ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

NO. 9

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VOORBLAD/COVER

Encephalartos ferox

EDITORIAL

Our President, Roy Osborne, mentions the importance of co-operation between our Society and national and provincial nature conservation authorities in his report elsewhere in this edition. This contact and co-operation at the highest level is certainly of great importance. As in many other fields, this type of relation=ship is in reality mainly determined on the lowest level, however - the level where interaction takes place between person and person. In the case of cycad-lovers this means the contact with nature conservation and law enforcement officers at local level. This is the area in which good or bad relationships exist or develop. This is the area where cordial relation=ships must be maintained and promoted.

Cordial relationships will be promoted if our members get to know their local nature conservation officers and if they show an understanding for these persons' difficult, sometimes almost impossible, task. Members should also remember that the officers do not make the laws and

REDAKSIONEEL

Ons President, Roy Osborne, maak in sy verslag elders in hierdie uitgawe melding van die belangrikheid van samewerking tussen ons Vereniging en die nasionale en provinsiale natuurbewaringsowerhede. Hierdie kontak en samewerking op hoë vlak is beslis van groot belang. Soos op baie ander gebiede word soʼn verhouding egter in werklikheid hoofsaaklik op die laagste vlak bepaal - daar waar wisselwerking, plaasvind tussen persoon en persoon. In die geval van broodboomliefhebbers beteken dit die kontak met natuurbewaringsbeamptes en -wetstoepassers op plaaslike vlak. Dit is hier waar goeie of slegte verhoudings bestaan of ontstaan. Dit is hier waar goeie verhoudings gehandhaaf en bevorder moet word.

Goeie verhoudings sal bevorder word as ons lede hulle plaaslike natuurbewaringsbeamp=tes leer ken en begrip toon vir hierdie persone se moeilike, soms byna onmoontlike, taak. Lede moet ook onthou dat die be=amptes nie die wette en regulasies gemaak

EDITORIAL
- CONTINUED -

regulations which they have to admini= ster. They can therefore not be held responsible for the existence and appli= cation of unpopular regulations.

On the other hand cordial relationships would also be promoted if nature conser= vation officers see their ultimate goal as conservation and not law enforcement or prosecution. They should also remem= ber that the manner in which they deal with the public is at least as important as what they do.

A cause as important as the conservation of our cycad heritage should not be hampered by unnecessary bad relationships. It should rather be promoted by cordial and friendly co-operation at the highest and the lowest levels.

Opinions which are expressed in the editorial are those of the Editor and do not necessarily represent the policy of the Cycad Society. Likewise are opinions expressed in articles published in ENCEPHALARTOS those of the authors and not necessarily those of the Cycad Society or the Editor.

REDAKSIONEEL
- VERVOLG -

het wat hulle moet toepas nie. Hulle kan dus nie verantwoordelik gehou word vir die bestaan en toepassing van ongewilde regu= lasies nie.

Aan die ander kant sal goeie verhoudings ook bevorder word as natuurbewaringsbeamp= tes bewaring as hulle uiteindelike doel sien en nie wetstoepassing of vervolging nie. Hulle behoort ook te onthou dat die manier waarop hulle teenoor die publiek optree minstens net so belangrik is as wat hulle doen.

'n Saak so belangrik as die bewaring van ons broodboomerfenis behoort nie in die wiele gery te word deur onnodige swak ver= houdinge nie. Dit behoort eerder bevorder te word deur hartlike en vriendelike same= werking op hoë en lae vlak.

Menings wat in die redaksionele artikel uitgespreek word, is dié van die Redakteur en verteenwoor= dig nie noodwendig die beleid van die Broodboomvereniging nie. In= gelyks is menings uitgespreek in artikels wat in ENCEPHALARTOS gepubliseer word, dié van die skrywers en nie noodwendig dié van die Broodboomvereniging of die Redakteur nie.

THE GENUS ZAMIA

by Dennis Wm. Stevenson

COMMENTS ON CHARACTER DISTRIBUTION, TAXONOMY, AND NOMENCLATURE OF THE GENUS ZAMIA L. IN THE WEST INDIES AND MEXICO.

I would like to take this opportunity to make a few comments on the recently reprinted article in ENCEPHALARTOS (No. 5: 14-15. 1986) on Zamia by H.A. Peters, and at the same time to discuss Zamia in the West Indies in general. While the Peters article is quite informative, there are several misleading statements that can lead to confusion for those who would use it as a means to identify plants of Zamia of West Indian and/or Mexican origin.

Let me begin with a few comments concerning the growth habits of Zamia in general. Growth habit ranges from those species that have wholly subterranean stems to pachycaulous arborescent species. Examples of the former include Z. boliviana (Brongn.) A. DC., Z. furfuacea L. fil. in Aiton, Z. pumila L., Z. wallisii A. Br., etc. Other species have truly aerial trunks. For example, both Z. roezlii Linden and Z. obliqua A. Br. may have trunks up to 3 or 4 meters in height. In these cases, branching is unusual and usually the result of injury. Therefore, it is quite inappropiate to use the term shrub. Many species of Zamia have quite short aerial stems that often appear rather globose at or on the soil surface, such as in Z. muricata Willd. Others, such as Z. acuminata Oersted ex Dyer and Z. tuerckheimii, have short trunks usually not exceeding a meter in height and usually unbranched. It should be noted that many species that have a subterranean growth habit in the wild often appear to have a short trunk under cultivation. This is because their contractile stems (Stevenson, 1980) have no place to contract as a result of being grown in pots! Finally, there is a growth habit that is unique in the Cycadales: the epiphytic growth habit of Z. pseudoparasitica Yates in Seemann.

