G F	NBI, Privaatsak X101, PRETORIA, 0001
2378	SMOOK, Dr Gustav J	Posbus 107, KIEPERSOL, 1241
0698	SMUTS, Mnr M N	Posbus 13682, SINOVILLE, 0129
2537	SNYDERS, Mev Suretta	Posbus 4115, JOHANNESBURG, 2000
2120	SNYMAN, Mnr A D	Posbus 520, UTRECHT, 2980
1481	SNYMAN, Mr A J	P O Box 5450, Panorama Park, WINKELSPRUIT, 4145
1815	SNYMAN, Dr P H R	Posbus 565, MONTANAPARK, 0159
2249	SOLE, Terry	P O Box 634, EDENVALE, 1610

2672	SONEMANN, G W	35 Bonza Bay Road, BEACON BAY, East London, 5241
2401	SOPP, Willie	Posbus 758, MALELANE, 1320
2755	SOROUR, Mr Keith A	P O Box 1062, BLOEMFONTEIN, 9300
2663	SPANGENBERG, Mnr & Mev C J P	Posbus 5584, KRUGERSDORP-WES, 1742
0992	SPICER, Mr B E J	23 West Riding Road, HILLCREST, 3610
9003	STAATSBIBLIOTEEK	Die Direkteur, (Afd Pligeksemplare), Posbus 397, PRETORIA, 0001
2698	STANDER, Adriaan H	Posbus 1326, DURBAN, 4000
2740	STANDER, Hennie	Posbus 20157, WILLOWS, Bloemfontein, 9321
2456	STANDER, Dr H F M	Posbus 17238, PRETORIA NOORD, 0116
2687	STEBBING, Mev Marina	Posbus 7410, PETIT, 1512
2508	STEENKAMP, Gawie	Posbus 336, MOOINOOI, 0325
2331	STEENKAMP, Mnr J H	Posbus 34, BRITS, 0250
0911	STEENKAMP, Mnr & Mev K	Posbus 218, LOUWSBURG, 3150
2830	STEENKAMP, Dr Lucas P & Me Estelle	321 Sadie Street, LYNNWOOD PARK, Pretoria, 0081
2305	STEENKAMP, Mnre P & W	Posbus 17257, GROENKLOOF, 0027
1576	STEP, Mnr E O	Van Riebeecklaan 133, LYTTELTON MANOR, Centurion, 0157
2575	STEYN, G Christo	Posbus 2568, THE REEDS, Centurion, 0158
2713	STOFFBERG, Dr M C	Posbus 100755, MORELETA PLAZA, 0167
2484	STOLTZ, Danie H	Posbus 1594, Thabazimbi, 0380
2761	STOLTZ, Mnr W	Posbus 47, WIERDA PARK, 0149
2254	STOLZ, A H G	Moultonlaan 1176, WAVERLEY, Pretoria, 0186
1117	STRANG, Mrs C	P O Box 69212, BRYANSTON, 2021
2341	STROBOS, Mev J M L	Posbus 1732, LINK HILLS, 3652
2625	STRONG, Peter D	P O Box 276, KLOOF, 3640
2210	STRUYF, Wim & Martie	Posbus 1954, NELSPRUIT, 1200
0213	STRYDOM, Dr Dawid	32 Louie Avenue, NORTHCLIFF, 2195
0845	STRYDOM, Mnr F A	Posbus 6517, PRETORIA, 0001
2553	STRYDOM, J J	Posbus 151, KIEPERSOL, 1241
9006	SUID-AFRIKAANSE BIBLIOTEEK	Die Direkteur, (Afd Pligeksemplare), Posbus 496, KAAPSTAD, 8000
2715	SUTHERLAND, Andrew C	P O Box 10289, MEERENSEE, 3901
2422	SWANEPOEL, Andy & Elize	Bezuidenhoutstraat 9, GLEN MARAIS, Kempton Park, 1619
0139	SWANEPOEL, Mnr Johan	Posbus 911, BLOEMFONTEIN, 9300
2697	SWANEPOEL, Mnr Johan	Posbus 93834, BOORDFONTEIN, 0201
2611	SWANEPOEL Mnr J J	Posbus 28127, DANHOF, Bloemfontein, 9310
1879	SWANEPOEL, Mnr Louis	Posbus 6093, BIRCHLEIGH, 1620
2767	SWANEVELDER, Mnr P	Posbus 1037, VAALWATER, 0530
1890	SWART, Dr I J	Posbus 1006, WITRIVIER, 1240
2757	SWART, Mev Marianne	Posbus 1992, BROOKLYN SQUARE, 0075
0651	SWART, Mnr M L	Privaatsak X9906, WITRIVIER, 1240
0147	TATE, Mr D M	P O Box 2064, CRESTHOLME, 3652
2562	TERBLANCHE, I W	Diemeerstraat 105, PIETERSBURG, 0700
1708	TERBLANCHE, Prof J	Mimosalaan 448, LYNNWOOD, 0081
2700	THERON, C	P O Box 1569, BELLVILLE, 7535
()	THERON, Prof G K	Posbus 1790, GROENKLOOF, 0027
1555	THERON, Dr H S	Posbus 1645, BRITS, 0250
2078	THEUNISSEN, Mnr P	1 Dharm Court, 213 Moore Road, DURBAN, 4001
2246	THORPE, Mr Robin P	P O Box 1797, MOUNT EDGECOMBE, 4300
2581	THURGOOD, Mike	5 Nerina Street, MILNERTON, 7441
2552	TONKING, Mr M J H	P O Box 4137, WHITE RIVER, 1240
2803	TONSING, Ernst	Brummerlaan 418, SILVERTON, 0184
2058	TOWNSEND, Mrs F A	P O Box 15061, FARRARMERE, 1518
1981	TROLLIP, S W K	Posbus 3622, BRITS, 0250
2237	UDEMANS, Mr Willie L	P O Box 90711, BERTSHAM, Johannesburg, 2013
0678	UNGERER, Mr H	P O Box 279, MELVILLE, 2109
1760	UYS, Mev A G	Posbus 2399, PANORAMA LANDGOED, 1718
0322	VALLABH, Mr P D	373 Mink Street, Laudium, PRETORIA, 0037
2744	VAN BILJON, Mr Gert J C	22 Myburgh Avenue, Vanes Estate, UITENHAGE, 6229
2683	VAN DEIJL, Mnr L	Posbus 3946, TYGERVALLEI, 7536
2597	VAN DEN BERG, Mnr D J H	Posbus 6138, BIRCHLEIGH, Kempton Park, 1621
2451	VAN DEN BERG, Mnr D S	Vavell Gardens 10, Cavell Place, SARNIA, 3610
1144	VAN DEN HEEDE, Mr A M P	P O Box 2031, PINETOWN, 3600
2838	VAN DEN HEEVER, Mr J L	P O Box 7262, WELTEVREDENPEAK, Johannesburg, 1715
1918	VAN DER MERWE, Mev C E H	Posbus 679, BARBERTON, 1300
1283	VAN DER MERWE, Mnr C H	Posbus 993, Rant-en-Dal, KRUGERSDORP, 1751
2835	VAN DER MERWE, Mev C S	Posbus 455, PIETERSBURG, 0700
2799	VAN DER MERWE, Mrs J	P O Box 121, ALEXANDRIA, 6185
0136	VAN DER MERWE, Mnr J F	Jack's Cycads, Posbus 39, DUIWELSKLOOF, 0835
2759	VAN DER MERWE, Mev M	Posbus 1049, ROOIHUISKRAAL, Centurion, 0154
0490	VAN DER MERWE, Mnr W D	Posbus 686, PIETERSBURG, 0700
2181	VAN DER WALT, Mnr A J (Snr)	Blackberry 85, ZWARTKOPS X4, Centurion, 0157
0203	VAN DER WALT, Mnr A S J	Posbus 77720, Fontainebleau, RANDBURG, 2032
2727	VAN DER WALT, Mnr Corn M	Williamweg 20, CHARLO, Port Elizabeth, 6070
0038	VAN DER WALT, Mev Ita	Cycad Kwekery, Posbus 15251, LYNN-OOS, 0039
2705	VAN DER WALT, Izak-Hendrik	Hermanstraat 95, CAPRICON, Pietersburg, 0699
2754	VAN DER WALT, Mnr Johan C	Postnetsuite 266, Privaatsak X 7260, WITBANK, 1035
2640	VAN DER WALT, Mr Pieter W	P O Box 913, OLIVEDALE, 2158
2724	VAN DER WESTHUIZEN, Mr Leon C	P O Box 8547, WESTERN LEVELS, 2501
2590	VAN DER WESTHUIZEN, Mnr P D	Posbus 12559, Die Boord, STELLENBOSCH, 7600
2874	VAN DER WESTHUIZEN, S J	Posbus 40, KATHU, 8446
1728	VAN DEVENTER, J C	Bluebellstraat 7, WELGEDACHT, 7530
2728	VAN DUYKER, Mr Paul S	P O Box 30328, RICHARDS BAY, 3900

