

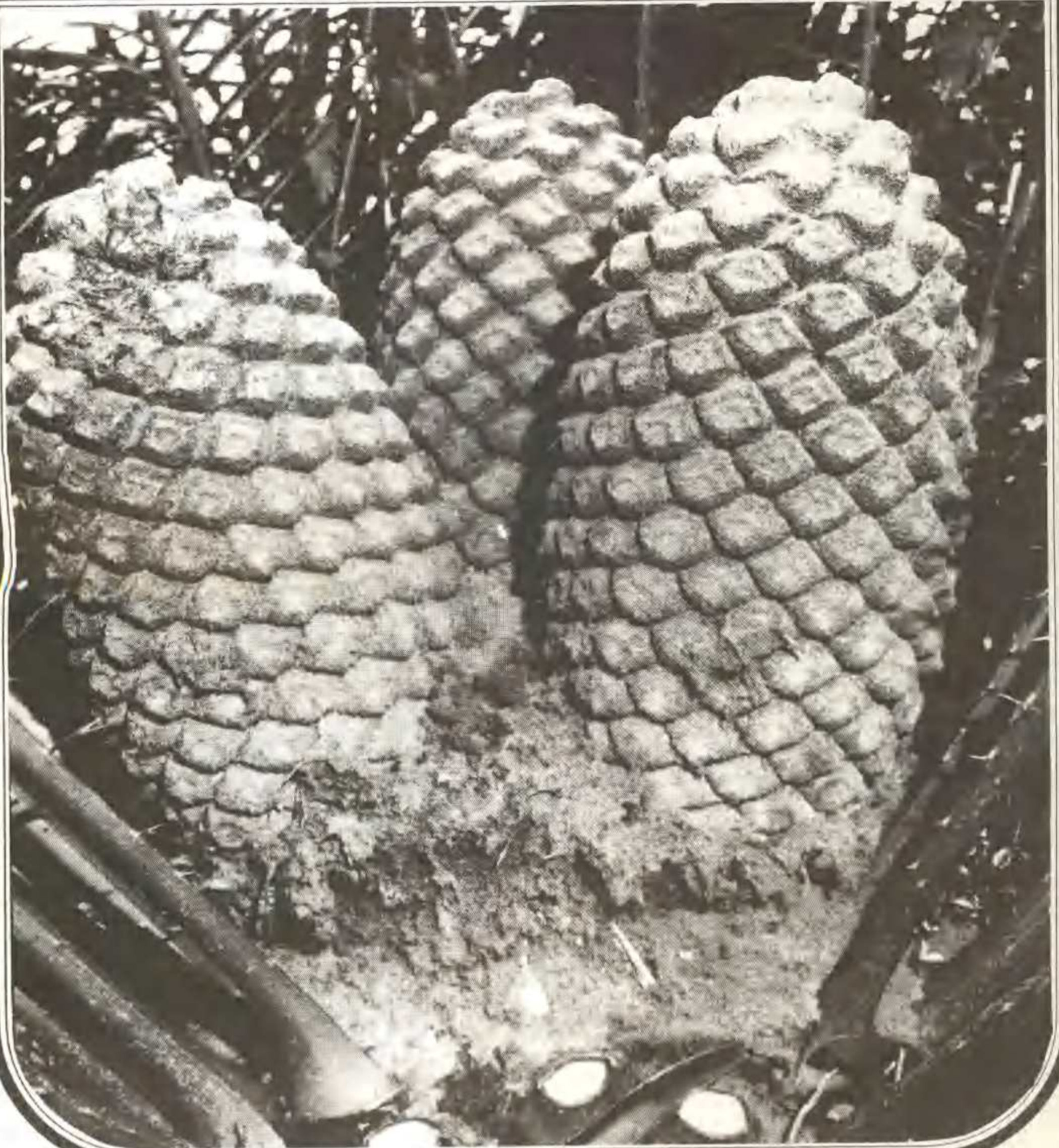
# ENCEPHALARTOS

JOURNAL OF THE  
CYCAD SOCIETY OF  
SOUTHERN AFRICA

NO. 28

TYDSKRIF VAN DIE  
BROODBOOMVERENIGING  
VAN SUIDELIKE AFRIKA

DECEMBER/DESEMBER 1991



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## EDITOR/REDAKTEUR

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## VOORBLAD/COVER

*ENCEPHALARTOS aemulans*  
male cones, 290mm long

Photo: P Vorster

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## VAN DIE PRESIDENT

Aangesien hierdie kolom reeds in September geskryf moes word om in hierdie uitgawe van ENCEPHALARTOS opgeneem te kon word, sal die uitslag van die stemming oor die Grondwet asook die stembrief vir 'n nuwe UK/Raad deur middel van 'n los blad by hierdie uitgawe van die tydskrif of as 'n afsonderlike dokument uitgestuur word.

Om groter aktiwiteit by die Streektakke te stimuleer en hopelik 'n nog beter diens as in die verlede aan ons lede te verskaf, is daar deur die UK besluit om die huidige Saadbankdiens wat vir jare op 'n uitmuntende wyse deur Danie Nel behartig en uitgebou is, vanaf begin 1992 te desentraliseer. Vanaf die begin van 1992 sal elke Streektak 'n saadbankdiens aanbied. Die idee is dat enige lid by enigeen van die Streektakke se saadbanke om saad kan aanklop. Nico Smuts van Posbus 13682, Sinoville, 0129 (Tel 012-575665) is die Saadbankbeampte van die Eugene Marais Streektak en sal hopelik vanaf begin 1992 met die goeie werk voortgaan. In die Oos-Kaap, sal Hentie Barnard van Posbus 1486, Port Elizabeth, 6000 (Tel 041-722031) die saadbankdiens aanbied. Die Natalstreektak hoop om die diens van Danie Nel te bekom maar die saak is nog nie ten tyde van die opstel van hierdie berig (September) gefinaliseer nie. Ek wil in ieder geval vir Danie Nel van harte bedank vir die baie ure se harde werk wat hy as ons saadbankbeampte vir baie jare met soveel deeglikheid en entoesiasme behartig het.

Die eerste amptelike kennisgewing aangaande die Derde Internasionale Broodboomkongres ("CYCAD 93") verskyn elders in

hierdie uitgawe van die tydskrif. Ek hoop vele van u sal die kongres bywoon en die kans benut om internasionale skakelings te smee. Uit die referate en plakkate wat deur deskundiges aangebied sal word, sal u kennis van broodbome hopelik ook baie verryk word.

Ek wil u ook weer daaraan herinner dat daar nie meer individuele rekenings aan lede vir die betaling van die jaarlikse ledegelde uitgestuur sal word nie. As u dus wil verseker dat u ENCEPHALARTOS sonder onderbreking sal ontvang, moet u asseblief sorg dat u ledegeld vir 1992 voor einde Maart 1992 by Pieter Stroebel van Posbus 189, Port Elizabeth, 6000 uitkom.

Graag wens ek elkeen van u 'n besonder aangename en vreugdevolle kersfeestyd toe.

die uwe

  
Nat. GROBBELAAR



FROM THE PRESIDENT

Because this column had to be written in September to ensure its inclusion in this issue of ENCEPHALARTOS, the outcome of the ballot re the Constitution will be announced and the ballot for a new EXCO/Council conducted by means of a loose leaf either included in this issue of the magazine or mailed separately.

To stimulate the activity of the Regional Branches and possibly to provide an even better service to our members than in the past, your EXCO decided that from the beginning of 1992 the Seedbank which Danie Nel managed for many years in a most exemplary way will be decentralised. Each Regional Branch will provide a seedbank service from the beginning of 1992. The idea being that the Seed Banks of all the Regional Branches will be available to all members. Nico Smuts of Box 13682, Sinoville, 0120 (Tel 012-575665) is the Seed Bank Officer of the Eugene Marais Regional Branch and will hopefully continue to serve in this capacity from the beginning of 1992. In the Eastern Cape, Hentie Barnard of Box 1486, Port Elizabeth, 6000 (Tel 041-722031) will run the Seed Bank. The Natal Branch hopes to enlist Danie Nel as their Seed Bank Officer but the matter has not been finalised at this stage (September). In any event, I would like to thank Danie most warmly for the many hours of hard work which he so diligently put in on behalf of the Society with so much enthusiasm.

The first official circular about the Third International Conference on Cycad Biology ("CYCAD 93") appears elsewhere in this issue of the magazine. I hope many of our members will

attend the Conference and use the opportunity to establish contacts with our overseas members. The lectures and placards presented by experts will undoubtedly also considerably enrich our knowledge about cycads.

I would also like to remind you that individual membership renewal accounts will no longer be mailed. If you therefore would like to ensure the uninterrupted delivery of ENCEPHALARTOS to your address, please see to it that your fee reaches Pieter Stroebeel of Box 189, Port Elizabeth, 6000 directly or via one of our Overseas Correspondents before the end of March 1992.

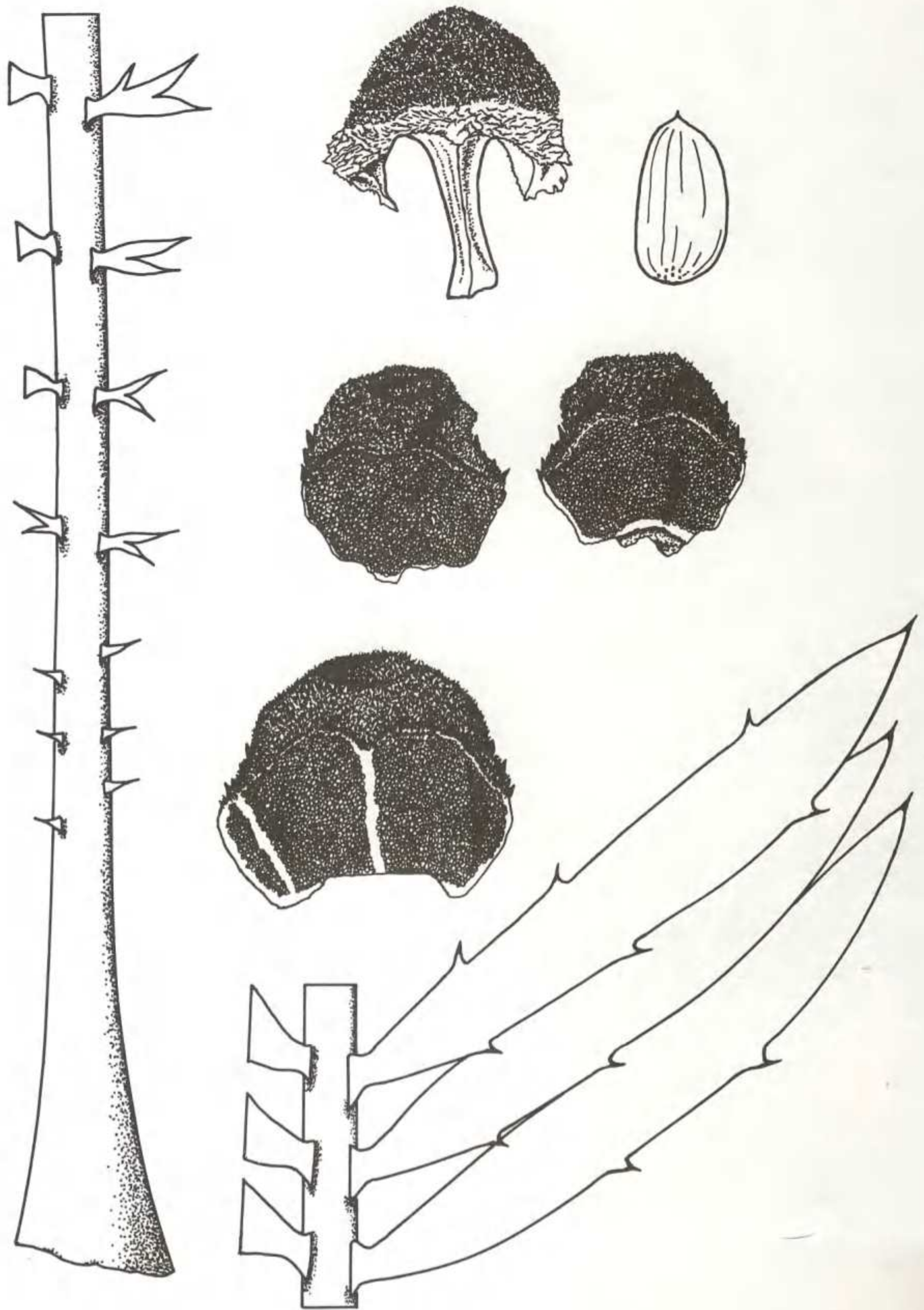
May each and every one of you enjoy a most gratifying and peaceful Christmas.