Although the nomenclature of Zamia spp. in Florida, the Bahamas and the West Indies has in the past been at best confusing, the recent work of Eckenwalder (1980) has clarified and resolved the nomenclatural aspects of the genus in these areas. As can be seen from Eckenwalder's nomenclatural treatment (remember nomenclature is an issue separate from the taxonomy in terms of valid and legitimate publication of names), many names used for West Indian plants are either invalid or illegitimate. Moreover, any name that was not listed by Eckenwalder is a nomen nudum (there are many of them) and as such has no status.

It is not my intention here to get into a long involved discussion on the taxonomy of Zamia in the West Indies but some germane comments can be made, particularly with reference to the more common misconceptions, some of which are reflected in the reprinted article by Peters (1986).

Peters discussed three taxa (he actually says three species but only discussed two species and one variety) he considers native to Florida. Keeping in mind the preceding discussion on nomenclature, the variety of Z. floridana discussed by Peters has never been validly published as such, to my knowledge. Moreover, the basionym for that variety, Z. portoricensis Urban, if it is a good taxon, is endemic to the serpentine soil of the Susua Forest and adjacent area in southwestern Puerto Rico. It is not found in Florida. Plants from this region are quite rare in cultivation, including the excellent collection at Fairchild Tropical Garden. This species, Z. portoricensis, if recognized, is unique in the West Indies in that it is the only one that has truly entire leaflet margins. All other taxa native to this region have

either well-defined teeth on the leaflet margins or at least a few callous teeth as in Z.integrifolia L. fil. in Aiton.

The other two taxa discussed by Peters as native to Florida are Z. floridana A. DC and Z. integrifolia. Both of these are validly and legitimately published names based upon different types. In fact, the holotypes (the original specimens upon which the descriptions were based) of both names are extant, the former being in the De Candolle Herbarium at Geneva and the latter at the British Museum of Natural History. Now, if one places both of these holotypes side by side, as I have done, one can not find a substantial difference between the two. In other words, there are not two species here but rather one. Moreover, as the names have come to be applied to various plants, people have merely chosen to utilize the extremes of variation of a single species. Furthermore, these extremes are not present in the type specimens and the names should thus not be applied in this manner.

The plants discussed as Z. pumila by Peters are also misidentified, for the following reasons: Peters gives the distribution as "A native of Mexico as well as of the West Indies and Florida", and describes the petioles as having prickles. Firstly, there are no plants of Zamia in the West Indies or Florida that have prickles on their petioles and, secondly, no matter how Z. pumila is interpreted, it does not occur in Mexico. In my opinion, the description provided by Peters is nearest to that of Z. furfuracea which only occurs in Mexico and perhaps Belize, but not in the West Indies or Florida, except as cultivated plants. I say 'nearest' because the leaflet shape given by Peters does not really fit that of Z. furfuracea. This species usually has distinctive ovate to obovate leaflets. Peters' description would seem to better fit hybrids between Z. furfuracea and Z. loddigesii Miq. I would point out that, although there are no plants of Zamia with prickles on their petioles in the West Indies or Florida, there are two species in Mexico, Z. inermis Vovides, Rees and Vazquez Torres and Z. fischeri Miquel, that have unarmed petioles.

Z. debilis Aiton is also listed by Eckenwalder (1980) as a nomen illegit. It should be noted that, while the binomial is correctly listed as an illegitimate name, the correct author citation is Z. debilis L. fil. in Aiton or simply Z. debilis L. fil., because Aiton (1789) clearly states in the preface to Hortus Kewensis (p. vi) that all the cycad text was supplied by Linneaus filius. This combination is most often applied to plants from Hispaniola, chiefly because its type is based on material from Hispaniola. As the reasons for the illegitimate status of this combination have never been discussed, I would like to do so now because it will also help to elucidate the nomenclature of the West Indian taxa of Zamia. To understand this situation we must begin with the second edition of Linneaus' Species Plantarum (1763) in which he first described the genus Zamia. In the protologue, Linneaus lists four citations: Miller (Gard. Dict. Abr. ed. 4: p. 12. 1754); Commelijn (Horti Med. Amstelod. 1: p. 111. t. 58. 1697); Plukenet (Phytographia t. 103. f. 2. 1691 and Almagesti Botanici Mantissa t. 309. f. 5. 1700) and Trew (Pl. Select. p. 5. t. 26. 1752). Because there is no extant specimen that can be demonstrated to be the specimen upon which Linneaus based his description of Z. pumila, it is necessary to choose a lectotype from these citations of Linneaus. According to the rules of nomenclature, the names in the Miller (1754) citation are not considered to be validly published and thus can not be considered. The citations of Plukenet and Trew are pre-

empted because Linneaus filius cites them in his protologue of Z. furfuracea. This leaves only the illustration in Commelijn as a lectotype for Z. pumila L. There is one more point to clear up here, as Smith (1961) considered that Miller (1768) in the eighth (the first to be valid for species descriptions) of the Gardener's Dictionary had lectotypified Z. pumila L. when he published Palma pumila Miller. This was because Miller cited only the Plukenet and Trew citations of Linneaus and omitted any reference to the Commelijn citation of Linneaus. Smith's interpretation was correct in as far as it goes, but Smith failed to note that Miller also makes no reference to the Linneaus combination. Thus, Miller, in publishing Palma pumila Miller, did no more than independently publish the specific epithet pumila for what is now Z. furfuracea. Now we come to the publication of Z. debilis by Linneaus filius. In the protologue, Linneaus filius cites the Commelijn illustration and material cultivated by Kennedy and Lee. Because there are no surviving specimens of the Kennedy and Lee material, Z. delibis is lectotypified by the default with the Commelijn illustration. Because the Commelijn illustration is the lectotype for Z. pumila L., Z. debilis L.fil., which is based on the same lectotype, becomes a later homonym for Z. pumila L. and as such is a nomen illegitimum and can not be used. In fact, it can not even be used at the infraspecific level because it is based on the same type.