2472	VAN EEDEN, Mnr B W	Posbus 3489, TYGERPARK, 7536
2297	VAN GEEMS, Mnr J J	Walnutstraat 26, KUILSRIVIER, 7580
2693	VAN GRAAN, Stephen G	Posbus 556, KROONDAL, 0350
2827	VAN HUYSSTEEN, Mrs J	Kosi Bay Spar, P O Box 534, KWANGWANASE, 3973
2711	VAN JAARSVELD, Jarrie & Magda	Posbus 2298, WITRIVIER, 1240
2105	VAN JAARSVELD, Dr W J	Posbus 28283, DANHOF, 9310
2726	VAN KOERSVELD, Paul	8 Bettina Road, RONDEBOSCH EAST
2519	VAN NIEKERK, Mr Andrew	82 Glen Avenue, HIGHWAY GARDENS, Edenvale, 1609
2855	VAN NIEKWERK, Alma M	Posbus 5562, ONVERWACHT, Ellisras, 0557
2070	VAN NIEKERK, Dr A R	Posbus 252, SOUTHBROOM, 4277
2272	VAN NIEKERK, Mev Cecilia	Posbus 262, IRENE, 1675
2397	VAN NIEKERK, Mnr G A	Posbus 32, UMBOGINTWINI, 4120
2660	VAN RHEEDE VAN OUDTSHOORN, Mej H	Posbus 10947, ASTON MANOR, 1630
2856	VAN RENSBURG, Albert B J	Victorstraat 36, MURRAYFIELSD, 0184
2293	VAN RENSBURG, Mnr Johannes	Posbus 3270, DAINFERN, 2055
2729	VAN RENSBURG, Mr Duane	P O Box 1255, GARSFONTEIN, 0042
2240	VAN RENSBURG, Mr P F J	54 Kosmos Avenue, WILRO PARK, 1724
1258	VAN ROOY, Mnr Leon	Posbus 1019, WITRIVIER, 1240
2470	VAN ROOYEN, Mnr A L	Posbus 1795, VRYHEID, 3100
1924	VAN ROOYEN, Mnr H C	Posbus 2690, WELKOM, 9460
1903	VAN ROOYEN, Prof H G	Dept Kurrikulumstudies, R.A.U., Posbus 524, AUCKLANDPARK, 2006
1925	VAN ROOYEN, Ds J C	Posbus 2752, MIDDELBURG, 1050
0060	VAN ROOYEN, Dr & Mev R A	Posbus 646, WITRIVIER, 1240
2742	VAN STADEN, Hermanus J	44 Louis Trichardt Blvd, VANDERBIJLPARK, 1900
2707	VAN STADEN, Mnr Mike & Mev Helena	DenysReitslaan 27, ROOSEVELDPARK, 2195
2644	VAN VUUREN, Mnr W A	Dickensonlaan 1427, WAVERLET, 0186
0229	VAN WYK, Mev G	Posbus 11306, HATFIELD, 0028
2610	VAN WYK, Mnr N R	Posbus 522, VRYHEID, 3100
2629	VAN WYK, Mr N W	P O Box 16328, NELSPRUIT, 1200
2751	VAN WYK, Mr J	P O Box 746, HOEDSPRUIT, 1380
2773	VAN WYK, Jaco	Posbus 25085, MONUMENTPARK, 0105
1891	VAN WYK, Mnr R J	Posbus 113, MOOINOOI, 0325
2516	VAN ZIJL, Mnr Eugene	Posbus 11888, HATFIELD, 0028
2604	VAN ZYL, Mnr Daan	Posbus 1998, TZANEEN, 0850
2708	VAN ZYL, Mnr Johan	Magdalenastraat 541, ROSEVILLE, 0084
2839	VAN ZYL, Mr Jeremy G	P O Box 462, LINMEYER, Johannesburg, 2105
0910	VAN ZYL, Mr J H	P O Box 1822, BROOKLYN SQUARE, 0075
2772	VAN ZYL, Ds P E	Posbus 1494, JEFFREYSBAAI, 6330
2601	VAN ZYL, Mnr P C	Posbus 17, GROOT BRAKRIVIER, 6525
2060	VELDKAMP, Mnr J A	Jim Versterlaan 42, PIERRE VAN RYNEVELDPARK, Centurion, 0157
2852	VENTER, Francois	P O Box 8798, CENTURION, 0046
0681	VENTER, Mnr F F C	Ontdekkersweg 367, Florida Park, Uitbr 3, FLORIDA, 1709
2804	VENTER, J J	Greybestraat 13, RYNFIELD, Benoni, 1501
2320	VENTER, Mev Marlene	Posbus 854, PHALABORWA, 1390
2656	VERMEULEN, Mnr Albert	Posbus576, ELLISRAS, 0555
1033	VICE, Dr A R	P O Box2053, BEACON BAY, 5205
1945	VILJOEN, Mrs Rona	P O Box 261, FERNDALE, 2160
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SHORT COMMUNICATIONS AND ARTICLES (continued)
KORT MEDEDELINGS EN ARTIKELS (vervolg)

GROWING CYCADS AT 34° S (4)

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Received 14 January 2003

In the last issue we looked at some hybrids in *Encephalartos*. This time we will take a look at some genera other than *Encephalartos*.