Yours sincerely



Nat GROBBELAAR





**Figure 1** *Encephalartos aemulans*: (a) proximal part of frond showing short petiole and basal leaflets reduced to prickles; (b) dorsal view of succubously overlapping median leaflets; (c-e) ventral views of microsporophylls; (f) ventral view of megasporophyll; (g) seed kernel; all  $\times 1$ . a, b, d, e, after Vorster 2951a; c, after Vorster 2972; f, g, after Vorster 2951b. Del. E.C. Vorster.

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## FOCUS ON...

## FOKUS OP...

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

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

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# ENCEPHALARTOS AEMULANS

by Piet Vorster

### INTRODUCTION

*Encephalartos aemulans* is an example of a species distinguished as new because of our better understanding of the taxonomic significance of the cones. At the same time its cone characteristics do not shed any light on its possible relationships, an all too common situation in *Encephalartos*.

Like so many recently described species of *Encephalartos*, *E. aemulans* has a very restricted distribution range. While at least one of the known populations consists of several hundred reproducing individuals, the total number of plants is still dangerously low and this species provides a challenge to all involved to guard it against depletion of its numbers in nature while this is still possible.

### DISCOVERY

Plants of this species have been in private collections for at least 20 years, in fact for so long that the origin of most cultivated specimens could no longer be traced. However, the description of the new species was held back as the available information was considered insufficient. A number of people, including members of this Society, directed the author to the natural location of the plants and provided help in various ways which enabled me to gather sufficient information for the description. To protect their privacy they are not formally acknowledged.

### DISTRIBUTION

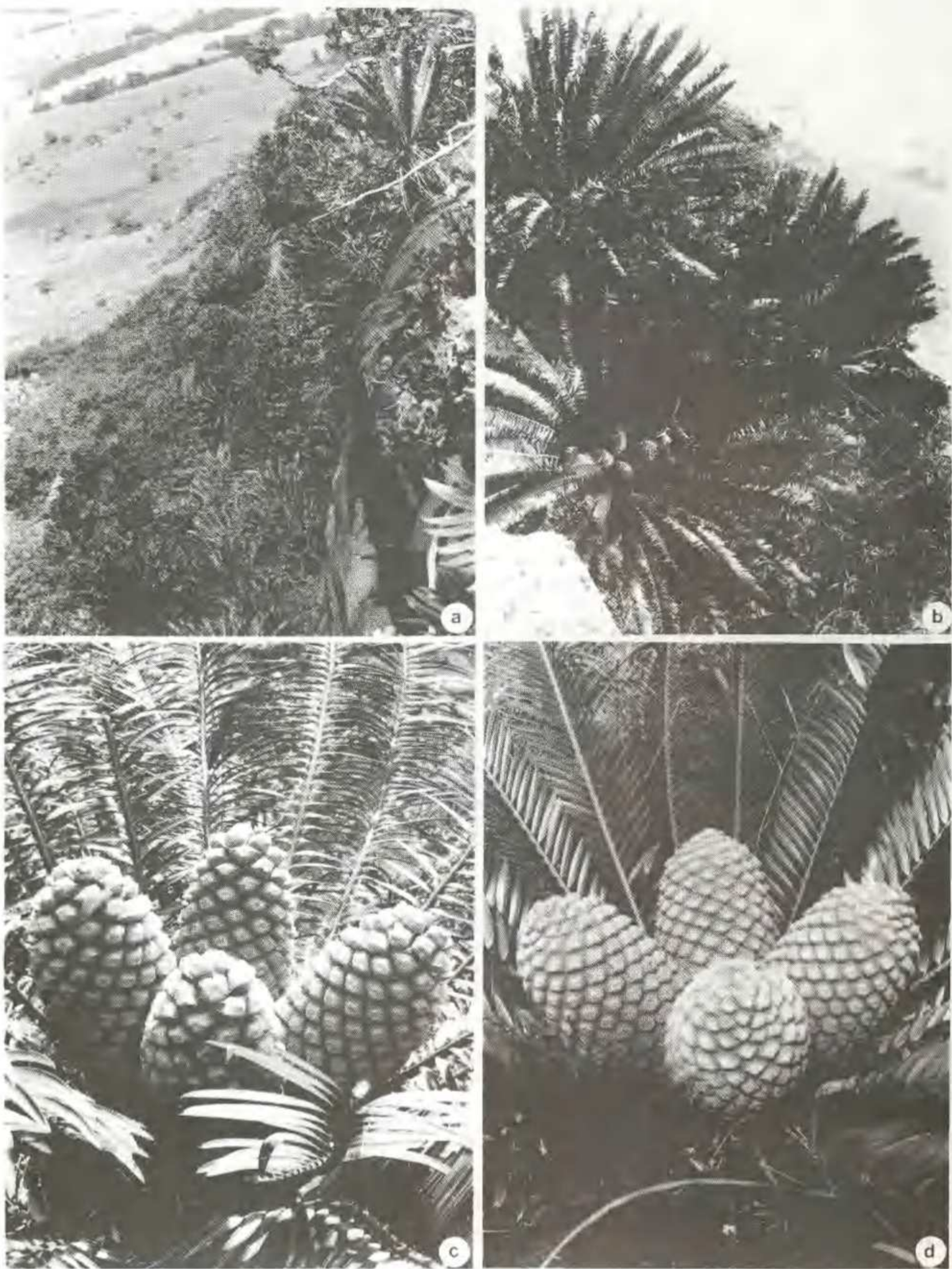
At present this species is known from a hill in the Vryheid district, at an altitude of 1000 to 1100 m where a population of several hundred individuals occur. Two old, multi-stemmed male plants were traced some 10 km from the first site, at an altitude of about 600 m. In spite of some effort, its wider distribution could not be established.

The plants favour south-facing sandstone cliffs (figures 2a & b), in short grassland where they are fully exposed, as well as humus-rich scree below the cliffs where especially small plants were found underneath scrubby vegetation under more shady conditions. All coning plants were found in fully exposed positions. On north- and north-east facing cliffs only a few plants were found, mostly very old individuals, and these aspects do not seem to be favourable for seedling regeneration. Light winter frost could be expected at this locality and the rainfall amounts to 600 to 800 mm per annum, occurring during summer.

The area from where this species was described, is unusually rich in species of *Encephalartos*, with *E. lebomboensis*, *E. natalensis*, *E. villosus*, *E. umbeluziensis*, and *E. ngoyanus* occurring almost within view.

### 1. STEM

Well-developed, erect, unbranched but usually suckering from base, up to 1.5 or rarely 3.0 m tall and 350 mm thick, with a densely woolly crown.



**Figure 2** *Encephalartos aemulans*: (a) habitat at type locality, showing dense stand of plants against south-facing cliffs and on the scree slope below; (b) a multi-stemmed plant with tallest stem about 3 m, against north-facing cliff at type locality; (c) cluster of mature sessile male cones, each 330 mm long, 21st May; (d) cluster of mature sessile female cones, each 350 mm long, 19th April —Vorster 2951b.

## 2. LEAVES

Dark glossy green, straight, rigid, 1.2 to 1.5 or rarely 2.0 m long (figure 2b), with short petioles only 70 to 110 mm long. The leaflets (figure 1b) are directed towards the apex of the frond at an angle of 15 to 45° (depending on location on frond), with opposing leaflets set at an angle of about 135° to each other. The basal leaflets do not overlap, and are reduced to prickles towards the base of the frond (figure 1a). The median leaflets either do not overlap, or else the lower margin of each leaflet slightly overlaps the upper margin of the leaflet directly below it; they are 125 to 150 mm long and 16 to 18 mm wide, very narrowly elliptic and very slightly curved, tapering to both ends, with the apices offset and spinescent, with 1 to 3 teeth on the upper margin and 1 to 2 on the lower margin.

## 3. CONES

The cones of both sexes are sessile and in external appearance remarkably similar almost to maturity, hence the specific epithet meaning "similar". Two to four cones per stem were observed.

The male cones (figures 2c, 3a) are ellipsoid at first but become somewhat more elongated at maturation, lemon yellow but with this colour obscured by a dense brown woolly hair coat. They are 290 to 380 mm long and 140 to 180 mm wide. The faces of the cone scales (figures 1c--e, 3c) are not projected into beak-like structures but the central facet is slightly raised. The scale faces are smooth except for the central facet which is warty.

The female cones (figures 2d, 3b) are also ellipsoid, and green but with this colour obscured by a dense brown woolly hair coat. They are 350 to 400 mm long and 200 to 230 mm wide. The scale faces of the cones (figures 3d & 3) are covered in warts. The seeds are covered with bright red flesh. The kernels (figure 1g) have poorly expressed longitudinal ridges, and are 25 to 29 mm long and 15--19 mm in diameter.

## AFFINITIES

Vegetatively *E. aemulans* is almost indistinguishable from *E. lebomboensis* on account of its relatively narrow leaflets which are reduced to prickles towards the base of the frond (figure 1a). It resembles *E. natalensis* and *E. altensteinii* on account of the tuberculate scale faces of the female cones (figure 3e).

It differs profoundly from all these species by its almost similar, densely woolly male and female cones (compare figures 3a & 3b), by the lack of a visible stalk to the male cone (figure 3a), and the very different scales of the male cones which are wide and rhombic and of which the central facets of the scale faces are slightly raised but not drawn out into beak-like structures as in the other three species (figure 3c).

## CONSERVATION

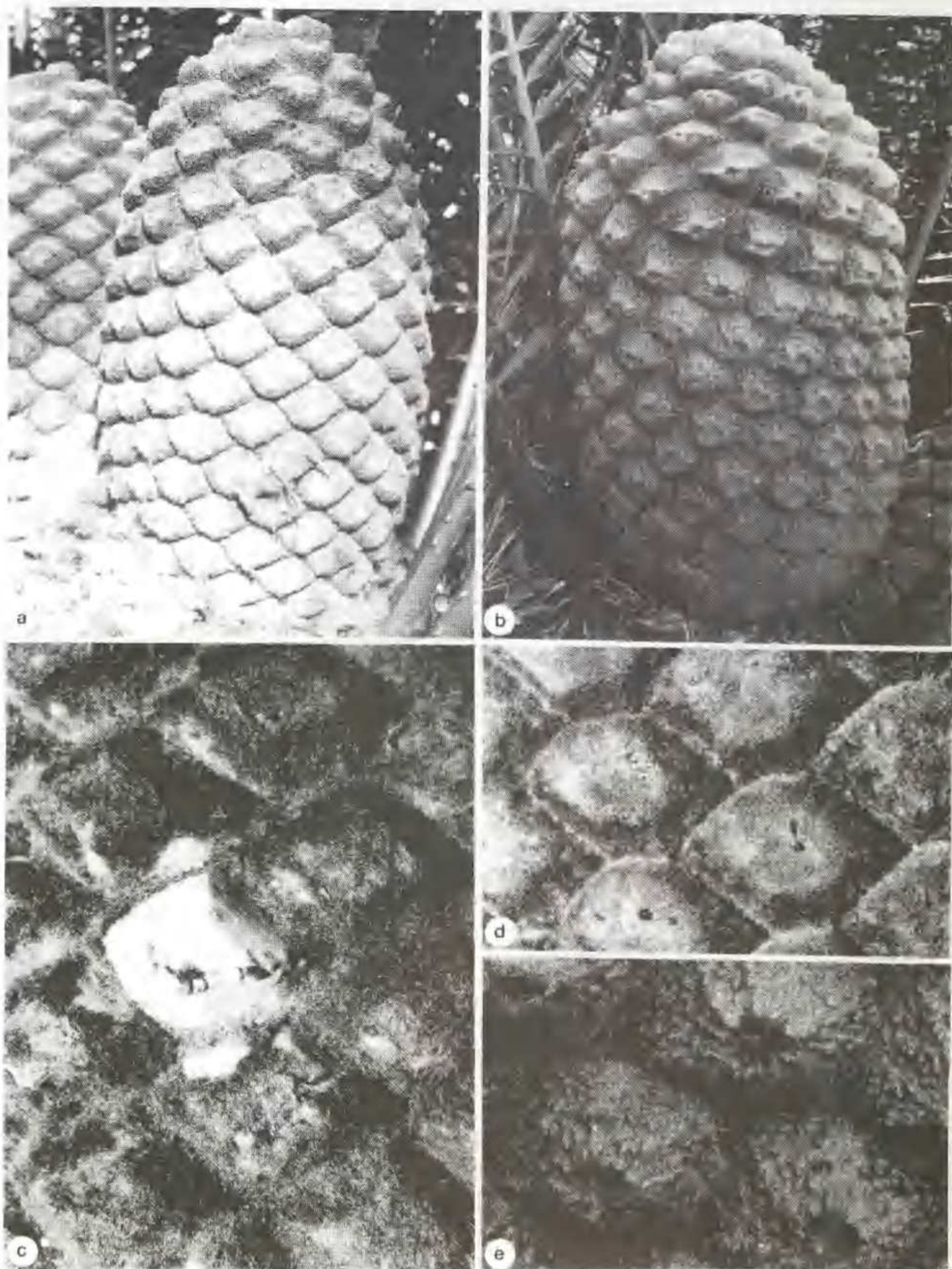
The type locality is in a healthy state with several hundred reproductively mature plants, and active seedling regeneration taking place. However, as this species has a very restricted distribution, and individuals taken from the type locality have been noticed in a considerable number of private collections, I have undertaken not to divulge the location of the plants.