Having waded through the preceding discussion, we can now turn our attention to the impact of this on the West Indian plants of Zamia in general. The Commelijn illustration is based on a plant from Hispaniola. Therefore, at least some of the plants of Hispaniola must be Z. pumila. Other names that have been validly and legitimately published and whose types are from Hispaniola are Z. allison-armourii Millspaugh and Z. latifoliolata Prenleoup. The type localities for both these species are quite near each other in the vicinity of Santa Domingo and, in fact, the holotypes appear virtually identical. If indeed these two species are considered one, then Z. latifoliolata would have priority. Because the types of these two conform more or less to the description and type of Z. pumila, my conclusion is that there is only one species, Z.pumila, on Hispaniola. For further information pertaining to this conclusion, see Zanoni (1982).

The description of Z. angustifolia Jacq. by Peters needs some amendment, as follows. The leaflets are quite narrow, from 3 to 10 mm wide with from 1 to 3 teeth present near the apex. This species, which in my opinion should be recognized, would appear to be limited to Eleuthera in the Bahamas and Oriente Province in Cuba. Those names which I consider to be taxonomic synonyms (those based upon different types and validly published) are Z. angustissima Miq., Z. guggenheimiana Carabia, Z. multifoliolata A. DC., Z. stricta Miq., and Z. yatesii Miq.

Now I would like to turn our attention to the dwarf zamias which are endemic to Cuba. The nomenclatural treatment of these can be found in Eckenwalder (1980) under Z. pumila subsp. pygmaea (Sims) Eckenwalder. At the species level there are five validly published names based on different types for the dwarf zamias. From a comparison of the type specimens, it is obvious that Z. pygmaea Sims, Z. pygmaea var. wrightii A. DC (= Z. chamberlainii Schuster), Z. ottonis Miq., and Z. silicea Britton are one and the same entity, and I would unite all four under Z. pygmaea. On the other hand, the type of Z. kickxii Miq. differs from those of the other three in that the leaflets are lanceolate rather than strikingly obovate and,

furthermore, many specimens conforming to this are common from central Cuba. In addition, plants conforming to this type have a tendency to produce only one or two leaves at a time, as opposed to the more than three leaves produced in each flush in Z. pygmaea. While further study is needed, Z. kickxii may well prove to be a distinct taxon. I would point out that, although Peters describes Z. ottonis as having an above-ground stem, in fact all of the dwarf zamias appear to have subterranean stems in habitat and it is only in pots that one sees an above-ground stem such as previously mentioned.

It should be clear by now that, even if one does not accept Eckenwalder's (1980) taxonomy for the West Indian cycads, the work itself represents significant progress in our understanding of Zamia in this region. Moreover, it makes an extremely valuable contribution to no= menclatural stability and establishes the nomenclatural tone for future in= terpretations. From this work one can see that it is possible to recognize 25 taxa of Zamia in the West Indies. It should be obvious from my preceding com= ments that this would be excessive. On the other hand,it should be equally ob= vious that the recognition of only two taxa (one species with two subspecies) is, in my opinion,too conservative. Besides the preceding comments, my reasons for this are also based on reproductive cha= racters such as strobilus shape and the nature of the sterile tip of the ovulate strobilus. While a detailed presentation will have to wait until I complete more field work, I would point out here that I will in future recognize a minimum of five taxa, probably at the species level. These would be Z. angustifolia, Z. inte= grifolia, Z. portoricensis, Z. pumila and Z. pygmaea (including, for the time being, Z. kickxii). A key to these taxa is given at the end of this paper.

Now to return to the other Mexican and Central American taxa discussed by Peters (1986). Z. loddigesii Miq. is an extre= mely variable taxon as evidenced by the many infraspecific taxa that have been described. It is perhaps a worse can of worms than are the West Indian plants. I prefer to reserve judgement until the field studies of Bart Schutzman of the University of Florida are completed. I would point out that Z. latifolia Loddiges ex Miq.is particularly difficult in that the original source of the plants is un= known, so that its affinities could lie with either Z. loddigesii or Z. muricata Willd., which is basically a Venezuelan species.

The range and description of Z. skinneri Warsc. ex A. Dietrich, as given by Peters, needs some revision. The trunks of plants of this species can reach at least 2,5 m and the leaflets 50 cm in length. The upper surface of the leaflets are deeply grooved between the veins and toothed along the margins. Although Peters gives the range of this species as from Guate= mala to Panama, its northernmost limit appears to be in southern Nicaragua, near the Costa Rican border.

Finally, I would like to point out that a large plant of Z. fischeri Miq. could possibly have a subterranean stem of 10 cm, but this would certainly be the upper extreme. Moreover, the leaflets are more commonly lanceolate to oblanceolate and narrowly lanceolate leaflets, as described by Peters, are uncommon.