"How does *Stangeria* do with you?" Very well. From looking at its natural distribution, one gets the impression that it is particular in its habitat requirements: it does not occur north of the KwaZulu-Natal border where it may be too tropical, it does not extend much south of East London where it may be too cool, and it does not extend inland where it may be too dry. Yet it is so easy and forgiving in cultivation (Colour Figure 21 on p. 31). We all know that in nature there are two apparently genetically distinct forms, one occurring in bright sunlight in short grassland and the other in dense shade within evergreen forests, yet in cultivation both forms prove to be tolerant of a range of light conditions. Moreover, this is the only cycad known to us which spontaneously sets viable seeds away from the natural habitat, and which apparently does not have a cycad-specific pollinator.

"What about the Australian species in the family Stangeriaceae?" We have both the *Bowenia* species (see Colour Figure 22 on p. 31), but neither ever looks like anything. Apart from a *B. spectabilis* which we got as a seedling from the late Bruce Bursey and which formed a huge clump, all our plants are solitary. They have the disconcerting habit of losing their leaves and for staying underground and apparently lifeless for years at a time.

"Given that Australia is supposed to have a climate so similar to South Africa, how do the other Australians fare?" Here we have to qualify. Parts of the Australian east coast are warm-temperate like the area between East London and Durban; then parts of Queensland, the Northern Territory, and the northern part of West Australia are very hot, the Perth area gets winter rainfall like the Cape, and some inland areas where species such as *Macrozamia moorei* and *M. macdonnellii* grow can be compared to the habitats of *Encephalartos middelburgensis* or *E. dyerianus*.

The Australian species of *Cycas* are generally not successful here, and we have tried many. They appear to have higher heat requirements than most other *Cycas* species and indeed most other cycads. In some desperation we dumped all ours against a north-facing wall where they get very little water and get baked in the sun. To our surprise they not only survived, but are doing better than previously in the greenhouse, though they are still far from specimen plants. What does seem certain now, is that all *Cycas* species must be grown in full sunlight here in Stellenbosch, no matter how they may grow in nature. Though many species of *Cycas* have passed through our hands over the years, we still don't have much to show. Strangely, it is the *Cycas rumphii* group, generally considered to be amongst the more tropical *Cycas* species, which do best here. Plants which grow well outside, are *C. thouarsii* (Colour Figure 23 on p. 31), *C. bougainvilleana*, *C. circinalis*, and an unidentified species. *C. nathorstii*

insists on producing new foliage in autumn or even winter, which seems to get winter damage. Our next step is to determine if this is really winter damage, or perhaps a nutritional problem. In general we are not so interested in expanding the collection of this group, because the species tend to look very similar when not in cone and we don't have unlimited space. That stalwart, *Cycas revoluta* (Colour Figure 24 on p. 31), looks no more than reasonable with us because it is prone to the dreaded "curly top" disease. We have been struggling with this malady for almost 20 years, but also think that we are finally close to a breakthrough to a cure. Desiderata? We are mourning the loss of *Cycas silvestris* which we would like to replace, and we certainly would like, against all odds, to try species like *C. micholitzii, C. multipinnata, C. bifida,* and (dare I say it) *Cycas debaoensis*.

Macrozamia is a trouble-free genus in these latitudes. Species which do well in the general landscape are *M. moorei* (Colour Figure 25 on p. 31), *M. miquelii* (Colour Figure 26 on p. 31), and *M. lucida* . Strangely our *M. johnsonii* and *M. communis* don't do so well, but it is possible that they simply suffer from competition by palms. Our *M. macdonnellii*, grown from seed, has reached a fair size, but at this moment is not looking so good because it is somewhat overgrown by plants which, for political reasons, cannot be removed or trimmed. Annoyingly we don't have any of the *M. riedlei* group in the open ground, for the simple reason that there is no space.

Figure 1 *Macrozamia stenomera*: **an immature, seed-grown plant, already showing the forked leaflets and the plumose appearance of the leaves.**

Then there are the innumerable little *Macrozamias.* These by no means all react in the same way, but some which are successful are *M. fawcettii, M. flexuosa* (Colour Figure 28 on p. 31; since this photograph was taken, it has produces a ramrod-straight erect leave, almost a metre long.), *M. pauli-guilielmii*, and a number of nameless ones. We have *M. stenomera* (Figure 1), with its delightfully forked leaflets, in both full sunlight and fairly dense shade, and is doing equally well in both situations. We are sure that they will be a real asset before long. The delectable *M. lomandroiides* survives but is hardly anything to look at. An impression, by no means yet tested exhaustively, is that most if not all species of *Macrozamia* do best in direct sunlight under our conditions. Forget that dictum that *in Australia every cycad grows under an* Eucalyptus *tree.*

Our *Lepidozamia peroffskyana*, a female which cones regularly, is beautiful by any standard; in fact, more beautiful than any which we saw in the wild. We grow it in filtered sunlight. Conversely, our *L. hopei* which grows under only slightly darker conditions, grows excruciatingly slowly.

Microcycas calocoma (Colour Figure 27 on p. 31), which we like to dubb the world's rarest cycad, is for us also one of the most difficult to keep alive. After years of experimenting we have come to the conclusion that it needs the brightest possible light. It dies in winter when getting too dry, and it dies if it gets wet in the cool season. For this reason we keep it in a coarse and very well-drained sand, and water weekly throughout the year, even in winter. We keep it in a pot, and have not yet scraped up enough courage to plant it in the open ground.

The Dioons, often looking so similar to *Encephalartos*, must be treated quite differently. Of these we don't have all the species (especially we are desiring *D. sonorense*), but the others do well for us now that we think we understand their needs. The problem is that, like *Macrozamia*, so many photographs of wild plants show them growing in shady situations. In Stellenbosch that does not work. It appears to us as if most, if not all, species of *Dioon* have high heat requirements. You will remember that we don't have too many hot days, and in shade it is simply not hot enough for them. We have a fair collection grown from seed, which for years we kept in containers and pampered in the greenhouse. More or less annually they produced one or two new leaves at a time, but even after more than 20 years they were still very small. At that stage we decided that they just had to leave the greenhouse to make place for other plants. We packed them outside in the blazing sun where, after initial light scorching, thet soon enough produced healthy leaves. After two years we judged them ready to start a new life, and planted them out on a new sunny rockery dedicated to *Dioon* (Figure 2). Then a surprising thing happened: they started to grow. Within a few years they have increased their stem diameters three or four times, and they now are really good-looking plants. Under our conditions it seems certain that they need long hours of direct sunlight, even species like *D. spinulo-*

Colour Figure 21 *Stangeria eriopus*. **These are in fact plants of the grassland form growing in semi-shade – note how well they have adapted to this situation.**