## CULTIVATION

Not much is known about the cultivation of this species, but seedlings seem to be at least as hardy and with about the same growth rate as *E. lebomboensis*. The plants should from an early age be exposed to direct sunlight, and I would guess that they will respond best to the same treatment as given to *E. lebomboensis*.

## BIBLIOGRAPHY

- Vorster, P.: *Encephalartos aemulans* (Zamiaceae), a new species from northern Natal. *South African Journal of Botany* 56: 239--243 (1990).



**Figure 3** *Encephalartos aemulans*: (a) submature sessile male cone, 290 mm long, 19th April, note similarity to following; (b) mature female cone with unusually small central facets of bullae towards apex, 410 mm long, 21st May; (c) surface of submature male cone with indumentum removed from one bulla, life size; (d) surface of submature female cone, life size; (e) surface of mature female cone (cf. 3b) with indumentum removed from bullae to reveal tuberculose surface, life size. a, from Vorster 2951a; d, from Vorster 2951b; b, c and e, from plants at type locality.

# ELUCIDATING EVOLUTIONARY RELATIONSHIPS AMONG CYCADS : THE APPLICATION OF ELECTROPHORESIS

by Terrence W. Walters

Over the last two decades, electrophoresis has proved to be a valuable tool for revealing evolutionary relationships in plants and animals. It is only recently that this technique has been applied to the study of cycads, assisting systematists in understanding relationships within and among species and genera (Ellstrand et al. 1990; Walters and Decker-Walters 1991).

In January 1990, I set up a laboratory at Fairchild Tropical Garden to begin electrophoretic studies on cycads. Since that time, Dr. Deena Decker-Walters and I have begun working on two projects concerning species of the genus *Zamia*. The first project uses electrophoretic data to examine the systematics and historical biogeography of the West Indies *Zamia* (Walters 1991; Walters and Decker-Walters 1991). Although this project is not yet complete, initial data have provided some insight regarding possible evolutionary relationships among interisland populations and the relationship of the West Indies *Zamia* to other species of *Zamia*. Results from this study, along with those from a study of *Macrozamia communis* populations (Ellstrand et al. 1990), indicate relatively slow rates of evolution in cycads compared to those of angiosperms and other gymnosperms.

In the second project, we are investigating evolutionary relationships within *Zamia* and the subfamily Zamioideae, which includes *Ceratozamia*, *Chiqua*, *Microcycas* and *Zamia*. Results to date suggest a strong affinity between *Chiqua* and South American species of *Zamia*, challenging the status of *Chiqua* as a distinct genus. *Ceratozamia* and *Microcycas* may have arisen from *Zamia* ancestors. The electrophoretic data support strong evolutionary ties among geographically related species of *Zamia*.

What is electrophoresis? It is a method for comparing proteins among individuals. Usually the proteins of interest are enzymes. Different forms of a particular enzyme often have different charges. Electrophoresis, which separates charged molecules, reveals enzyme variants. Enzyme variants reflect differences in the gene(s) coding for an enzyme; thus electrophoretic differences represent genetic differences.

Electrophoretic data have a number of advantages over other types of data for addressing questions regarding genetic variation within and evolutionary relationships among cycad populations. Systematic investigations of other plant products (e.g. biflavonoids, glycosides, mucilage monosaccharides) and karyology (the study of chromosome number and type) have revealed little or no variation within genera, making these data difficult to use for examining species relationships. *Zamia* is the

only genus of cycads with karyotypic variation; however, the direction of karyological evolution in this taxon has been under debate for well over ten years. Whereas these types of systematic data have failed to reveal species affinities because of the lack of variation, electrophoretic data have exhibited quantifiable variation within and among populations, species and genera.

The electrophoretic technique also has a number of advantages over morphologically-based analyses. First, enzymes, unlike morphological features, are not affected by varying environmental conditions. Second, it is difficult to compare two groups of plants when one group lacks a morphological character (e.g. prickles on the petiole) present in the other group. This problem is rare with enzymes because if one form of an enzyme is absent, an alternative one is present. Finally, electrophoretic data may provide a clearer picture of the evolutionary history of cycads because enzyme variation can be more directly equated with the underlying genetic variation.

The electrophoretic technique shows promise for detecting hybrids and hybrid swarms as well as for understanding the genetic structure of cycad populations. Interspecific hybrids can usually be detected using this technique because the hybrid has a banding pattern that is a combination of those of its parents. One of our future projects will look for interspecific hybrids in the Mexican "*Z. furfuracea* - *Z. loddigesii*" complex. Morphological and chromosome analyses suggest that interspecific hybrids occur in this complex. The genetic makeup and reproductive biology of cycad populations is still not well documented. Data derived from electrophoresis may shed light on pollen flow and the genetic structure of cycad populations. Documenting the genetic structure of cycad populations may assist those who are interested in conserving specific populations by determining the number of individuals necessary to maintain the genetic integrity of the population.

## References:

- Ellstrand, N.C., Ornduff, R. & Clegg, J.M. 1990. Genetic structure of the Australian cycad *Macrozamia communis* (Zamiaceae). *American Journal of Botany* 77: 677-681.
- Walters, T.W. 1991. Biogeographical history of the West Indies *Zamia*. *Fairchild Tropical Garden Bulletin* 46: 8-13.
- Walters, T.W. & Decker-Walters, D.S. 1991. Patterns of allozyme diversity in the West Indies cycad *Zamia pumila* (Zamiaceae). *American Journal of Botany* 78: 436-445.

*Dr. Terrence Walters writes from Fairchild Tropical Garden, 11935 Old Cutler Road, Miami, Florida, USA.*

# THE LONGEVITY OF CYCAD POLLEN

## Results of some preliminary experimentation

by R. Osborne, P.J. Robbertse & M.I. Claassen

### Introduction

The most effective method of cycad propagation is from seed, but seed material collected from both habitat and garden sources is often infertile and hence artificial pollination is usually necessary to ensure a fertile seed crop. Since fresh pollen of a corresponding male species is not always readily available when female cones are receptive, it is desirable to maintain private or collective pollen banks. Evidence from pollen storage trials on non-cycad material indicates that low temperature storage usually extends pollen longevity but there has been very little work published on optimal storage conditions for cycad pollen.

In ENCEPHALARTOS 7 (pages 4-6), Willie Tang quotes the Chamberlain's observations that *Ceratozamia* pollen, presumably kept at room temperature, retained about 50% viability for about ten days and that "a month can be regarded as the limit of the life of *Ceratozamia* pollen". Furthermore, Tang carried out some tests on cycad pollen stored at reduced temperature and reduced humidity, using the nitroblue tetrazolium enzyme stain to assess viability. He found substantial differences between genera but an overall pattern of declining viability over a 12-month period.

In order to investigate factors affecting pollen viability more fully, we carried out two sets of experiments and report our preliminary findings below.

### Experimental methods : Experiment 1.

Pollen from *Encephalartos ferox*, *E. natalensis*, *E. princeps*, *E. woodii* and *Cycas thouarsii* was harvested from male cones between February and July in 1988. Small amounts of the pollen were stored under a variety of temperature, atmospheric and humidity conditions. Sub-samples were removed every 3 months and incubated for 72 hours at 20°C on a sterile medium of 2% sucrose, 1% agar and 0.01 % boric acid. Sub-samples from these cultures were examined by light microscopy after being stained with safranin. Triplicate counts of the numbers of germinating and non-germinating pollen grains were made and the percentage germinability thus calculated. It is acknowledged that this artificial test does not necessarily represent the potential success in "real" pollination trials but it should nevertheless be a useful indication of actual viability.

### Results: 1. The effect of storage temperature.

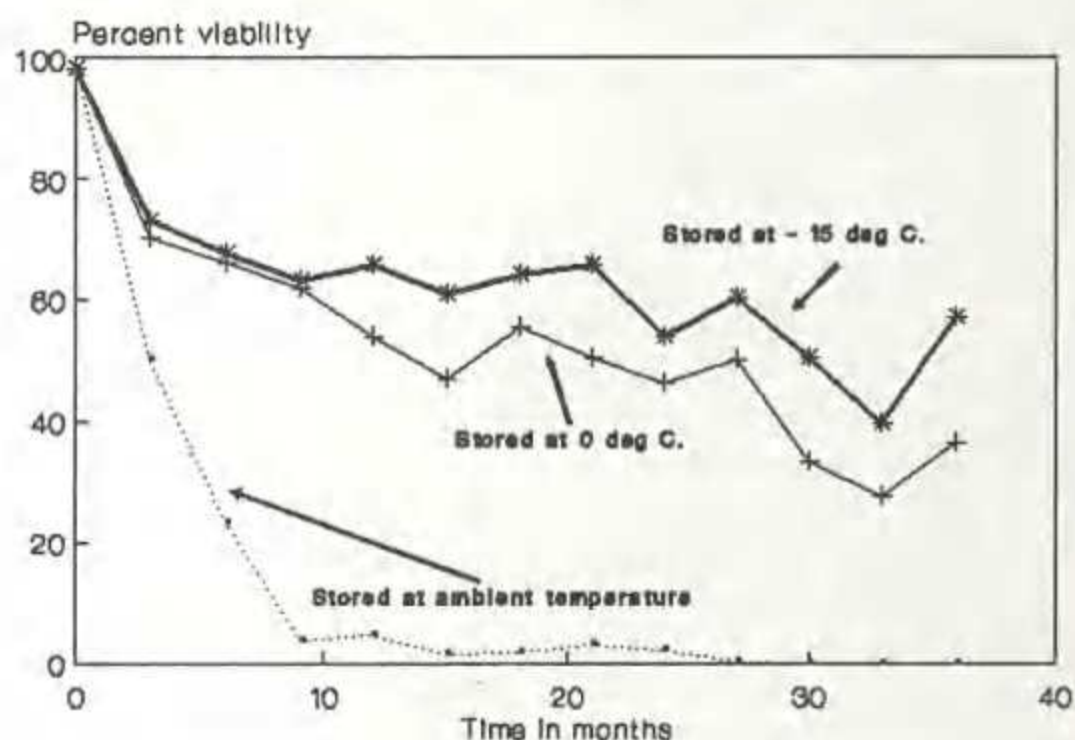


Figure 1: The effect of storage temperature on the germinability of *Encephalartos* pollen. The results from four species have been averaged.