In conclusion: I hope the preceding com= ments have clarified some of the common misconceptions concerning Zamia and have also helped the readers to under= stand how solving nomenclatural problems can eventually pave the way to under= standing the taxonomy of a group. Per= haps we also can begin to see a resolu= tion to the West Indian problem.

KEY TO THE WEST INDIAN SPECIES OF ZAMIA

1. Leaflets entire ---------- Z. portoricensis Urban

1. Leaflets with marginal teeth

2. Leaflets with 1 to 4 apical teeth, leaflet apex acute, leaflets linear, 3 to 5 mm wide ---------- Z. angustifolia Jacq.

2. Leaflets with numerous distinct or callous teeth in upper third, leaflet apex rounded, more than 6 mm wide

3. Leaflets with teeth reduced to cal= lous bumps ---------- Z. integrifolia Willd.

3. Leaflets with distinct teeth

4. Leaflets oblong to subobovate, more than 10 cm long ---------- Z. pumila L.

4. Leaflets obovate or lanceolate, less than 10 cm long ---------- Z. pygmaea Sims

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CYCAD SEEDS AND SEEDLINGS

by Willie Tang

If you have recently pollinated a cycad cone, you may be concerned about the proper pre- and post-natal care of the expectant mother and of the seeds and seedlings that you will have.

A pollinated cycad cone undergoes rapid development. The mother transports large amounts of nutrients and energy-rich compounds into the developing seeds. Thus, pregnancy for a cycad, like that of human beings and other animals, is a demanding and stressful period. It is important that the female cycad receive adequate moisture and fertilizer at this time. In wild populations of Zamia pumila in Florida, especially on poor soils, I have observed that the leaves of females with expanding cones may shrivel and drop and the plant may go dormant, probably due to the drain on their nutrient and energy stores.

The period from pollination to the release of the seeds from the cone varies among species and individual plants. This period ranges from 4 months to over a year in 18 species where I have made measurements (see Table 1). For many species the embryos within the seeds that have been released are not fully mature and the seeds benefit from storage in a non-dessicating condition for several months before planting. This is especially so for Encephalartos (3, 4). Other species are ready for planting without a waiting period, (e.g. Dioon spinulosum and many Zamia (see Hendricks (5) for a further discussion).

Seedling emergence occurs through a star-shaped hatch in the seed in 9 of the 10 genera. The exception is Cycas, whose seeds split in half during seedling emergence (see Fig. 1).

For several months cycad seedlings can rely solely on seed reserves for their nutrition. In those species with large seeds, a large well-established seedling will result without much effort from the grower (e.g. Dioon spinulosum, Lepidozamia peroffskyana and Macrozamia macdonelli). For smaller-seeded species,

Table 1. Time elapsed from pollination to release of seed from the cone for 18 species of cycad.

SPECIES	PERIOD FROM POLLINATION TO SEED RELEASE
Ceratozamia hildae	7-8 months
C. robusta (Belize)	7
Dioon edule	12-13
D. spinulosum	15-16
Encephalartos ferox	5-6
E. gratus	5-6
E. hildebrandtii	4-6
E. manikensis	5-6
Macrozamia lucida	7-8
M. moorei	6-7
Microcycas calocoma	10
Stangeria eriopus	10-11
Zamia fischeri	11-12
Z. furfuracea	7-9
Z. loddigesii	7-9
Z. pumila	10-12
Z. pseudoparasitica	11
Z. splendens	9-10

Fig. 1. Germinating cycad seeds in proper planting position. On the left is a Cycas seed. On the right is a seed representative of the other 9 genera.

Fig. 2. Cycad seed volumes. For scale a size medium chicken egg is 50ml and a pea is 0.4 ml. Measurements for Dioon are from (8).