Colour Figure 22 *Bowenia serrulata*: **two plants, each with a single leaf. After a few months or a year these leaves die off, and the tuber can then remain dormant for several years.**

Colour Figure 23 *Cycas thouarsii*: **this 25 year old plant was grown from seed received from the Comores.**

Colour Figure 24 *Cycas revoluta*: **this is the best we can do in Stellenbosch. It still shows signs of the "curly top" disease on the far left side, but seems to be well on its way to recovery.**

Colour Figure 25 *Macrozamia moorei*: **a 30-year old seedling which has grown so fast since planted in the open ground that we are getting scared of it.**

Colour Figure 26 *Macrozamia miquelii*: **a fine 30-year old seedling of coning age (it is a male).**

Colour Fiogure 27 *Microcycas calocoma* **a 16-year old plant.**

Colour Figure 28 *Macrozamia*, **presumed to be** *M. flexuosa*, **looking rather the worse for wear after winter.**

Colour Figure 29 *Ceratozamia latifolia*: **a particularly striking and shade-loving species.**

Colour Figure 31 *Zamia integrifolia*: **this species grows fast as long as it gets sufficient light, and soon forms a nice clump.**

Colour Figure 30 *Zamia furfuracea*: **a clump containing several variants of this species, and grown in almost direct sunlight.**

Colour Figure 32 *Zamia vazquezii*: **this is a single clumping plant, grown from seed and kept in shade.**

Colour Figure 33 *Zamia fischeri*: **a species which is more often than not confused with** *Z. vazquezii*. **It is smaller in all respects, with far harder foliage.**

Colour Figure 34 *Cycas revoluta* **showing the dreaded "curly top".**

Colour Figure 35 Symptoms of potassium deficiency on an *Encephalartos arenarius* **x** *E. trispinosus* **hybrid.**

Figure 2 *Dioon*: **a general view of the rockery, with various Dioons competing with short-lived and ephemeral plants.**

Figure 3 *Dioon spinulosum*: **a young male plant growing in direct sunlight. Its leaves are straight rather than curved, and not as long as in plants grown in shade, but it looks good, grows well, and shows no,sign of sunburn.**

sum (Figure 3) which everybody swears should be kept in shade. Apart from the latter, we successfully grow *D. califanoi, D. edule, D. holmgrenii, D. mejiae, D. merolae, D. purpusii, D. rzedowskii, D. spinulosum,* and *D. tomasellii*, plus a few as yet unnamed ones. We don't have *D. caputoi*, and we fervently desire *D. sonorense*.

"In view of your difficulties with *Dioon*, I suppose that you also struggle with *Ceratozamia*?" Let us qualify. The *Ceratozamias* have relatively soft, or at least soft-looking, foliage, and in nature almost always grow in shady situations. In fact, they often grow in elatively moist evergreen forest. Yet, their habitat preferences, and hence their reaction to cultivation, vary widely. The stalwart is *Ceratozamia mexicana*. This is a variable species, but all the variants are amongst the most beautiful if cycads. For us it is very easy to grow, and very year we produce some seed. This is one of the few species which must be grown in shade. Every year in autumn or early winter it produces new foliage. In other cycads this means that the new fronds will be depauperate because there is not enough heat for them to develop properly, but in *C. mexicana* they develop to perfect proportions under these cool conditions. This is also the time when they produce cones. Others which we grow outside, are *C. hildae* (which may require more light and heat than we supply), *C. latifolia* (Colour Figure 29 on p. 32), *C. robusta, C. kuesteriana, C. matudae, C. microstrobila, C. mirandae, C. norstogii,* and *C. zaragozae*, plus the obligatory bevy of as yet unnamed species. Surprisingly we don't have *C. miqueliana*. This is an example of a group where we won't ever have all the species, nor do we think it is necessay to grow them all. Of course one always dreams of such apparently unattainable and delectable species as *C. europhyllidia*, which keeps the collectors' spirit alive.

"How does *Zamia* fit into your collecting philosophy"? *Zamia* is a rather bitter-sweet matter. Many species are not difficult to grow outside in a frost-free area such as ours, and their small size comes in very handy when utilising small spaces between bigger cycads. Furthermore, many species can be grown in full sunlight, and in fact does best when grown that way. On the downside seed of any but the common species is very difficult to obtain, and we know woefully little about how to grow them. Of course one always loses the most desirable species.

Figure 4 *Zamia vazquezii*: **a clump grown in full sunlight. In spite of its soft, fernlike foliage, it thrives under these conditions.**

"Which species do you grow?" Apart from the common-or-garden *Zamia furfuracea* (Colour Figure 30 on p. 32) and *Z. integrifolia* (Colour Figure 31 on p. 32), the Caribbean species all do well outside here I think of *Z. amblyphyllidia* and *Z. pumila*, as well as such "disputed" species as *Z. lucayana*. *Z. vazquezii* (Colour Figure 32 on p. 32 & Figure 4) does exceedingly well in blazing sunlight, but we are less successful with little *Z. fischeri* (Colour Figure 33 on p. 32). Others which are well on their way to successful establishment, are *Z. boliviana, Z. poeppigiana* – the latter, from the rain forests of Ecuador being one of the biggest and most pleasant surprises. We have recently successfully established the astounding *Z. angustifolia* outside, and within the next year or two will try the same with *Z. portoricensis* and even the rare *Z. pygmaea*. Others which we think we should be able to grow outside here, are *Z. inermis* and *Z. spartea*. What we so far have not been

able to grow outside are, rather surprisingly, *Z. loddigesii/ Z. paucijuga*, and *Z. acuminata*. Species which even under glass are difficult for us to maintain, are *Z. fairchildiana, Z. muricata, Z. splendens*, and *Z. purpurea*. We also have a clump of a *Zamia* hybrid in the garden (Figure 5); the seeds from which these plants were grown were labelled *Zamia furfuracea* x *Z. integrifolia*, but that is unlikely. More probably it is *Z. furfuracea* crossed with something like *Z. loddigesii*.

Figure 5 A *Zamia* hybrid which is probably a cross between *Z. furfuracea* and *Z. loddigesii*.

"Do you have any problems apart from wind, short summers, and lack of warmth?" Unfortunately yes. I can immediately think of two examples, both of which are thought to be nutritional problems. The first concerns the so-called "curly top" in *Cycas revoluta* (Colour Figure 34 on p. 32). As far as I know it is unknown in the summer rainfall region, but it is epidemic here in the Cape and is also a problem in Florida. New leaves develop normally; but as soon as they start to harden, some small yellow spots develop on the leaflets. These soon spread into larger areas, and then die. Analysis shows that such leaves contain smaller than normal amounts of manganese, calcium, and zinc, but application of those elements does not cure the problem. The other problem is prevailent in blue-leaved species of *Encephalartos* as well as green-leaved hybrids involving blue-leaved species. These plants develop normal, healthy leaves which may stay that way for several years, but when cones appear they may literally overnight develop large purple blotches on the leaflets which soon die (Colour Figure 35 on p. 32). We suspect that this is caused by potassium deficiency and that it is the same as too much nitrogen. Nitrogen is used mainly in the foliage, so no harm is done as long as only leaves are involved. However, for cones considerable amounts of potassium are needed, and when cones are produced on plants which previously have been fed on disproportionally large amounts of nitrogen, there are simply not sufficient amounts of potassium in storage. To the plant cones are important, even more so than leaves, and all possible potassium is extracted from the other plant parts, including the leaves, with these results. This phenomenon is well known in grapes. Regular readers will know that Tom Broom and myself have for long had a difference of opinion on the application of high nitrogen concentrations, and we actually feed our plants more potassium than nitrogen, in the ratio 2:3:4. We have had some success preventing this problem with application of potassium sulphate, but a nutritional imbalance is always very *difficult* to rectify.