Figure 1 shows the effect of storage at three different temperature conditions on the germinability of *Encephalartos* pollen. The samples stored at ambient temperatures rapidly lost apparent viability - but it is interesting to note that some germination occurred even after storage for 6-8 months. The samples stored under refrigeration (0°C) or deepfreeze (-15°C) conditions, as expected, lost their viability much more slowly and were only just less than 50% viable after 3 years. The somewhat colder conditions of the deepfreeze gave slightly but consistently better results than those of the refrigerator.

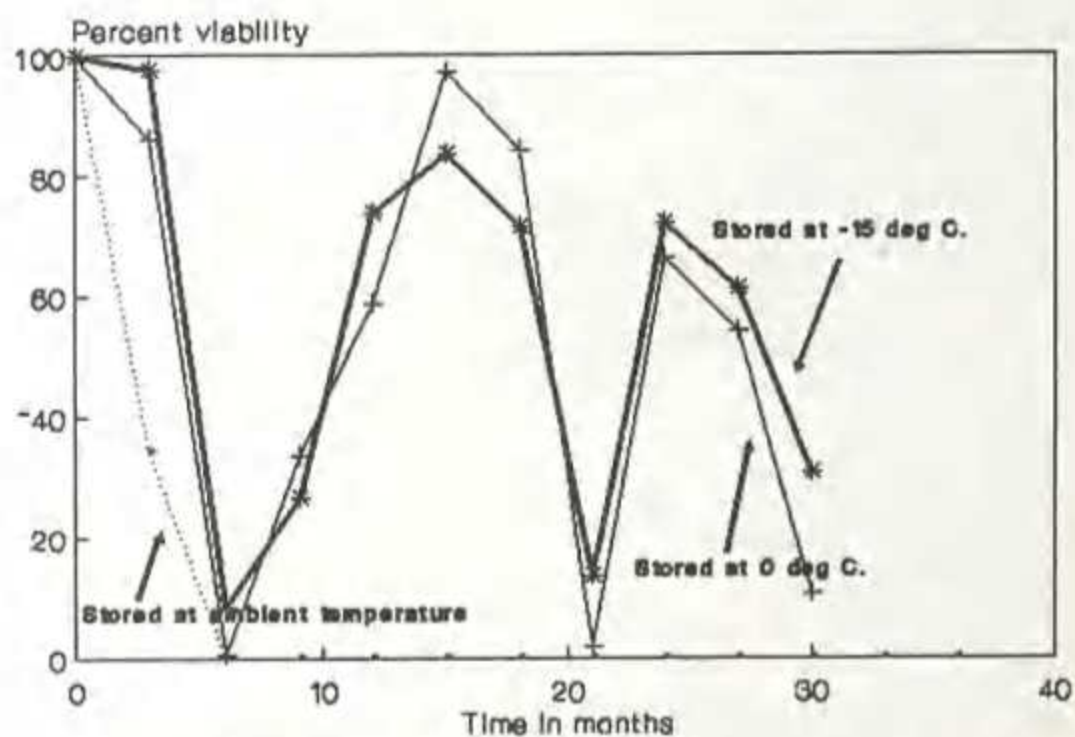


Figure 2: The effect of storage temperature on the germinability of *Cycas thouarsii* pollen.

An anomalous and fascinating result was obtained with *Cycas thouarsii* pollen, as shown in Figure 2 above. Here, all samples appeared to lose nearly all viability within 6 months of storage, but the same pollen showed a curious "recovery" of viability later - rising to a maximum just one year after the initial harvesting. Then the whole cycle is repeated; a sharp decline in germinability followed by another apparent recovery peaking two years after the initial harvesting. Thus it appears that, even when the pollen is stored in a sealed container in the dark at low temperatures, a "biological clock" is "ticking" in each pollen grain, signalling alternating phases of dormancy and potential vigour. This is no freak behaviour; many plants and animals possess such biological clocks but, as yet, little is known of the probable interplay of metabolic reactions, enzymes, co-enzymes and inhibitors which must collectively control such behaviour. These observations in *Cycas* offer a fascinating and important research project for further detailed investigation.

**Results: 2. The effect of storage atmosphere.**

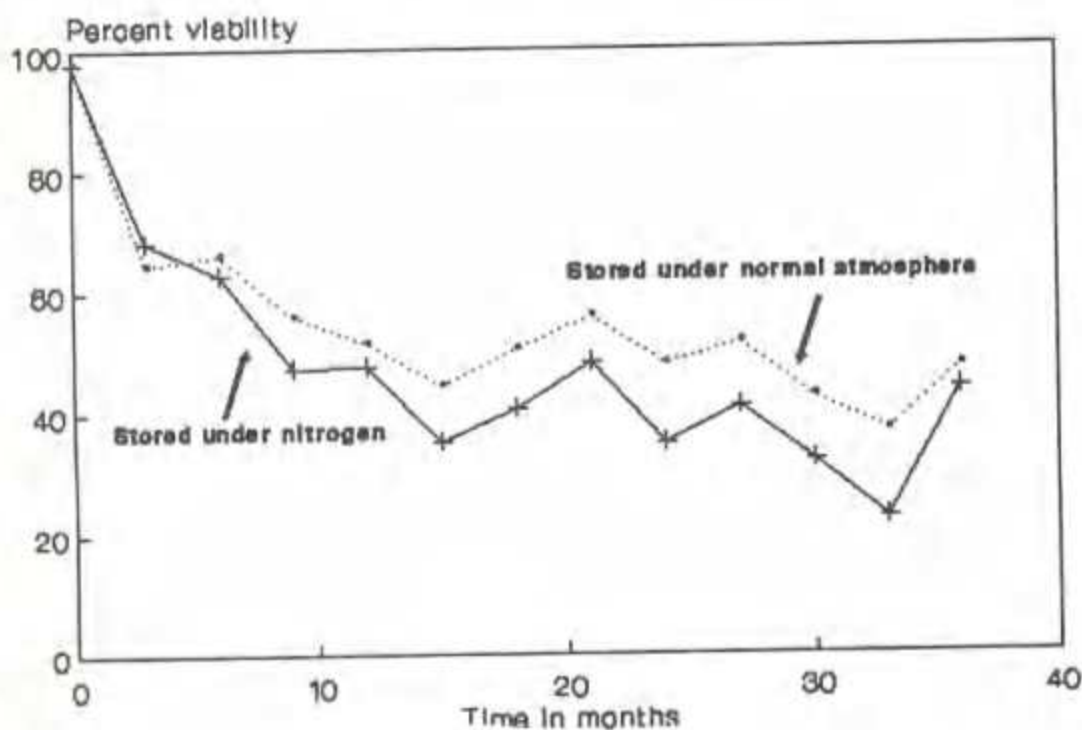


Figure 3: The effect of storage atmosphere on the germinability of *Encephalartos* pollen. The results from three species have been averaged.

Figure 3 shows the results of a comparison of pollen samples stored under a normal atmospheric headspace versus those stored under an inert atmosphere of nitrogen. There appears to be no benefit to storing pollen under nitrogen as might have been expected; on the contrary, the inert atmosphere appears to be slightly disadvantageous.

From Figure 4, below, it seems that there is no clear-cut advantage or disadvantage to the inert atmosphere for storage of *Cycas* pollen. But the curious seasonal dormancy effect described previously is again apparent.

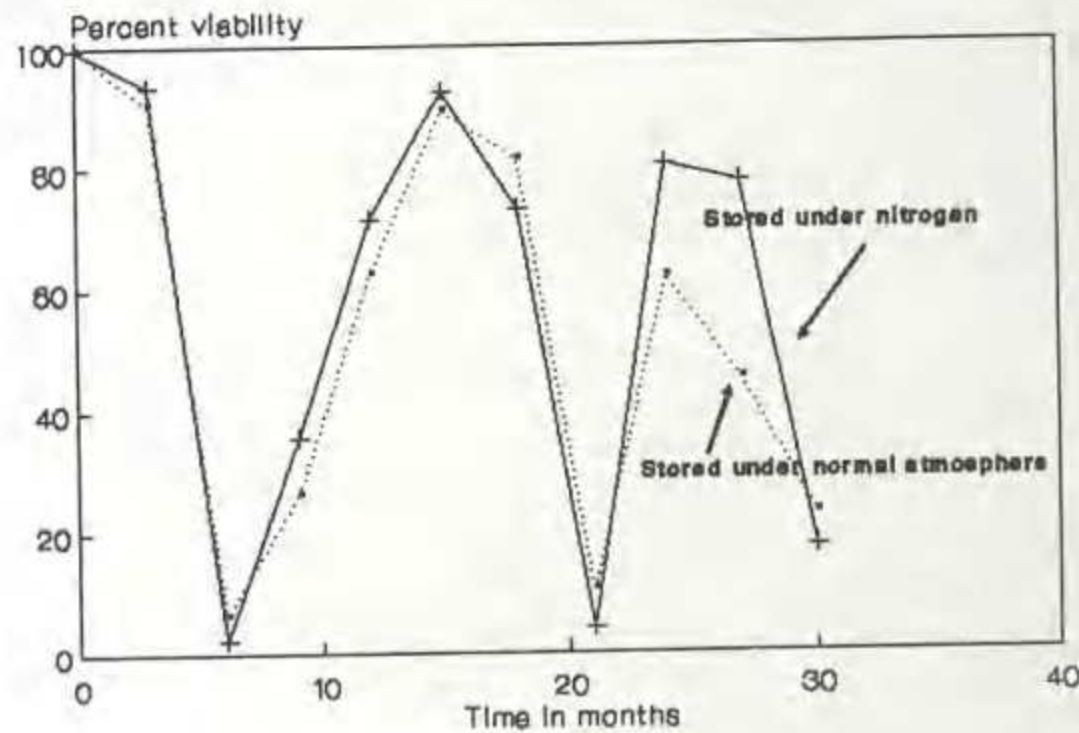


Figure 4: The effect of storage atmosphere on the germinability of *Cycas thouarsii* pollen.

**Results: 3. The effect of storage humidity.**

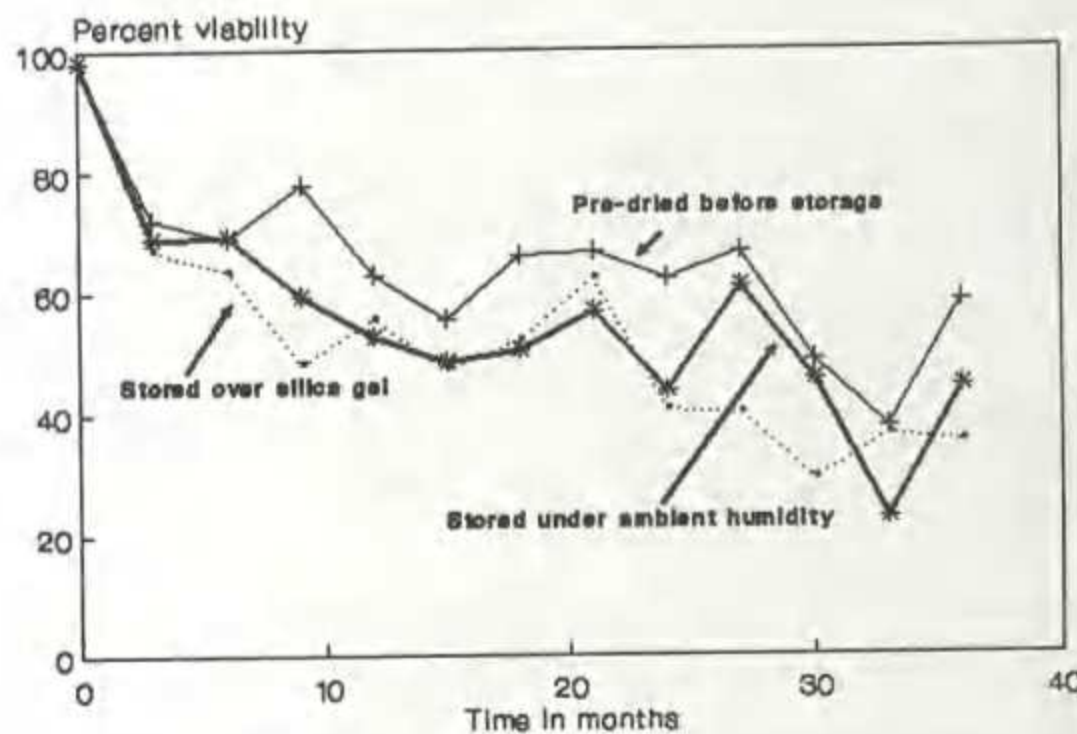


Figure 5: The effect of storage humidity on the germinability of *Encephalartos* pollen. The results from four species have been averaged.