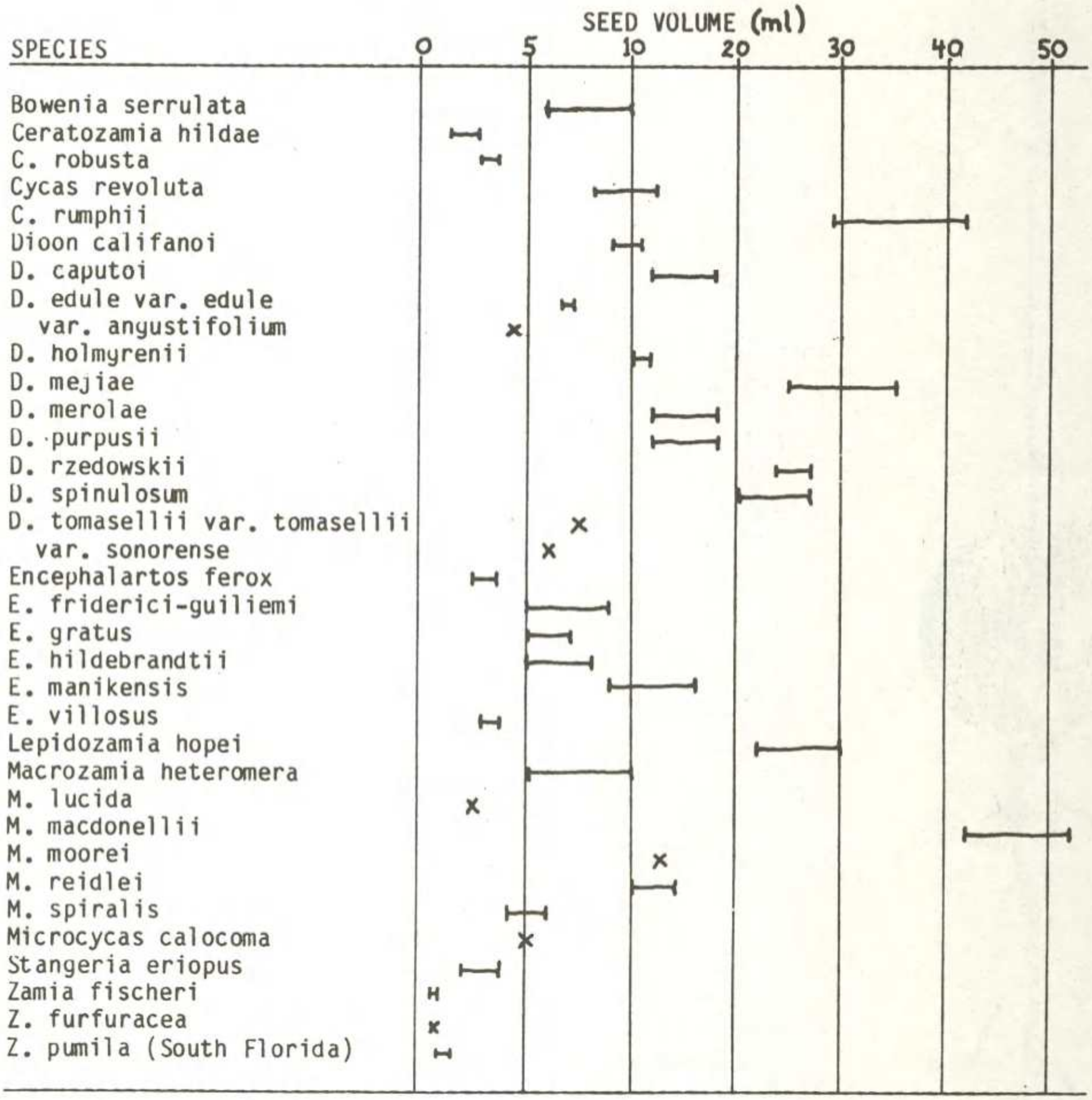

FIG. 3

the seeds do not have enough reserves to produce a large plant before reserves are depleted and some care from the grower is important for the establish=ment of the seedlings. Seed size can be used as an indicator of the care re=quired to raise a species from seed (see Fig. 2). In the wild the germina=tion and young seedling stages are times of very high mortality, with 90% and more of the young cycads succumbing to stress, competition and attack by predators. In cultivation this is a period when the cycad grower can really make a difference in whether the young cycad survives and becomes established.

Once established, the seedling will grow rapidly and may double its size several times a year for several years. This is the stage of the most rapid growth for cycads. The myth of slow growth doesn't really apply to young cycads. If your seedling doesn't show good growth it is probably under stress. In my experience with young cycads, both in a temperate region (San Francisco Bay area) and a subtropical climate (South Florida), if a seedling is given the right conditions, it can undergo relatively explosive growth. An Encephalartos gratus I pos=sess increased its stem width from 5 to 18 cm in three years and a Ceratozamia robusta (from Belize) increased its stem from 5 to 16,5 cm in 2½ years. In my experience, the most important factor preventing or allowing growth is soil condition. Warmth, with constant ade=quate moisture, but excellent drainage, seems to be the key.

Those of you who have never grown cycads from seeds may find it rewarding. As seedlings and young plants, leaf shape may be quite different from that of the adult. In appearance and for ornamental purposes, seedlings and adults are diffe=rent plants (see Fig. 3 for examples of seedlings). Perhaps the most fascinating thing about cycads for me is the germina=tion of their seed. Every time I expe=rience it,I am in awe. This is the event that makes possible every new generation of cycads and has occured to start each of the thousands of generations of this 300 million year-old plant lineage. It is also the event which must occur if this lineage of plants is to continue into the future.

(Reproduced from "The Cycad Newsletter" (USA), Vol. IX , no. 2, June 1986, with kind permission of the author and the editor, Mr Garrie P. Landry.)

Two plants of Zamia furfuracea, demon=strating one year's growth difference

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FROM THE PRESIDENT

This issue of ENCEPHALARTOS ushers in the third year of activity of your Society. 1985 was essentially our year of formation, policy formulation and membership recruitment, while 1986 followed as a period of consolidation. Membership at the end of 1986 stood at 431, distributed as follows: Transvaal 184, Natal 92, Cape 86, O.F.S. 14, S.W.A./Namibia 3, Swaziland 1, Zimbabwe 1 (381 'African' members); Australia 17, U.S.A. 16, New Zealand 3, Israel 3, France 2, Austria 2, United Kingdom 2, Italy 2, West Germany 2, Netherlands 1 (50 'Overseas' members).

A membership recruitment drive at the beginning of this year has already borne fruit and I am pleased to extend a warm welcome to the 50 or so new members who have joined in January and February. A special welcome to the new members from Thailand, New Zealand, West Germany, Australia and the U.S.A.

My hopes for 1987 include those for future growth of the Society, in both membership numbers and status, for a continuation in the liaison between the Society and Government and Provincial authorities, for the expansion of the seedbank and pollen exchange facilities, for the formation of a Southern Transvaal regional branch and for more spontaneous contributions from members to ENCEPHALARTOS.

The financial report for 1986 appears elsewhere in this issue. Your committee's conservative fiscal policy is reflected in a modest surplus of income over expenditure and no financial problems are anticipated in the immediate future.