So that, dear reader, brings us to the end of this tour. You would have seen that we don't have everything because we cannot grow everything and don't desire everything, and you will be well aware that as specimens our plants are in many instances no match for those grown in warmer areas. Yet, it does demonstrate that, with the necessary care and attempting to understand the needs of these plants, it is possible to use them as cornerstones of a garden, and to grow a wide range of species into reasonable specimens.

THE VIETNAM CYCAD EXPEDITION (Part 3)

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Received 15 January 2003

On day 10, travelling from Thai Nguien to Ba Be, we stopped just beyond Thai Nguien to look at some garden plants. In many respects these are intermediate between *Cycas dolichophylla* and *Cycas bifida*, and Ken thought that they represented natural hybrids between these two very different species. They resembled *Cycas bifida* in respect of their long and erect leaves, but the leaflets are forked once only. They resembled *Cycas dolichophylla* on account of their harder textured foliage, and an aerial stem which can be as long as 60 cm. These were big plants, with leaves up to 4.5 m long (Colour Figure 36 on p. 35). Near Choi Moi we again found *Cycas dolichophylla*, and again could not resist the temptation to photograph these glorious plants (Colour Figure 37 on p. 35). Finally we reached Ba Be, a nature reserve of indescribable beauty. It is centred round a 10 km-long lake with the strangest soapy green colour caused by the limestone in its catchment area, and surrounded by high, steep, evergreen forest covered

Colour Figure 36 *C. dolichophylla* x *C. bifida*: **Ken Hill contemplating a cultivated plant which can only be interpreted as a hybrid.**

Colour Figure 37 *Cycas dolichophylla*: **Willie Tang losing his heart.**

Colour Figure 38 *Cycas brachycantha*: **a plant growing from a limestone crevice, resulting in an exposed stem.**

Colour Figure 39 *Cycas brachycantha*: **leaf detail.**

Colour Figure 40 *Cycas ferruginea*: **leaf detail, from a captive specimen offered for sale at the roadside.**

Colour Figure 41 *C. bifida*: **Jeff Chemnick posing with a plant in dense scrub.**

Colour Figure 42 *C. bifida*: **leaf detail of a wild plant near Cao Bang, showing once-forked leaflets.**

Colour Figure 43 *C. brachycantha*: **a fine cultivated plant. See how different it looks from that in Colour Figure 38.**

Colour Figure 44 *Cycas elongata*: **female cone.**

Colour Figure 45 *Cycas elongata*: **male cone.**

Colour Figure 46 *C. balansae*: **a splendid specimen, over 4 m tall, in dense scrub near Bai Chai.**

Colour Figure 47 *Cycas balansae*: **a female cone.**

Colour Figure 48 *Cycas balansae*: **leaf detail.**

Colour Figure 49 *Cycas tropophylla*: **leaf detail.**

Colour Figure 50 *Cycas tropophylla*: **female cone.**

limestone mountains. This was the first time that we encountered limestone in Vietnam, as all the rock which we had seen up to then was granite. By contrast, almost all the hills which I saw in Thailand and China were limestone

On day 11, our first task of the morning was to scale a formidable mountain behind the rest camp at Ba Be, to locate *Cycas brachycantha*. As these plants are so often wont to do, this species grows near the top of the mountain where, as far as I am concerned, it is as safe from collectors as can be. The climb up to where they were was most exhausting, and outright dangerous. Not only was it steamingly hot and humid even at 7 in the morning, but it was immensely steep and slippery so that the slightest misstep could have resulted in serious injury or worse. It was literally a case of one step forward and three steps backwards. When we finally located the plants, we found them growing (within the dense evergreen forest) on rather steep ground close to the upper edge of a cliff, and uncharacteristically I felt no interest in determining the height of the cliff. We had to ask ourselves what the effort was all about, because the plants were really unpreposessing and in fact outright emaciated (Colour Figure 38 on p. 35). By contrast, later that day we we inspected a cultivated specimen of this species (Colour Figure 43 on p. 35) at a dwelling alongside the river which drains the lake, and it was so lush and beautiful that we could not believe that it was the same species as that seen on the mountain. Those on the mountain looked not unlike depauperate specimens of *Encephalartos villosus*. Their stems were completely underground, except when wedged into limestone crevices where they can emerge for as much as a metre though only 9 to 12 cm thick. There are seldom more than 10 leaves to a plant, these being some 1.5 to 2.5 m long, but quite showy with a deep green and glossy surface, and substantial leaflets up to 250 mm long and 14 mm wide (Colour Figure 39 on p. 35).

The remainder of that day was spent travelling to Cao Bang, over spectacular terrain which is very mountainous with evergreen forests. It was difficult travelling, because during the previous week this area had been subjected to torrential rains and floods, with the result that the road was badly washed away and in many places blocked or caved in through landslides.

On day 12 we travelled from Cao Bang to Lang Son. Not far from Cao Bang we found low but dense deciduous scrub, and within this scrub the delectable *Cycas bifida* which we first saw some days previously in neglected cultivation. These are big plants with leaves up to 6 m tall, yet the dense surrounding vegetation and the fact that the petioles of the small number of leaves alone extend to above eye level, make it extremely difficult to recognise these plants unless one actually grabs a petiole and gets stung by its prickles (Figure 1 and Colour Figures 41, 42 on p. 35; the plant in Colour Figure 41 is almost three times Jeff Chemnick's length; can you spot the plant? Compare the leaf in Colour Figure 42 to the one shown in Colour Figure 17 on p. 19, *Encephalartos* **73**, March 2003). Spotting was not made easier by the presence of look-alike bamboos. No cones, and reluctantly we bade farewell to these plants as it was still some six hours travelling to Lang Son, without taking into account our other planned stops.

Figure 1 *Cycas bifida*: **a plant in a more open situation.**

Figure 2 *Cycas elongata*: **huge field-collected plants in an holding area near Lang Son, probably awaiting shipment to China.**

Near Lang Son we found a nursery, or more correctly a holding area, with a large number of huge *Cycas elongata* plants (Figure 2), some with male and female cones (Colour

Figure 3 *Cycas ferruginea*: **the tall more, or less inaccessible limestone cliffs on which these plants grow.**

Figure 4 *C. ferruginea*: **an unreachable specimen on a limestone cliff.**

Figures 44 & 45 on p. 36). We did not get opportunity to speak to the owner, but one can imagine at what expense and with how much trouble these plants had been transported for hundreds of kilometres from their habitat in the south of the country.