Figure 5 summarises the results obtained when pollen is either pre-dried (by drying the sample in a desiccator with silica gel for 24 hours immediately after harvesting) or storing the material continuously over silica gel (i.e. in near zero humidity conditions). There seems to be a significant benefit to the pre-drying process, while the continuous storage over the desiccant, if anything, is marginally detrimental.

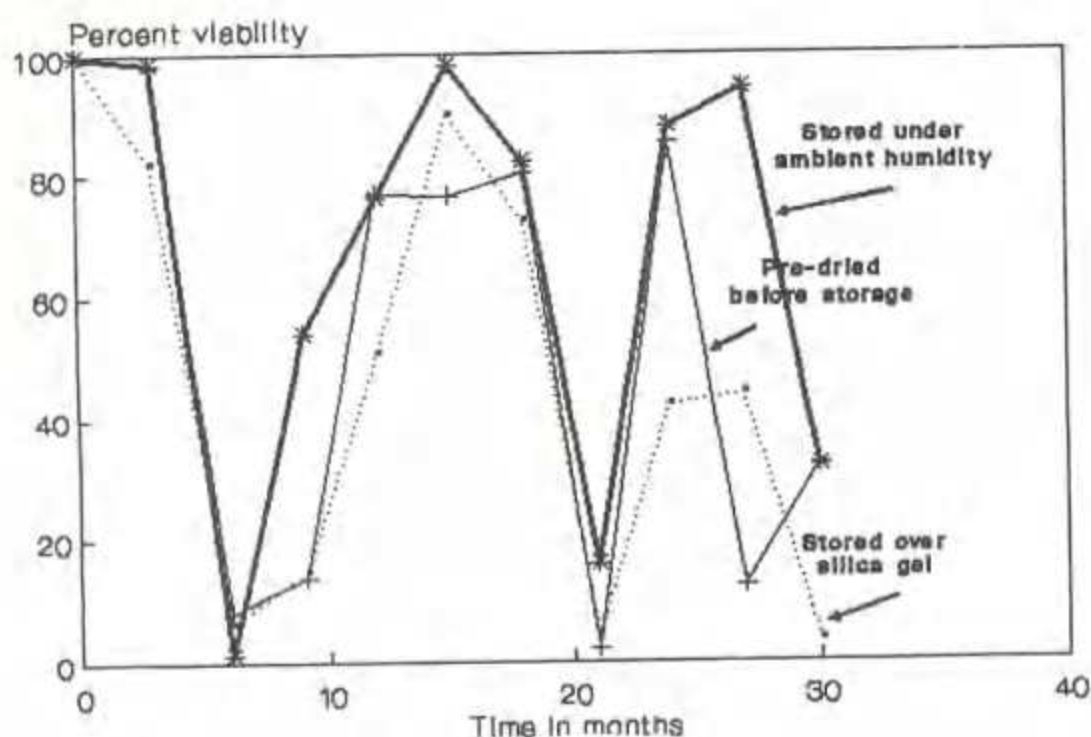


Figure 6: The effect of storage humidity on the germinability of *Cycas thouarsii* pollen.

In Figure 6 the cyclical dormancy pattern for *Cycas thouarsii* is illustrated for a third time. Pretreatment drying, or storage over silica gel, appears to offer no benefit.

#### Conclusions : Experiment 1

1. *Encephalartos* pollen can be stored successfully for periods of at least three and probably up to five years in cold conditions. Deepfreeze temperatures give better results than those of a refrigerator.
2. Optimal results are obtained with *Encephalartos* pollen when the material is pre-dried for 24 hours over silica gel before being placed in sealed containers.
3. There is no advantage to storing pollen in an inert atmosphere.
4. The pollen of *Cycas thouarsii*, and possibly that of other *Cycas* species, undergoes an unusual cyclic behaviour in its apparent viability.

#### Experimental methods : Experiment 2.

Pollen from *Encephalartos transvenosus* was collected from male cones in 1987 and 1988 and stored in sealed containers at 0-4°C. Fresh pollen from *E. woodii* cones was harvested in 1989. Sub-samples of the pollen were suspended in a hanging drop of solution containing 5, 10 or 15 % sucrose and 0.005% boric acid and the viability was assessed by counting the germinating pollen grains after 48 hours at 28°C. Each result represents the mean of six counts.

In addition to the germination counts described above, an aqueous suspension of the fresh *E. woodii* pollen was used to pollinate a female cone of *E. natalensis* by four successive applications in June 1989. The stored *E. transvenosus* pollen was similarly used to pollinate female cones of that species in August 1989. The seeds were allowed to develop naturally and were harvested at the time of cone fragmentation. A preliminary assessment of the seed viability was carried out by determining the percentage which sank when immersed in water; thereafter the seeds were planted according to normal horticultural practice and the percentage germination recorded in due course.

#### Results : Experiment 2.

The results obtained in this experiment are shown in Table 1. These results show that there is a significant difference in the germination when different concentrations of sucrose are used in the hanging drop suspension medium. The results obtained when 15% sucrose is used, appear best to approximate the percentage germination of the seeds in the *in vivo* test situation. The *E. transvenosus* pollen gave satisfactory results after both one and two-years' storage, while the fresh pollen of *E. woodii*, used on the female cone of *E. natalensis*, gave somewhat poorer results.

TABLE 1: Pollen and seed viability tests from two species of *Encephalartos*.

Species tested	Date pollen collected	Date pollen tested and cones pollinated	% Viability by the hanging-drop method (5, 10, 15% sucrose)	% Seeds sinking	% Seeds germinating
<i>E. transvenosus</i>	15/6/1987	16/8/1989	19.0 65.6 66.2	97.2	58
<i>E. transvenosus</i>	11/8/1988	16/8/1989	6.4 71.8 44.9	96.5	42
<i>E. woodii</i>	16/5/1989	7/6/1989	29.7 60.8 17.8	56.3* (* <i>E. natalensis</i> seeds)	21*

## Conclusions : Experiment 2

1. The percentage viability of *Encephalartos* pollen can be reasonably predicted by the "hanging drop" method when 15% sucrose is used in the suspension medium.
2. Pollen of *E. transvenosus* stored at 0-4°C for 1-2 years can be used to produce acceptable seed crops.
3. There may be evidence that inter-specific or hybrid seed crops have a lower viability than those of pure species.

## Recommendations arising from this work

Based on the above two sets of experiments, it is recommended that persons wishing to store cycad pollen use the following procedure:

1. Harvest fresh pollen in a dry, well-ventilated area. The practice of wrapping male cones in dry newspaper for 2-4 days seems appropriate. In conditions of fairly high ambient humidity, it is advisable also to dry the pollen crop over a desiccant such as silica gel for 24 hours.

2. Store the pollen in a sealed container and preferably in a deepfreeze. The use of pharmaceutical vials or photographic film cannisters which, in turn, are kept within a sealed plastic container, also seems sound practice.

Following the above steps, there is good reason to believe that cycad pollen will retain a significant level of viability for at least 3 years and possibly up to 5 or 6 years.

## Acknowledgements

We are grateful to the Department of Biology, University of Natal, Durban (R.O.), and to the Margaretha Mes Institute for Seed Research, University of Pretoria (P.J.R. and M.I.C), for the kind use of their facilities during the course of this work. We thank Nat Grobbelaar for his critical comments on an early draft of this text.

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With best wishes for a joyful Christmas and  
peace throughout the New Year

FROM THE PRESIDENT, EDITOR, NATIONAL AND REGIONAL COMMITTEES



n Wens van vreugde en vrede aan u met Kersfees  
en deur die Nuwe Jaar

VAN DIE PRESIDENT, REDAKTEUR, NASIONALE EN STREEKKOMITEES

# Roots on Zamia Cones

By Willie Tang

In recent years there has been interest in tissue culture of cycads with the goal of producing whole plants from small pieces of tissue (2). Such a breakthrough may make mass production of cycads possible and help to propagate endangered species of cycad. Tissue culture of orchids, for example, is the basis a worldwide orchid industry. To date various parts of the adult cycad plant have been tested for their suitability for tissue culture including meristem, gametophyte, leaf, stem, and root with varying success. To my knowledge, however, no test has been undertaken on cone tissue to gauge its suitability for tissue culture. I report below the adventitious growth of root tissue on female cones of Zamia fischeri and the implications for the use of cone tissue in tissue culture.

## Methods and Results

In Miami, Florida female Zamia fischeri cones become receptive to pollination during December and January. After pollination rapid growth ensues for 3 months. The time of fertilization of the ovules inside the cone is not known, however, it can be estimated from that for Z. pumila, the cycad native to the area, which has a similar pollination and seed production schedule. Fertilization in Z. pumila occurs in June (5).

I collected 3 female cones of Z. fischeri in late March 1990, approximately 4 months after pollination. This was after the stage of rapid growth that occurs after pollination but prior to fertilization. These cones were placed in a ziploc bag in

a closet that received dim indirect light. One month later they were examined: roots, up to 2 cm long, had grown from the base of all three cones where the cones had been cut from the stalk (Fig. 1).

Two of the cones were then placed in small pots of potting soil and one was left inside of the bag. Root growth continued at a slow pace until shortly before the cones began disintegrating in November 1990, the usual time of cone disintegration and seed shedding for this species. Full-sized seeds were enclosed, however, their endosperms were jelly-like and clear instead of the white color expected from viable seeds. No embryos were found. Attempts to maintain cone stalk and root tissue failed.

## Discussion

Callus tissue forms on cycads when a wound occurs. Such callus tissue is undifferentiated - it is not specialized into leaf, root, or stem tissue. Callus tissue on wounded stems often form areal roots (3). From an evolutionary standpoint cycad cones are believed to have developed from stem tissue (1). In fact, leaf production occasionally occurs on cycad cones (4, 6). So perhaps the spontaneous production of roots from severed cones is not surprising.

In controlled experiments in the lab it has been found that the production of roots, stems, and leaves from callus tissue requires the application of various nutrients and plant hormones, otherwise no such specialization of tissue will occur (2). It appears that for the case of female Z. fischeri cones the period after pollination and before fertilization a hormonal environment exists in the cone that is favorable for the adventitious growth of root tissue. On reflection this is

perhaps not surprising; cone development is a period of great change: the cone is growing and assimilating nutrients at a rapid pace and ovules are undergoing transformation into seeds. In such a hormonal environment a cone severed from the plant may be capable of various types adventitious growth including that of root growth.