In reviewing the Society's activities in 1986, I would like to record our appreciation to all those committee and other members who have assisted in their many and varied ways. In this regard it is appropriate to record our special appreciation to the following: Maans Kemp for his continued excellent work in the production of ENCEPHALARTOS, Danie Nel for his enthusiastic promotion of the seedbank, Cynthia Giddy for managing the pollen exchange, Marion Debruyne for her diligent work on the membership records,

VAN DIE PRESIDENT

Hierdie uitgawe van ENCEPHALARTOS lui die derde jaar van aktiwiteit van u Vereniging in. 1985 was essensieel 'n jaar van stigting, beleidsbepaling en ledewerwing, terwyl 1986 gevolg het as 'n periode van konsolidasie. Lidmaatskap het aan die einde van 1986 op 431 gestaan, wat as volg versprei was: Transvaal 184, Natal 92,Kaap 86, O.V.S. 14, S.W.A./Namibië 3, Swaziland 1, Zimbabwe 1 (381 'Afrika-lede'); Australië 17, V.S.A. 16, Nieu-Seeland 3, Israel 3, Frankryk 2, Oostenryk 2,Verenigde Koninkryk 2, Italië 2, Wes-Duitsland 2, Nederland 1 (50 'oorsese lede').

'n Ledewerwingsveldtog aan die begin van hierdie jaar het reeds vrugte gedra en dit is vir my aangenaam om die 50 of so nuwe lede wat in Januarie en Februarie aangesluit het,hartlik welkom te heet. 'n Spesiale woord van welkom aan die nuwe lede uit Thailand, Nieu-Seeland, Wes-Duitsland, Australië en die V.S.A.

My hoop vir 1987 sluit in dié vir verdere groei van die Vereniging, beide in ledetal en status, vir 'n voortsetting van die skakeling tussen die Vereniging en Regerings- en Provinsiale owerhede, vir die uitbreiding van die saadbank- en stuifmeelruilfasiliteite, vir die stigting van 'n Suid-Transvaalse Streekstak en vir meer spontane bydraes van lede tot ENCEPHALARTOS.

Die finansiële verslag vir 1986 verskyn elders in hierdie uitgawe. U komitee se konserwatiewe fiskale beleid word gereflekteer in 'n matige surplus van inkomste bo uitgawe en geen finansiële probleme word in die onmiddelike toekoms voorsien nie.

Terwyl ek die Vereniging se bedrywighede in 1986 in oënskou neem, wil ek graag ons waardering te boek stel aan al die komitee- en ander lede wat op hulle baie en verskillende maniere gehelp het. In hierdie verband is dit van pas om ons besondere waardering aan die volgende te betuig: Maans Kemp vir sy volgehoue uitstekende werk in die produksie van ENCEPHALARTOS, Danie Nel vir sy entoesiastiese bevordering van die saadbank, Cynthia

Angela Osborne for keeping the books in order and Willem Nel for carrying out the year-ending audit. In addition, thanks are due to all who have been involved in organising meetings and excursions. Appreciation is also recorded to all who have contributed material for publication in ENCEPHALARTOS. We are grateful to all who have assisted the seedbank in terms of cash or seed donations. Finally, a very sincere thank you to those members who have kindly added a donation to their dues when renewing membership for this year.

ROY OSBORNE

Giddy vir die bestuur van die stuifmeelruil, Marion Debruyne vir haar pligsgetroue werk met die lidmaatskaprekords, Angela Osborne vir die op datum hou van die boeke en Willem Nel vir die uitvoering van die jaarlikse oudit. Daarby is ons dank verskuldig aan almal wat betrokke was by die reël van vergaderings en uitstappies. Waardering word ook betuig aan almal wat materiaal vir ENCEPHALARTOS bygedra het. Ons is dankbaar vir almal wat die saadbank gehelp het in die vorm van skenkings van kontant of saad. Laastens, 'n baie opregte dankie aan daardie lede wat 'n donasie by hulle ledegeld gevoeg het toe hulle hul lidmaatskap vir vanjaar hernu het.

ROY OSBORNE

REGIONAL NEWS STREEKNUUS

Natal

Danie Nel reports:

VISIT TO QUEEN ELIZABETH PARK

On Sunday, 30 November 1986, Natal members and guests visited the Queen Elizabeth Park in Pietermaritzburg. We saw a small variety of cycads which looked healthy.

The morning's excursion was followed by a bring-and-braai at Ted and Cynthia Giddy's home at Umlaas Road. Cynthia showed us around her nursery and we were delighted to see such beautiful specimens and the wide variety of cycads.

VISIT TO CYCAD NURSERY

On Sunday, 8 February 1987, 25 members and 17 guests visited the nursery of Mr Eddie du Preez at Kloof. Eddie showed us his beautiful cycad-filled garden which he had landscaped himself.

After visiting Eddie's nursery, we went on a hike in the Krantzkloof Nature Reserve near Kloof. The trail led us to a dense stand of Encephalartos villosus. We saw no plants in cone , but there was a large number of healthy seedlings.

SLIDE SHOW

The next meeting will take the form of a slide show in May. Details will be sent to Natal members.

Members of the Natal Section visiting the garden and nursery of Mr Eddie du Preez

FOCUS ON... FOKUS OP...

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

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

ENCEPHALARTOS FEROX

BY ROY OSBORNE

Encephalartos ferox is understandably one of the most popular of all cycads. Its relatively fast growth rate, its attractive dark green foliage and its vividly-coloured cones added to a reasonable degree of availability explain why this species is found and admired in so many public and private gardens the world over.