Figure 5 *Cycas tropophylla*: **Ha Long Bay, dotted with over 2000 islands, some of which harbour this species.**

Figure 6 *Cycas tropophylla*: **a cultivated plant on the mainland. Note the chatacteristically keeled leaves.**

However, our real quest was a tantalising glimpse of *Cycas ferruginea* growing high against limestone cliffs (Figure 3), in fact so high that even with a 300 mm lens it could not be decently photographed (Figure 4). Ken Hill's electronic "*Cycad pages*" and Loran Whitelocks's "*The cycads*" tell us that it is characterised by abundant red wool in the crown and on the emerging foliage, and persisting to some extent on the mature foliage (see also Colour Figure 40 on p. 35). And lo! and behold, alongside the road passing below the cliffs on which these plants grew, apparently forever outside the reach of even the most determined collector, we found the obligatory trader selling mature plants of this very species.

Day 13 was for Lang Son to Bai Chay, to see *Cycas balansae* (Colour Figures 46 to 48 on p. 36). First of all we found it in cultivation, and then wild in secondary scrub. It is a stemless species (or more correctly, the stem is underground), with up to 9 (more in cultivation) arching leaves which may be more than 4 m long (Colour Figure 46 on p. 36). The leaflets are dark glossy green, up to 260 mm

long, and 15 mm wide. It grew in rather dense scrub, in shade, where it was not easy to find and still less easy to photograph. Unlike most other species in this area, *Cycas balansae* grows on granite-derived soils. In general habit it resembles *Encephalartos villosus*, but with a petiole 40 to 160 cm in length. We would have liked to stay longer at this interesting and pleasant place, but our schedule was pressing and we still had to travel to Ha Long Bay.

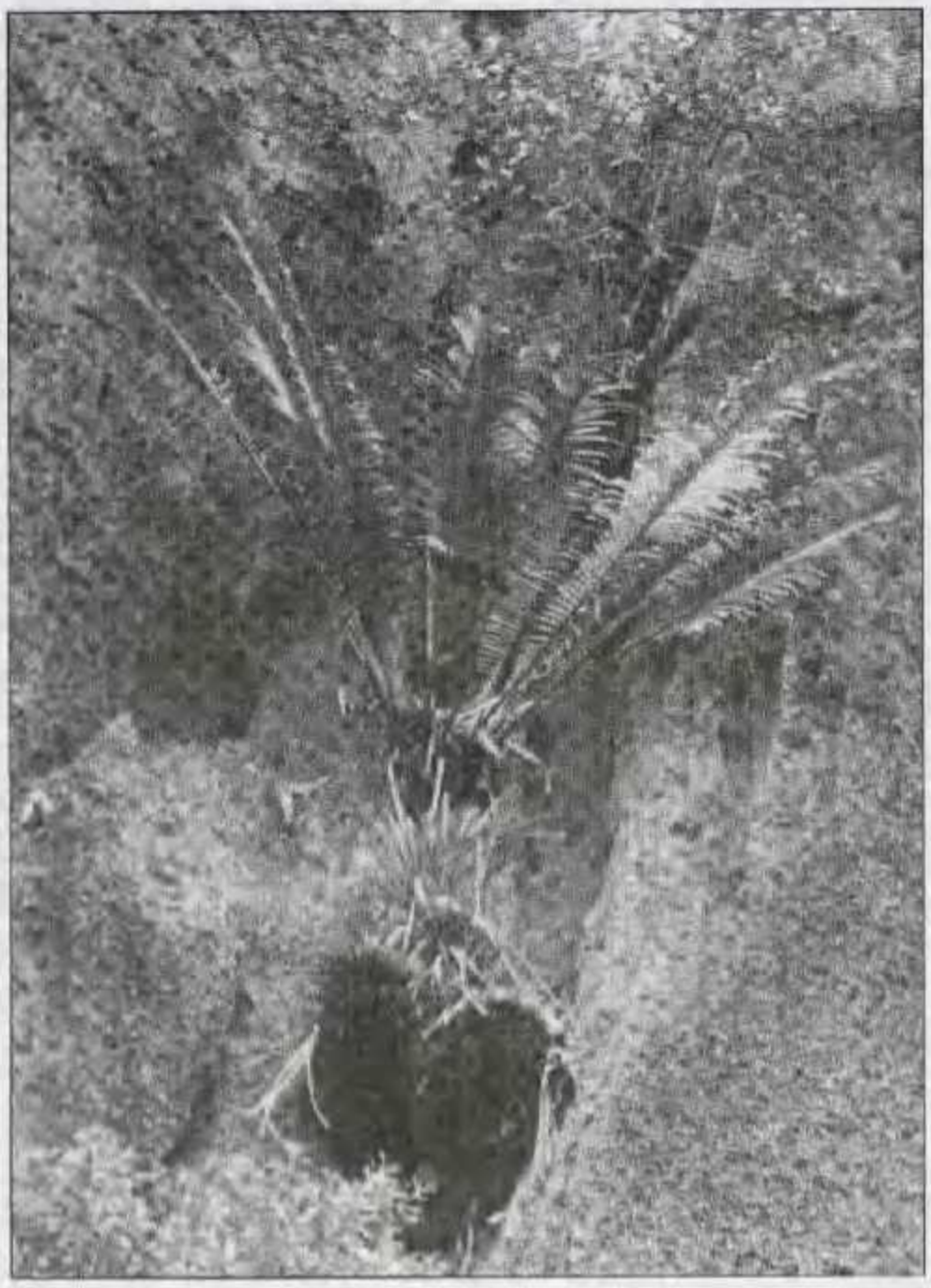

Figure 7 ***Cycas tropophylla*: a group of plants, clinging to a sheer limestone face of one of the islands in Ha Long Bay.**

Our last day in Vietnam was spent at Ha Long Bay. It has been designated a *World Heritage Site*, and not without reason. The bay is dotted with nearly 2000 steep and sheer-sided limestone islands (Figure 5). From a distance the vegetation on these islands appear lush, but from close up one can see that it is a severely well-drained and therefore dry habitat, and all the plants on these islands have special adaptations to cope with a scarcity of water. Botanical exploration of these islands have commenced only in recent years, yet already it is estimated that there are about a thousand species of which several are endemic (*i.e.* they occur no-where else). Amongst these endemic species is *Cycas tropophylla*. Unfortunately for us, this species favours sheer limestone cliffs which rise straight out of the sea, which makes access and photography almost impossible. The accompanying photo (Figure 7) was taken with a telephoto lens and a tripod, yet is was spoilt by movement. Nevertheless I present it here, to give you readers just some idea of the habitat. Fortunately we also found plants in cultivation (Figure 6), including one with a female cone (Colour Figure 50 on p. 36). This species occurs in extremely dry situations, very well-drained and hot, and this is reflected in the morphology of the plants. It has a short trunk, up to 1 metre tall and 15 cm thick. It is the only Vietnamese species with keeled leaves, which are bright glossy green and 70 to 120 cm long. The leaflets are 120 to 180 mm long and 7 to 12 mm wide, thick-textured and with flat margins (Colour Figure 49 on p. 36)

And so ended a memorable expedition. You may well ask what it really was like in Vietnam?