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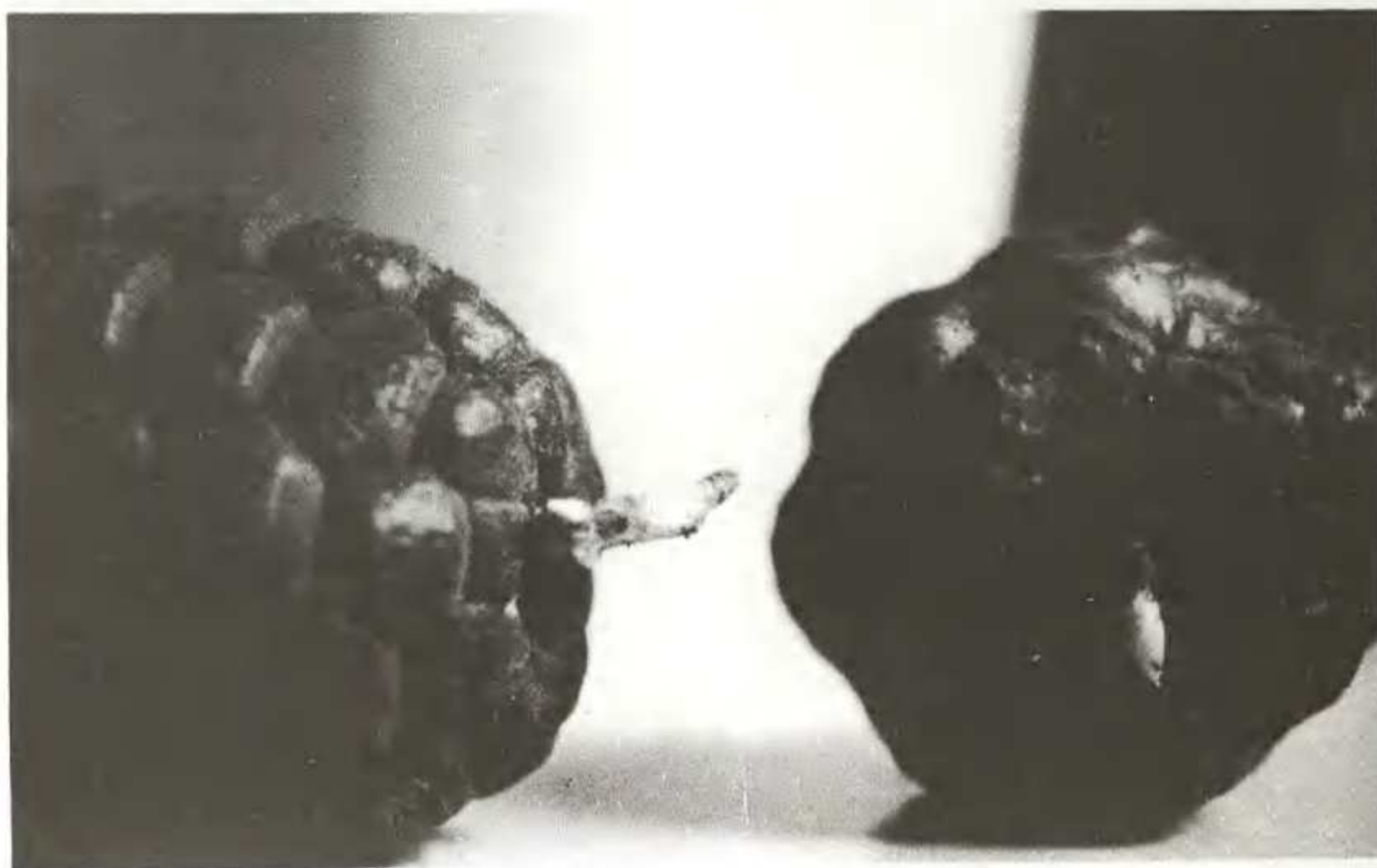


Figure 1. Two female *Zamia fischeri* cones with roots growing from the severed stalks.

VISIT TO KAAPSEHOOP  
DISTRICT NELSPRUIT

By: Ian Freeman

On a crisp clear morning of Sunday 5 May 1991, a group of some 18 members of the Eugene Marais Branch gathered at 10h00 hours to undertake a most pleasant excursion to find E. laevifolius. The plants are growing in the Berlin State Forest Station in a protected natural area. The protected area encompasses a mountainous section and includes clear mountain streams and deep gorges.

We drove through exotic pine forests to the summit of the mountain where there were offices and quarters for staff. We saw a number of cars parked and were told they belonged to back packers who were off on a three day hike. We were thrilled to see two species of wild antelope foraging near the road.

The forest station officer in charge, Mr Gert Potgieter, met us and guided us to a point where he indicated the route down to the place where he knew the cycads to be. Men, woman and children all trudled off excitedly down the steep slope, eager to see the cycads. After 15 minutes the ones in front were off the track and lost in thick shrub. A call from Mr Stef Schoeman gathered the lost members and all then followed the intrepid octogenarian on the correct path.

On the slope a small tree with a big name Bequaertiendenron magalimontanum (known to the locals as Stamvurg) grew in profusion and sheltered watsonias and a variety of succulents. As we descended the vegetation changed and we entered a primaeval forest with hundreds of ferns thriving the tall ferns Cyathea dregei looked splendid in a sheltered spot.

Soon we were at the small stream and caught our breath watching the water tumble strongly over slippery boulders. We found the cycads over a small area and were pleased to see active regeneration taking place.

After enjoying a tranquil moment we proceeded back up the path. Things looked different on the way up and we noticed a number of excellent specimens and clumps growing in the sun which we had missed on our way down.

Back at the camp an excellent fire was ready and needless to say a few beers and a good braai was all that was needed to end a perfect outing.

Our thanks go to the wardens of the station for their hospitality and of course for protecting the cycads so future generations can also appreciate their beauty in the wild.



Stef Schoeman (left) and Ian Freeman pose next to the E. laevifolius they saw at Kaapsehoop.

# ENCEPHALARTOS NATALENSIS POPULATION UNDER THREAT

by Roy Osborne

One of the most impressive "colonies" of *Encephalartos natalensis*, a population of about 1000 mature plants about 20 km west of Pietermaritzburg, is under severe threat. This group, in the Elandskop area and under the jurisdiction of the KwaZulu Bureau of Natural Resources, has amongst its numbers the tallest known specimens of the species and, until recently, presented a truly magnificent spectacle to the few visitors who knew of the locality. At present the picture is much less impressive. Nearly one-half of the largest trunks have been entirely stripped of their outer stem and leaf base material by the "muthi" collectors (tribal medicine men). Plants damaged in this way were in most cases falling, or had fallen, and many of the trunks had perished. When questioned as to the medicinal value of this material, we were told that it is stewed in water and the extract used as a purgative.



One of the remaining tall *E. natalensis* specimens in the Elandskop "palm valley". This 7.2 m plant had been stripped of leaf base and outer stem material at the base and may not survive much longer. Photo: Roy Osborne.



A 4 m tall *E. natalensis* specimen at Elandskop showing very recent evidence of removal of stem and leaf base material by the "muthi" men. The large number of cones on plants recently stripped in this manner may be some desperate attempt by the population to propagate itself. Photo: Roy Osborne.

Apart from the damage caused in this way, the area is being invaded by alien vegetation, including *Lantana* and bugweed. Several cycads had also been encompassed by strangler figs. Added to this, the leopard moths seem to have discovered the plants and the porcupines carry out their usual foraging activities. Last, and by no means least, the locals have perceived these plants to be valuable to collectors and there is a more-or-less permanent display of uprooted stems for sale.

It is saddening to know that the days of this once very proud population are numbered.

# BOOK REVIEW: JACK KREMPIN'S "PALMS & CYCADS AROUND THE WORLD"

by Roy Osborne

Published in 1990 by Horwitz Grahame (Pty) Ltd. [506 Miller Street, Cammeray, Sydney, Australia 2062], this beautifully-produced 276-page book, by Australian nurseryman, seedman and horticultural author **Jack Krempin**, is an ambitious attempt to cover about 150 species of cycads and a representative selection of the 2800-odd palms which occur throughout the world's tropical and neo-tropical zones.

The book relies largely on its 700 colour pictures to portay information as the author has wisely kept botanical jargon to a minimum. Most of the photographs are of specimens in botanic gardens (Fairchild, Huntington, Brisbane, etc) and their quality is generally good (but not excellent). Captions to the pictures do not convey as much useful information as one might anticipate.

The first 52 pages span an introductory section, discussions of the origin and distribution of palms and cycads and their commercial and horticultural uses, together with some information on vegetative morphology and reproductive processes. Included in this section is a useful 6-page contribution by **Len Butt** on "The Cycads of Australia". This is followed by a section which emphasizes climatic zones where plants are found and which the author quite correctly recommends should be used as a guide to the choice and management of plants. I found the "quick reference table" somewhat difficult to follow.

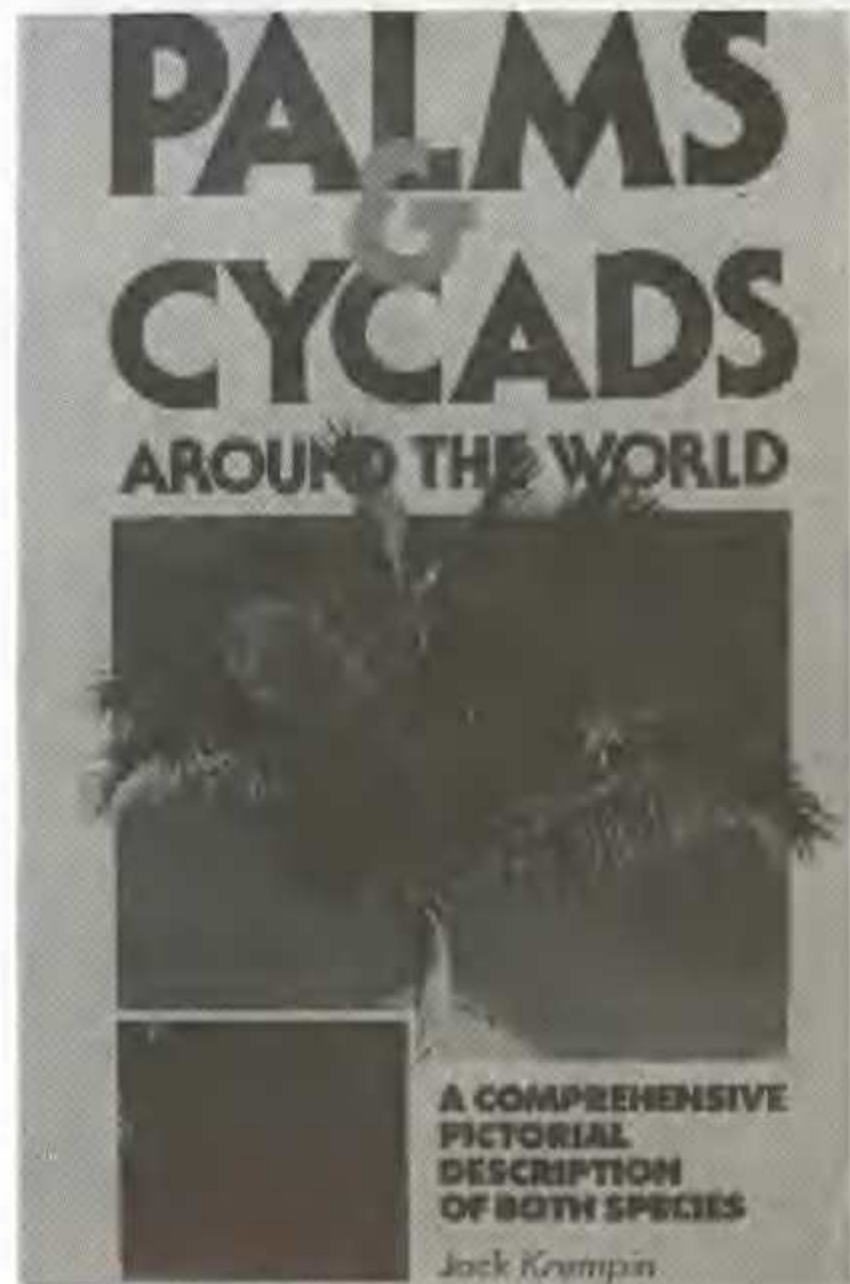
The next portion of the book deals with landscaping aspects - an area where the author's abundant expertize comes through well - and the suggestion of "Why not a rainforest?" will undoubtedly initiate a few projects amongst growers. Similarly the sections on indoor and outdoor preparation, planting and propagation are treated from an obviously experienced standpoint.

The bulk of the text is then given to a necessarily-brief treatment, alphabetically by genera, of palms (160 pages) and cycads (52 pages) and some of their look-alikes.

The author freely admits to being a little hazy in some of the botanical areas - his rather loose useage of the terms "species" and "varieties" (the former even misused on the book's dustcover), is unfortunate. Examination of the listing for *Encephalartos* (10 pages) will lead to some questions on species validity; correspondence with some of South Africa's cycadologists would have resulted in elimination of unrecognised taxa such as "E. Chinzazany", "E. tangwendte" and Heenan's obsolete "A", "B" and "C" namings.

It is not my intention to dwell on other minor technical inaccuracies. Let me end on a more positive note: Jack Krempin's book has many merits, especially in the landscaping and management sections. It does meet its objective in presenting a comprehensively and illustrated overview. It is enjoyable reading and it is a useful reference work. It would be a most welcome Christmas present to any of our readers.