Discovery of E. ferox

An Italian plant collector, Cavaliere Carlo Antonio Fornasini, is generally credited with the "discovery" of E. ferox . Fornasini botanised in and around the Inhambane area in Mocambique from 1839 onwards and kept up a continuous flow of specimens to his countryman, Professor Giuseppe Bertolini who worked in the northern Italian city of Bologna. Bertolini, himself the son of a well-known botanist, drew and described many of Fornasini's specimens in a series of dissertations entitled "Illustrazione di Piante Mozambicesi" which was published in a local scientific journal, "Memorie della Accademia delle Scienze dell' Istituto di Bologna". Amongst the specimens sent by Fornasini were two large cycad leaves from a quite beautiful ("una bella pianta") but not very common plant which had stems "as thick as a human torso" and bore amongst its leaves "several fruits similar to a pineapple ..... but not very good to eat". Fornasini also remarked that the natives extracted a type of starch from the stems. Thus on 27 March 1851 Bertolini published a two-page report on this cycad which he named Encephalartos ferox.

Discovery of E. kosiensis

In July 1920, two young botanists, Robert Aitken, newly-appointed lecturer at Natal University College, and postgraduate student George Gale, set out on a arduous trip to the Pondoland (now Maputaland) in northern Natal. From their subsequent report ...."The means of transport was the only one possible in a country unoccupied by white settlers, viz. a wagon and a span of sixteen donkeys. Progress by this means is extremely slow ..... it will scarcely be surprising that a day's journey rarely exceeds twelve miles." But their efforts were well rewarded when they came across a stand of cycads where (in what seems to be a somewhat exaggerated report) ....."The tallest plant seen was 11 ft. in height and about 3ft. 6ins. in girth. Plants of 6 to 9 ft. are common". Specimens were collected and are still preserved in the National Herbarium at Pretoria. During the same expedition, Aitken and Gale also came across the stand of Raphia palms, later named Raphia australis at Kosi Bay. The following year a Colonel Lugge made a similar trip and his cycad specimen is still on file in the Natal Herbarium.

During the next ten years or so, a number of people visited the area in which these plants had been found and brought back plants, many of which were planted in Durban homes. A Roman Catholic Missionary, Father Jacob Gerstner, collected plants in the 20's. A Mr R.H. Rutherfoord of Obotini

Figure 1 : Details of leaf structure, and one female and three male cone scales of *Encephalartos ferox*. (From "Cycads of Africa & Madagascar" by Douglas Goode, presently in print, and reproduced in reduced scale by kind permission of the author).

gathered specimens in 1927. All these people obtained their specimens independently and there was subsequently a rather curious set of correspondence in the "Natal Mercury" in which each of them claims to have "discovered" the Kosi Bay cycad. Another story tells of a Zulu woman wearing a necklace of the red seeds and being seen in Durban's West Street by a passing botanist who, on questioning the lady, was told that the seed had come from a plant "near Tongaat".

In 1930 Sir Arthur Hill and Dr. J. Hutchinson, distinguished botanists from Kew Gardens, visited Durban and saw well established plants of this cycad in several local gardens. On returning to Kew, Hutchinson wrote up a description of the species in the 1932 issue of Kew Bulletin and thus, twelve years after its first discovery in Natal, Encephalartos kosiensis was officially named.

One of the more detailed accounts of this species comes from the records of Colonel George Molyneaux, Durban's Licensing Officer over the period 1902 - 1933. Molyneaux was fascinated by cycads and was responsible for making the Old Fort site in Durban into an area where a permanent collection could be established. In a letter to Kew, Molyneaux wrote about an expedition he made to the Kosi Bay site. ..."The coastal belt of northern Zululand is unhealthy in the wet summer, and in the dry winter, prior to the introduction of motor-cars, was rather inaccessible, for there is 80 miles of sand to be got over which is soft when dry. These facts are sufficient to explain why this cycad should have remained unknown for so long." However, for those who did make the trip, Molyneaux reported that the plant was common in the area, up to about 4 ft. in height, occurred up to 250 yds. from the sea and extended in range right up to the Mozambique border.It was Molyneaux who might be considered the first trader in this species. He sent five plants to Kirstenbosch in 1932, James Wylie sending further specimens to the National Botanic Gardens the following year.

A Mr Cyrus R. Barrett of Durban visited the cycad area twice in the early 30's and commented that there seemed to be differences between the coastal and the inland forms of E. kosiensis . "It appears to me that those plants growing within 3 miles of the bay and 5 miles from the sea shore are different from those growing 22 miles from the shore. The coastal form had definite stems with