Our most lasting impressions: people, deforestation, cycads holding their own in a secondary vegetation, weather very hot and humid. Narrow roads under constant repair, very mountainous terrain especially up north, delicious food appearing miraculously before we starved, our well-organized leaders and cheerful and knowledgeable companions, and millions of bicycles and scooters.

***Nguyen Tien Hiep*, a fine man who made a profound contribution to the botany of Vietnam in general, and the knowledge of Vietnamese cycads in particular, who made this expedition possible. Here he poses with a six-wheeled truck which served in the Vietnam War but is now employed in the agricultural industry.**

CYCADS STOLEN FROM QUAIL BOTANICAL GARDENS IN ENCINATAS, U.S.A.

Julian Duval
Executive Director, Quail Botanical Gardens
(Message forwarded by Roy E. Works to Roy Osborne on 29 January 2003)

The Gardens had 20 *Encephalartos* (rare African cycads) stolen last night (26 January 2003) from the plantings near the Larabee House. These were all large plants. Four of them were plants we received from USFWS as confiscated specimens placed at QBG as part of our involvement with plant rescue.

Dave, Jason, Sergio and Robert Kopfstein have all helped with giving the report to the officers from the Sheriff's Department. Susi and Bruce Ironmonger have also been here and will help to get the word out to cycad nurseries and enthusiasts about the theft. A friend of Robert's will have the list of stolen plants up on website today. Many of the plants are unique specimens and will be easy to identify even though they have been defoliated. We also have photos of most of them.

I have also left messages for the newspapers. I would like to get the word out about the theft as soon as possible. It could help with recovering the plants but it also will be important to let any potential future perpetrators know that we will pursue prosecution to the fullest possible extent. I also believe we should offer a reward for information that would lead to an arrest. I have requested and have been told that the Sheriff's patrol will provide increased surveillance of our perimeter tonight (despite Superbowl) and for the next week. We know how and where the thieves exited with our plants and wish to make sure they do not return for what was left behind.

While we have insurance that covers equipment and buildings we do not carry insurance on the collection. Not many botanical gardens do have this type of coverage because of the high premium associated with unique and often priceless living specimens. Most of the plants that were stolen have been donated to the QBG over the years. This means of acquisition needs to continue to be open to QBG and is hindered when possible donors cannot be confident that we have adequate security for specimens of high value.

Cycads have been stolen from other botanical gardens in the past and it may be that significant thefts are on the rise. Just last year Fairchild Tropical BG, which has a collection far greater than what we have at QBG lost a large number of very rare cycads. I have not heard if they were successful in recovering any of these plants but intend on contacting them to learn more about what they have done to deter plant thefts.

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We will also organize a group to review what we can do to improve our capacity for security. There are many cycads that are in need of *ex situ* conservation efforts and given our climate, QBG should play a role in conserving these plants. I do not think we should give up on working with them because of this theft or threat of theft. The extreme would be house and exhibit all of the high dollar value plants in a high security area. Imagine an eight foot fence with concertina wire on top and motion detector light beams surrounding the perimeter. It would be the antithesis of the environment that we are trying to provide for our guests but at the same time it would serve to let people know what some of the challenges are in conserving certain plants. Cycads are not only stolen in botanical gardens but poaching is a major reason why so many are endangered in the wild. Given the prices these plants command in world trade there are some cycads who's continued existence is in fact threatened solely by poaching.

Staff and volunteers such as Robert who have worked very hard to see QBG develop the cycad collection and its care feel personally violated by this experience. It is very sad that our work can fall prey to such acts. However, we will learn from this experience and from others who face the same challenges. Security from theft is not the first thing that comes to mind when considering care of the collection but we clearly need to give it more attention and plan to do so.

(Message forwarded by Jeff Chemnick to Roy Osborne on 5 February 2003)

An anonymous caller left a message on QBG's general voice mail box stating they thought they knew where the cycads stolen from the Gardens the weekend before last were located. The caller (male) then proceed to give detailed directions to two locations. One was on Twin Oaks Valley Road north of Twin Oaks Crest and the second location was about ¼ mile west of the 15 on the road to San Louis Downs.

Today QBG staff followed up on these leads and were met by four San Diego County Sheriff's Department officers at the two sites. Fifteen plants were recovered at the first site in a ditch along the road. The remaining six plants were recovered at the second site amongst discarded debris including a long dead dog. While the plants have suffered from this experience, staff are encouraged that all can with time and care survive. While this is not certain and the process may take over a year we are extremely pleased that all 21 plants have been returned to QBG.

While increased security measures were implemented from the time of theft we are still evaluating what long term measures will be most effective in deterring future thefts. Conversations I have had since the theft with other public garden directors and collection managers who are

responsible for the care and display of rare cycads does point to a common vulnerability. I was surprised as to how many institutions have lost these plants to theft and I believe the problem is getting worse.

I wish to thank all the many people who responded with well wishes and also potential leads. The community of private cycad enthusiasts and conservationists have helped a great deal in getting the word out. I also wish to thank the media for giving this theft the profile they did which may very well have contributed to recovering the plants. The detective on this case believes the plants ended up being "too hot" and that's why they were dumped. The Union and NC Times both will run stories tomorrow and will have photos of the plants as they returned to the Gardens. The Sheriff's Department personnel were all extremely helpful and will continue the investigation to hopefully uncover the perpetrators. Robert Kopfstein even made a trip to Rosarito to visit a nursery where he knew stolen cycads had been seen in the past.

I'm sure it is appreciated as to how this theft impacted the staff and volunteers who have worked so hard to establish these plants in a conservation role. While no one ever verbalized it, there was little hope that we would ever see these plants again. Feelings are very high at this time but in no way a distraction to our resolve to protect what we have.

LETTERS / BRIEWE

Dear Editor

RE: NOVEMBER 2002 STUDY TOUR OF SOUTHERN AFRICA

Last November myself and two colleagues spent three weeks on a botanical tour starting in Cape Town and finishing in East London. One of the main objects of the tour was to observe all the cycads of the Eastern Cape. The tour was a great success, we saw many wonderful plants in beautiful localities (Figure 1) and would just like to thank all the people we met on our travels and helped us with our quest. The time and trouble went to, along with the kindness and hospitality we were shown made the trip all the more enjoyable and full of great memories.

Figure 1 ***Encephalartos longifolius*****; the first cycad we came across in the wild; near the Tsitsikamma Mountains and probably close to the edge of its range westwards. There were several smaller plants in the valley beyond.**

I would just like to add that I am hoping to continue with my photographic study of cycads in habitat, starting where we left off and if anyone can offer help or assistance with localities I would be most grateful. Please write to me privately, complete confidentiality is of course assured.