**General recommendation: Buy, but beware of the botany.**



To obtain a copy of this book, write to the author:  
*Mr J.L. Krempin, 25 Beverley Crescent, Broadbeach Waters, Queensland, 4218 AUSTRALIA. [Fax number 075-731272]. He will send an autographed copy of the work. Price details are:*

*Book plus seamail postage A\$ 53. Insurance by request A\$9.*

*Book plus economy airmail postage A\$ 65. Insurance by request A\$9.*

*Book plus airmail postage A\$ 77. Insurance by request A\$9.*



Psssst! Seen any dirty cycads lately? Not in Middelburg, Transvaal, if this depot does what it seems to be advertising! (Photo by Roy Osborne).



Willie Milford of Johannesburg has an interesting *E. transvenosus* coning in his garden. The cone can be seen emerging below the leaf stalks

## BOOK REVIEW: KREMPIN'S "PALMS & CYCADS AROUND THE WORLD"

comments by Ann Lambert

Not being too familiar with the palms, Roy Osborne asked Ann Lambert, from the Durban Botanic Gardens, to comment on the palm section; she reports as follows:

"A delightful book with updated and welcome information for the basic gardener, where good sense prevails. Although some of the pictures are of young palms, it is still possible to recognize the botanical features in most cases and many are rare to horticulture.

The text is easy to read and the interesting approach to both cycads and palms should enthuse fanciers. The repetition of important facts underlies their importance.

After reading this book, the gardener should be able to plant the right palm and care for it with the precise information on culture.

**Recommendation: Most creditable."**

[Ann goes on to point out a few technical problems which have been referred back to the author.]

## NEW SCIENTIFIC REPORTS

New cycad-related reports which have appeared in the scientific literature are:

Moretti, A.,<sup>1</sup> Caputo, P., Gaudio, L. & Stevenson, D.W. 1991. Intraspecific chromosome variation in *Zamia* (Zamiaceae, Cycadales). *Caryologia* 44: 1-10.

[<sup>1</sup>Author's address: Dept. Biologia Vegetale, Università di Napoli, 80139 Napoli, Italy.]

Vovides, A.P. 1991. Cone idioblasts of eleven cycad genera: morphology, distribution and significance. *Botanical Gazette* 152: 91-99.

[Author's address: Inst. de Ecologia, A.C., Apdo Postal 63, Xalapa, Veracruz 91000, Mexico.]

Vovides, A.P. 1991. Insect symbionts of some Mexican cycads in their natural habitat. *Biotropica* 23: 102-104.

[Author's address: as above.]

## THE INTERNATIONAL TRADE IN CYCADS

One of the resolutions of the CITES Plants Committee meeting held in Malawi in April this year (ENCEPHALARTOS 27: 10-13) was that a detailed analysis of the plant trade would be carried out to improve the protection of important plant groups. As a result a workshop was held at Kew Gardens in London in September and attended by members of the CITES Secretariat, the Wildlife Trade Monitoring Unit as well as Orchid, Cycad, Succulent and Cactus specialists from the IUCN Species Survival Commission. Cynthia Giddy and Andrew Vovides of Mexico were invited to attend on behalf of the IUCN Cycad Specialist Group.

The purpose of the workshop was to look at a preliminary analysis of the statistical information on trade in Appendix II plants for the period 1983 - 1989 in order to:

- Improve the implementation of CITES
- To identify which Appendix II plants traded at levels detrimental to their survival in the wild.
- To determine the main countries in the wild plant trade.

Cycads on Appendix II include the genera *Bowenia*, *Cycas*, *Dioon*, *Lepidozamia*, *Macrozamia*, and *Zamia*. Commercial trade in wild collected plants of Appendix II is allowed if the country of origin does not consider that the quantities traded represent a threat to the wild populations. *Encephalartos*, *Stangeria*, *Microcycas* and *Ceratozamia* are on Appendix I and will be the subject of a future workshop. No commercial trade is allowed in wild collected Appendix I plants and the international trade in these genera is restricted to artificially propagated seedlings only.

The average number of Appendix II cycads traded annually is 1,035,102 of which 50.13% are reported to be artificially propagated, leaving a nett balance of half a million collected cycads traded annually.

As well as the trade in live plants, there is also a major international trade in cycad seeds amounting to just more than 6 million seeds per annum.

The major source of cycads in the international trade are Japan (789,061 p.a.), the Dominican Republic (74,948 p.a.), Netherlands, Australia, Taiwan, Israel, Mexico and the U.S. The percentage artificially propagated plants varies from 100% (Netherlands, Taiwan, Israel and the US) to 45% (Japan 5.61%), Mexico and Dominican Republic 1.70%. In Mexico particularly there have been reports of whole populations of newly undescribed species being removed for export. The survival of some species in the wild is directly threatened by the extensive export trade. In view of the large number of wild collected *Ceratozamia* species traded annually, *Ceratozamia* was transferred to Appendix I in 1985.

Annually the most heavily traded cycad species are *Cycas revoluta*, *Zamia pumila*, *Bowenia serrulata*, *Lepidozamia peroffskyana*, *Dioon edule*, *Macrozamia moorei*, *Zamia loddigesii* and *Dioon spinulosum*. In addition to live plants and seeds the following cycad products are also traded. Leaves 66398 annually (mainly *Cycas revoluta* and *Bowenia serrulata*) roots 70360 annually, timber 23500kg from Brazil in 1988, and 4000 timber carvings from Japan in 1985.

On the basis of the above statistics which are supplied annually to CITES by 79 countries, the workshop formulated certain resolutions which will be put to the Conference of the Parties in Japan in 1992.

Input from the specialists related to reporting on the nursery trade in the source countries and the conservation status of the wild populations in the countries of origin. Such information is useful in determining conservation priorities for certain species and evaluating either delisting or upgrading of species to Appendix I.

Cynthia Giddy  
IUCN Species Survival Commission  
Cycad Specialist Group

## STEVENSON ON THE USA ZAMIAS

The taxonomy of *Zamia* remains an unresolved issue in the study of cycad systematics. Readers may remember the article "Comments on Character Distribution, Taxonomy and Nomenclature of the Genus *Zamia* L. in the West Indies and Mexico" by Dennis Stevenson (ENCEPHALARTOS 9: 3-7, March 1987) which pointed out a number of errors in a previous *Zamia* article (ENCEPHALARTOS 5: 14-15, March 1986) by H.A. Peters.

A step which undoubtedly represents further progress in this matter is the publication by Stevenson of "The Zamiaceae in the Southeastern United States" (*Journal of the Arnold Arboretum*, Supplementary Series 1, 1991). This eminently readable paper comprises a contribution to the **Generic Flora of the Southeastern United States**, a long term project under the direction of Norton G. Miller and Carroll E. Wood. The treatment is not so much of a conventional botanical "Flora" but more of a natural history as well as a taxonomic treatment. An early landmark in the taxonomic development was Small's (1933) assignment of the USA *Zamia* populations into 4 taxa: *Z. integrifolia*, *Z. floridana*, *Z. silvicola* and *Z. umbrosa*. By contrast, Eckenwalder's well-documented treatment in 1980 lumped all these - and all other West Indies populations - into the single species, *Z. pumila*. Stevenson has taken something of a compromise stand between the splitters and the lumpers, treating all the USA populations as being assignable to *Z. integrifolia* L. fil. in Aiton - which he regards as being distinct from *Z. pumila* and other West Indies taxa. Apart from the taxonomical details, the 18-page paper provides an invaluable summary of broader aspects of *Zamia* biology.

The author's contact address for reprint requests is: Dr. Dennis Wm. Stevenson, New York Botanical Garden, Bronx, New York 10458, USA.

## MICROCYCAS TRAGEDY

There has been something of a tragedy with respect to the only known mature plants of *Microcycas calocoma* in cultivation. Knut Norstog has passed on the sad news that the three reproductive plants of this very rare Cuban endemic cycad, at the Fairchild Tropical Garden in Miami, have died - apparently as the result of a freak lightning strike.

The only fortunate part of this incident is that the Fairchild plants had previously coned (in 1984), were successfully pollinated, and that some 300 seeds were subsequently distributed to institutions in 16 different countries (see ENCEPHALARTOS 3: 3).

It is hoped that all those persons or institutions fortunate enough to have juvenile specimens of this plant will take especial care of their specimens and that successful pollinations of *ex-situ* plants will be possible again sometime in the future. One hopes too that the Cubans continue a vigorous policy of conservation of the remaining habitat plants about which so little is known to outsiders.

## AN INTRODUCTION TO THE ZAMIACEAE IN AUSTRALIA

Only a year ago we had the pleasure of seeing the appearance of Len Butt's *An Introduction to the genus Cycas in Australia* (Publication Fund, Palm & Cycad Societies of Australia, June 1990). This most-useful and excellently illustrated booklet was reviewed in ENCEPHALARTOS 23: 17.

We can now congratulate Len and all others involved on the appearance of the sibling publication *An Introduction to the Zamiaceae in Australia* which constitutes Issue No. 31 of PALMS & CYCADS, Magazine of the Palm & Cycad Societies of Australia, April-June 1991. This follows the format of its predecessor and again is written in clear non-jargon language which is nevertheless scientifically correct. It is also superbly illustrated with numerous colour pictures. The publication describes the various species in the family Zamiaceae in Australia, viz. *Bowenia*, *Lepidozamia* and *Macrozamia*; the species descriptions being supplemented with several other fascinating and informative notes.

Copies of this booklet (and its predecessor) can be ordered through The Palm & Cycad Societies of Australia, P.O. Box 1134, Milton, Queensland 4064, Australia.

## COMPUTER IDENTIFICATION OF CYCADS

A novel computer system for identifying cycads, mainly on the basis of leaf characters, has been described. Published in the *South African Journal of Science* (Vol.87, No. 5, pp.179-182), the "Expert system shell for the classification problem" is the brainchild of Professor G. de V. de Kock of the Computer Science Department of the University of Port Elizabeth. Cycad enthusiasts may have difficulty in reading this very mathematically-orientated paper and it must be noted that the cycad application constitutes only an example of the general theme of the work. Using the data "knowledge base" as outlined, the author claims that 87% of a sample number of cycads were correctly identified using the best strategy and that 11% of the remaining samples had their correct names featured as the programme's second choice.

## DURBAN BOTANIC GARDENS - NEW INITIATIVES IN CYCAD COLLECTION

Information from the World Cycad Census has revealed that the Durban Botanic Gardens (DBG), with 516 specimens in 69 different taxa, is one the world's top six most important cycad gardens. However, only 37 species of *Encephalartos* are currently represented in the garden. A decision has now been made to re-organize and expand the DBG cycad collection *inter alia* so as to establish a complete set of *Encephalartos* with at least 5 specimens of each taxon.

A project committee was constituted in August 1991 under the Chairmanship of Durban's Parks Department Director Errol Scarr with representation by the Natal Section of the Society and the DBG senior administration. The objectives of this committee are:-

- to raise funds for the purchase of cycad specimens
- to plan the re-organisation and continued development of the collection
- to solicit specimens from private collectors in the form of bequests and donations
- to continue active pollination and seed harvesting from the present specimens
- to propagate especially rare plants at the DBG (e.g. *Encephalartos woodii*) for sale as part of the fund-raising programme
- to recruit a team of volunteers who will participate in occasional weekend work in the garden

*The committee hopes to make sufficient progress with this project so as to arrange a ceremony to "open" the "new" collection during the CYCAD 93 Conference.*

If you are interested in participating in this project in any way, please contact Roy Osborne (20 Maryvale Rd., Westville 3630, tel 866953 after hours) who is co-ordinating the project in conjunction with DBG staff.

## NATAL SECTION NEWS CYCAD CHEMISTRY LECTURE

July 17, 1991, was an unusual date for the Natal Section of the Cycad Society. On this occasion, members of the Society participated in a joint meeting with the Natal Section of the S.A. Chemical Institute. The evening lecture, attended by some 70 persons, was addressed by Roy Osborne on the subject "The Chemistry of Cycads". The speaker outlined some of the unusual chemical, physiological and biochemical features of the Cycadales, focussing particularly on the cycad toxins and the (as yet) unresolved issue of whether MAM glycosides or BMAA or both classes of compound, are implicated in the etiology of neurotoxic and carcinogenic conditions in humans and mammals who had been exposed to cycad material. In addition, Dr Osborne gave an overview of cycad phytochemistry, covering phenolic compounds, carbohydrates, leaf waxes and also some current developments in the field of molecular biology. Natal Chairman Harry Gerber, summing up at the end of the meeting, said that the chemists had learnt a little biology and the cycad enthusiasts had learnt a little chemistry; all attending were enriched as a result of the function.