Many thanks.

Ian Watt, *25 Treves Road, Dorchester, Dorset, DT1 2HE, United Kingdom.*

Received 24 February 2003

Dear Dr. Vorster

ENCEPHALARTOS GHELLINCKII **MALE CONES**

This picture (Front Cover) is of a male *E. ghellinckii* bearing three mature cones, photographed in my garden in Noordhoek, Cape, on December 10, 2002. Unlike those of many other *Encephalartos* species, these cones emerged, matured and withered relatively rapidly (approximately 6 months apart from coning in the wild?)

Bill Liltved, *P.O. Box 372, 7979 Noordhoek.*

Reply

This is valuable information, and typical of the kind of observations which our members can record. I am not aware of other published information on coning times of *Encephalartos ghellinckii* in the Cape Town area. Furthermore, I would guess that coning times for this species in the Cape are not very different from those in the natural habitat.

Encephalartos ghellinckii belongs to a group of species

which also includes *E. cycadifolius, E. friderici-guilielmi, E. laevifolius, E. humilis, E. brevifoliolatus*, and *E. lanatus*. This group is remarkable in two respects: firstly, they cone approximately six months out of phase with the other species; and secondly, both male and female cones develop and fall apart within a very short space of time.

With regard to *E. ghellinckii*, I have seen female cones falling apart early in April in natural habitat in the KwaZulu-Natal Drakensberg. In Grobbelaar's book *Cycads*, page 112, times and pollination and cone disintegration in the Pretoria area are given. In the case of *E. ghellinckii* plants are ready for pollination in November (thus a month earlier than Bill's observation in the Cape), and seeds are released between December and February, i.e. one to two months later. **– Piet Vorster.**

Dear Editor

ENCEPHALARTOS HORRIDUS WITH MULTIPLE CONES

Figure 1 ***Encephalartos horridus*****, male plant with three cones.**

In *Encephalartos* **70** of June 2002 Morné Ferreira reported on his *E. horridus* plant that recently produced three male cones. He, however, indicated that the plant was transplanted 8 months previously and that the multiple cones may be as a result of that.

I also have a male *E. horridus* that I planted in my collection approximately three years ago that have produced three male cones this year (Figure 1).

Manie Maritz**, Manie.maritz@psa.co.za**

Received 25 June 2002

Dear Dr. Vorster

UNUSUAL LEAF FORMATION IN *ENCEPHALARTOS CYCADIFOLIUS*

The photograph (Figure 1b) shows a seedling of *E. cycadifolius* which was until recently trying very hard, and seemingly with little success, to grow in my garden.

Figure 1b ***Encephalartos cycadifolius*** **with twisted leaves.**

Fearing that it may die I decided to transplant it from the open ground into a pot from where I would have more control over it in my nursery under shade netting.

When I came to transplanting it I found it was just beginning to make three new leaves. After removing it from the ground I carefully inspected the root structure for any possible disease or damage but found it to be intact and apparently very healthy.

After potting, and as the leaves were developing I noticed this peculiar corkscrew like twisting tendency in the leaf formation. As can be seen in the photograph, the two old

leaves have the typical *E. cycadifolius* flat herringbone pattern in the leaflets, whereas the three new leaves have developed the corkscrew pattern. So much so that the two taller leaves have both twisted twice through 360 degrees.

Maybe some of our readers have had similar experiences or may be able to throw some light on this strange behaviour.

***Viv Elliot,* [mailto:vegro@iafrica.com]**

E-mail sent 10 April 2003

Dear Dr. Vorster

GERMINATING *ENCEPHALARTOS FEROX* SEED SHOWING TWO ROOTS

When this *E. ferox* seed germinated two roots developed (Figure 1). I will keep you informed of the progress of the plant. Is this a common phenomenon?

André J. Cilliers, *Senior Agricultural Researcher, Agricultural Research Council - Grain Crops Institute, Private Bag X1251, 2520 Potchefstroom, R.S.A.*

[A few times in the past I have also had seed from different

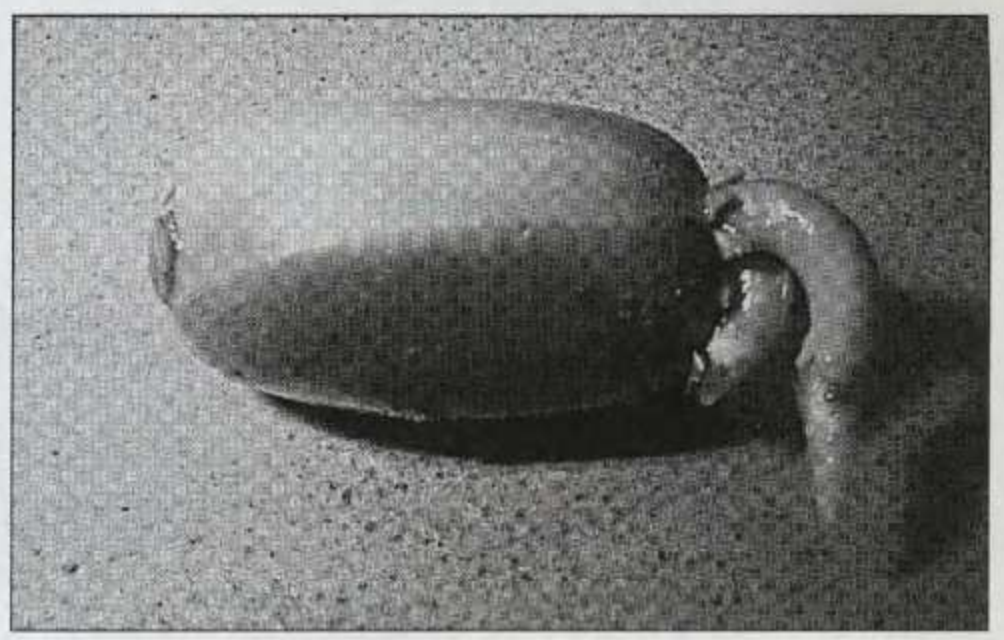

Figure 1 ***Encephalartos ferox*: germinating seed producing two roots.**

Encephalartos species (*E. arenarius, E. lehmanii* and *E. natalensis*) that developed two roots when they germinated When transplanting them at a later stage I came to the conclusion that each of the seeds must have contained two embrios because two separate seedlings developed. Each ovule contains several archegonia and it is possible that the egg cell in more than one of them could be fertilized after pollination. See also Nat Grobbelaar's book (p. 42 in the Afrikaans edition). **- Editor.**]

ZAMIA TUERCKHEIMII?

Wessie van der Westhuizen of Stellenbosch photographed this *Zamia* in a garden in Honduras. While it is possible that it is a local species, this is not necessarily so, but it does look like *Z. tuerckheimii*. Whitelock's *The cycads* cites *Zamia standkeyi, Z. tuerckheimii,* and *Z. variegata* as occurring naturally in Honduras; and *Z. prasina* as growing in neighbouring Belize, close to the border with Honduras. If you have any other ideas, do write to the Editor.