## NATAL SECTION NEWS - NORTHERN NATAL EXTRAVANGANZA

Members of the Society from the Northern Natal centres of Mtunzini, Empangeni, Richards Bay and Mtubatuba, were the hosts - and beneficiaries - of the Natal Section's September meeting in 1991. On Saturday 28 September, Roy Osborne presented an evening slide show, "Cycads of the World", at Richards Bay, which was attended by a small but enthusiastic audience. On the following Sunday, members were treated to a tour of cycad gardens in Mtunzini, including those of Gilbert Christopulo and William Nel. The party also took the opportunity to view the Raffia Palms National Monument before proceeding to their various home destinations.

## NATAL SECTION NEWS - WILDLIFE EXPO 1991

Members of the Natal Section of the Society, assisted by the staff of the Durban Botanic Gardens, again staged a popular and successful cycad exhibit at the 1991 Sappi Saiccor Wildlife Environmental Expo in Durban over the period 28 August to 1 September 1991. On display were about 60 indigenous and exotic specimens. Seeds and seedlings were offered for sale and a daily raffle was held. Funds raised at this event have been set aside as the first contribution towards the Durban Botanic Gardens Cycad Fund (see report elsewhere).

## OVERSEAS VISITOR TO SOUTH AFRICA : ANDREW SHAW

South Africa was the venue of choice by Biology undergraduate **Andrew Shaw** of the University of Leeds, England, his visit being funded by awards from The Merlin Trust and the Leeds University Biology Department. Andrew (21), an enthusiastic member of our Society, has focused his interest on cycad biology and hence South Africa was a natural destination for him. Within 24 hours of arrival at Durban, he had seen three cycad populations in the wild and "the most spectacular scenery he had ever seen".

During September 1991, Andrew viewed public and private cycad collections in Natal and visited habitat sites of several species. He was instrumental in drafting the plan of the Durban Botanic Gardens which will be used in possible reorganisation of the DBG cycad collection (see report elsewhere in *ENCEPHALARTOS*). He was also involved with a population survey of *Stangeria eriopus* carried out by the University of Natal. Andrew was furthermore able to make brief visits to the University of Pretoria, the Botanic Research Institute's head office and the National Botanic Gardens.

**Right: Andrew Shaw, Leeds University Biology student and member of our Society, inspecting a specimen of *Encephalartos lebomboensis* while visiting Natal. (Photo: R. Osborne, September 1991).**



## CYCAS RUMPHII HABITATS PLUNDERED

The removal of large habitat cycad specimens for personal gain is a well-documented problem in South Africa and Mexico. It is less-well known that this unfortunate practice is not confined to those countries. The accompanying photograph, submitted by member S.H. Fadjat Marta, shows a number of very large field-collected specimens of *Cycas rumphii* offered for sale by a nurseryman near Cibodas, Jawa, Indonesia.

**Right: Very large field-collected specimens of *Cycas rumphii* offered for sale at a roadside nursery near Cibodas, Java, Indonesia.**



# CYCAD GROWS LEGS AND WALKS AWAY!

**Alison Patey**

An expensive, rare cycad grew legs and walked away from a house in Meyersdal on Tuesday night.

This specific cycad, a *Mannetjieslehmanii* cycad, needs at least four adult men to carry it comfortably yet it just disappeared into the sunset.

The owner of the cycad, Mrs Elsa Jacobs, said the plant has great sentimental value to her as it was a present to her from her mother.

To replace this particular variety can cost anywhere between R1000 and R3000.

It certainly seems as if the thieves knew the value of what they were stealing, as a more common cycad was planted in front of the stolen one - and no attempt had been made to steal this one.

No-one in the vicinity saw anyone or anything at the Jacobs' house and they searched the veld near the house thinking that the thieves had possibly dumped the cycad and would come back later to collect it.

The theft has been reported to the police who say it's not the first time something like this has happened and that in the last case four of the six cycads were recovered.

The theft was definitely a deliberate act and Mrs Jacobs says she is shocked that someone would rip out and steal plants from a private garden.

The cycad has bluey-green leaves and the cone which is approximately 45cm long, grows on the outside of the leaves rather than from the centre of the plant.

The whole cycad plant is about 1,6 metres high in total.

Remember you must have a permit to grow cycads, so if you are approached by someone selling a cycad without the necessary papers, inform the police.

In the meantime, Mrs Jacobs has a big hole in her front garden where the cycad used to be, to remind her there are some destructive and thieving people out there!



This is the hole where the cycad used to be!

Please advise membership officer Pieter Stroebel if you are changing your address.

## Protected plant laws 'a maze'

IT'S high time that legislation governing the possession of specially protected plants, such as cycads, was reviewed, said a magistrate, Mr Johan Bester, in the Port Shepstone Magistrate's Court this week.

Mr Bester was delivering judgment in the trial of Lt Heinrich Hechter of the Port Shepstone Detective Branch, who was found guilty on an alternative charge of being in possession of specially protected plants and a failure to give satisfactory account for

his possession.

Lt Hechter was found in possession of more than 100 cycads at his home in Port Shepstone last year.

He was fined R500 or 100 days imprisonment and a further R1 000 or four months imprisonment conditionally suspended for five years.

Mr Bester said present legislation was ineffectual as it created 'pitfalls for innocent people and loopholes for those who were guilty'. — (Mercury Reporter)

● Last week the ESPU arrested a man for the possession of 20 cycads. Ten were of so rare a sub-species it had not yet been registered by botanists.

On Wednesday they arrested two men for selling rhino horn and another two men for selling two huge python skins.

On Thursday night they arrested a syndicate of nine men for selling two rhino horns.

Yesterday morning they arrested two for selling rhino horns.

## Botanic Garden society 'has done its job'

The Johannesburg Botanic Garden Society has decided to disband.

The society was formed in 1967 with the basic objective of supporting the Johannes-

burg City Council in the establishment of a botanical garden at Emmentia Lake.

Chairman Hutin Tomaselli said founder Sima Eliovson thought

four years ago the society had served its purpose.

The remaining funds will go to the Transvaal Horticultural Society for building a committee room. — Staff Reporter.

## Cycad arrest expected

THE Natal Parks Board is expected to make an arrest soon after a large-scale investigation into an illegal cycad racket in the Amanzimtoti area.

Parks Board zone officer Mike Tilsbury said last night that the investigation was at a delicate stage and he could not release any further details.

It is believed that recent successes on the South Coast, where a policeman was found guilty of having cycads illegally, have led to further investigations.

Earlier yesterday a Parks Board spokesman said that steps were being taken locally and abroad against the smugglers, whose actions cost the country hundreds of thousands of rands a year.

### SEED TO EXCHANGE

Large quantities of E. friderici-quilielmi to exchange at up to 2:1.

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# Kransberg dalk vanjaar al oopgestel vir stappers



Bergpalm, *Encephalartos eugene-maraisii*. • Waterberg cycad

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Artikel en foto's:  
Piet van Staden

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Die Kransberg Nasionale Park, sowat 20 kilometer van Thabazimbi in die suidwestelike Transvaalse Waterberg, is nog nie oop vir besoekers nie, maar die beplanning van die park vorder goed en hopelik sal minstens die ontwikkeling van die staproetes in 1991 afgehandel kan word.

Kransberg is een van die taamlik nuwe toevoegings tot Suid-Afrika se nasionale parke en beslaan ongeveer 30 000 hektaar.

Die klimaat is baie gematig met die somers nie te warm nie, en die winters nie te koud nie. Die nagte kan wel koud word in die wintermaande met ryp in die laagliggende gebiede. Die park val in die somerreënvalstreek en baie swaar donderweer kom in die gebied voor.

Kransberg Nasionale Park het 'n baie ryk flora wat beskou word as 'n kombinasie van die plantegroei wat in die Punda Maria- en die Pretoriuskopomgewing in die Krugerwildtuin voorkom, en dié van die Magaliesberge en sekere dele van die Kaap. Vir 'n plantliefhebber is die Kransberg Nasionale Park 'n paradys: opregte geelhout, *Podocarpus latifolius*; seder (die bergsipres), *Widdringtonia nodiflora*; boomvaring, *Alsophila dregei* en agt verskillende soorte orgideë kom hier voor. Altesame 96 plantfamilies — wat 298 genera en 393 spesies verteenwoordig — is reeds in die park opgeteken. 'n Uitsonderlike plant wat jare gelede deur die befaamde digter/skrywer Eugene Marais ontdek is, die bergpalm, *Encephalartos eugene-maraisii*, groei ook in die park.

Die diere wat tans in die Kransberg Nasionale Park voorkom, sluit die volgende in: koedoes, bosbokke, rooiribbokke, klipspringers, gewone duikers, steenbökkies, vlakvarke en bosvarke. Erdvarke is ook redelik volop in die gebied. Kleiner soogdiere sluit in die kolhaas, Jameson se rooi klipkonyn en klipklaasneuse. Die luiperd is die grootste roofdier in die park en daar kom ook bruin hiënas en rooikatte voor. Tot dusver is reeds 30 soogdierspesies in die park opgeteken. Twintig rietbokke is onlangs in die park hervestig. Sodra die park met 'n wildheining toegespan is, sal daar met 'n volledige hervestigingsprogram begin word.

Altesame 178 voëlsoorte, waaronder die bedreigde kransasvoël, is al geïdentifiseer. Die kransasvoëls broei teen die suidelike hange van die Kransberge wat ook die park se suidelike grens vorm. Tot dusver is ook reeds 23 reptielspesies, vyf amfibieë, tien visspesies en dertig mot- en skoenlapperspesies in die park opgeteken.

Deinende heuwels, diep klowe, hoë plato's en loodregte kranse van oor die 100 meter gee Kransberg 'n eiesoortige karakter. Drie riviere ontspring in die park: die Matlabas-, die Mamba- en die Sterkstroomrivier. Laasgenoemde is 'n groot sytak van die Mogolrivier. Al bogenoemde riviere is belangrike sytakke van die Limpoporivier.

Aangesien die park voorheen plaasgrond was, word daar hard gewerk om die heinings af te breek. Veral by die plaasopstalle staan heelwat aangeplante indringers soos bloekom-, wattel- en seringbome wat ook uitgeroei moet word.

Die publiek sal nog 'n rukkie geduldig moet wees, want om van vooraf die infrastruktuur en fasiliteite vir 'n nasionale park te skep om dit vir die toeris toeganklik te maak, is 'n duur en tydrowende taak. Die hele gebied moet onder meer met 'n wildheining omhein word en 'n paaienewerk en ruskamp moet gebou word.

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## SEEDBANK.

As Seedbank Officer for the Cycad Society of South Africa it is with great regret that I wish to inform all those concerned that I will no longer be able to handle the seedbank as from the beginning of January 1992.

Over the past six years in my term as seedbank officer, I have made so many wonderful friends and more important, I have gained a lot of knowledge about cycads and for this I am extremely grateful.

The time has come for someone else to take over the seedbank, and I would therefore like to thank one and all who supported the seedbank over the past six years, it was a pleasure working with you all.

The seedbank is the heart of the Cycad society and it makes me extremely proud when I see the results of our efforts. Many members gardens have been visited, assisted with pollenating their plants and later when the seed arrives for distribution it is a very good feeling, to know that these plants we hold dear to our hearts can continue growing forever.

There are 381 active members in our seedbank.

With the exception of E.cerinus, E.aemulans, E.cupidus, E.heenanii, E.inopinus and E.latifrons, the seedbank was in a position to supply members with a large variety of the Encephalartos species.

There were also 25 varieties available from Australia of the four species namely Cycas, Bowenia, Macrozamia and lepidozamia, from the United States we had 14 varieties of the three species namely Zamia, Dioon and Certozamia.

From Zimbabwe, the following seed E.manikensis, E. Munchii and E.gratus were received.

In my term of office, 32,655 seed were received and distributed among our members.



DANIE NEL.  
SEEDBANK OFFICER.

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