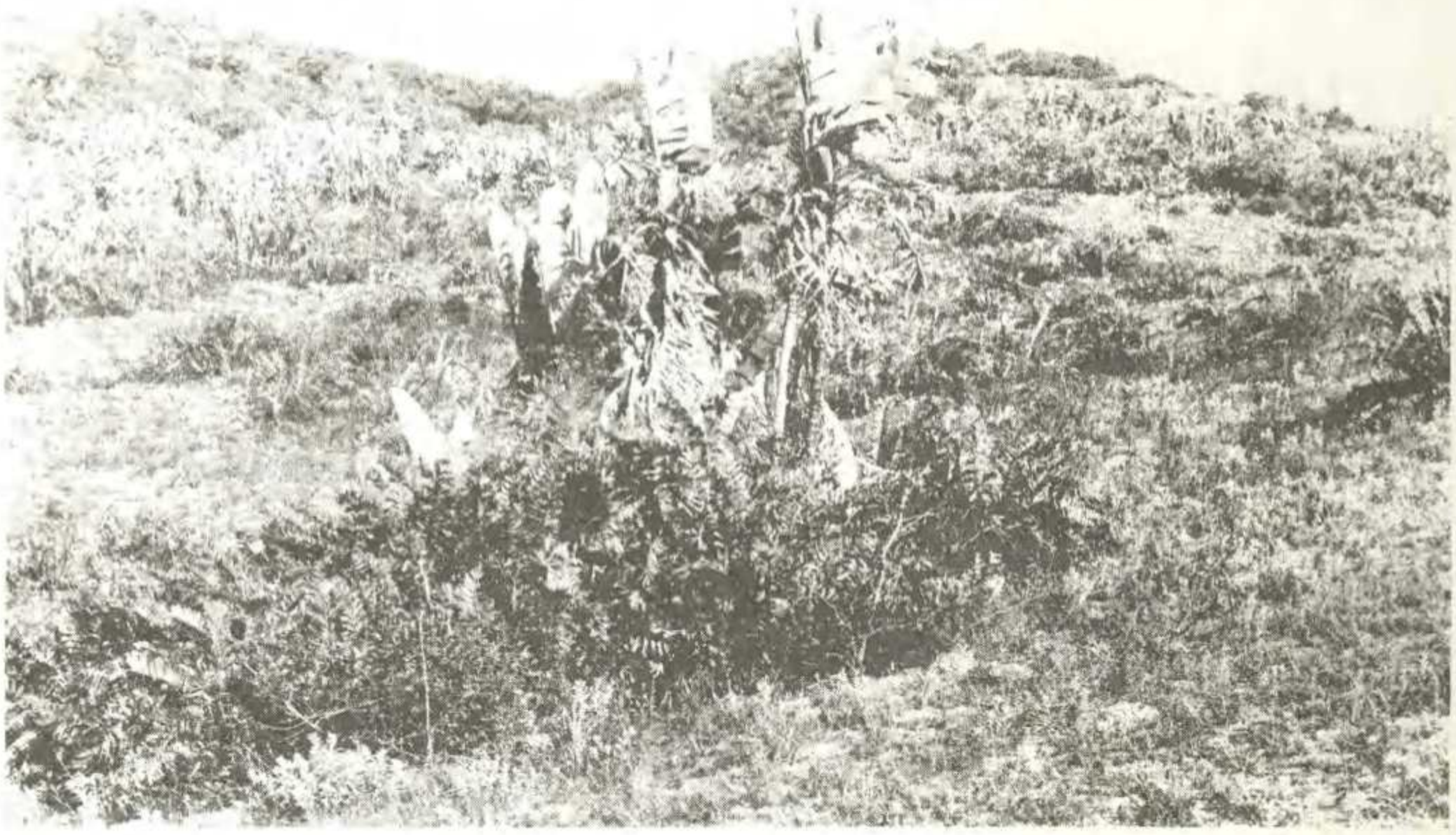

Figure 2
A group of E. ferox in habitat south of Kosi Bay. The plants occur on stabilised coastal sand-dunes, very commonly associated with Strelitzia nicolai. Photograph by Mr Mark Ward, Kwazulu Bureau of Natural Resources.

short leaves, while the inland form had practically no stem above ground and somewhat longer leaves. Barrett also reported how common the plants were ..."In some parts so close together it was impossible to walk through the bush." His notes further tell that he collected 250 seeds from 3 cones and from these he managed to grow some 200 seedlings.

Other expeditions to the habitat area followed and with more material available, B.M.L. Ogilvie of the Natal Herbarium was able to write up a much amplified description of the species in the Kew Bulletin of 1939. More plants were brought to Durban by Mr C.Standish Williams, Magistrate of Pinetown, who added several specimens to the collection at the Old Fort Gardens in 1941. An example of the species was given to General J.C. Smuts on the occassion of his visit to Durban in November 1941 and was presented to him by Mr W.B. Collier, then President of Assocom. Smuts was apparently delighted with the gift which he announced would be planted at the front door of his residence "Libertas" in Pretoria.

Synonomy of E. ferox and E. kosiensis .

When Hutchinson named E. kosiensis in 1932 he was careful to note that this species was undoubtedly allied to E. ferox . Only about ten years later was the question raised of just how similar or how different these two taxa were and it was Miss I.C. Verdoorn who suggested that they might in fact be one and the same species. The key to the whole episode was Bertolini's original water-colour painting which his grandson found and sent to Kew. A copy of this painting found its way to H. Basil Christian, keen cycadologist and founder of the Ewanrigg Gardens near Harare. Christian immediately wrote to Kew and in a letter dated 5 December 1946, says ..."In my opinion this photograph definitely settles the question .....Had Hutchinson seen this it is possible that he may not have described the Kosi Bay plant as a new species". Since about 1950 the two taxa have been regarded as synomonous and E. ferox , as the earlier of the two names, has precedence.

Occurrence

The natural habitat of E. ferox comprises a fairly narrow strip of coastal scrub extending from Sordwana Bay on the Zululand coast up to a point about 650 km north of Maputo in Mocambique. It is fairly well established throughout this area and although the species is not officially listed as endangered, rare or threatened, numbers have been reduced due to encrbachment of habitation in Mocambique, afforestation activities in Zululand and the activities of unscrupulous collectors. In Maputaland (previously Tongaland) the main four localities are south of Kosi Bay, the shores near Lake Sibaya, the Sileze area and the Tembe elephant park. In the coastal zones it is often found associated with the 'wild banana', Strelitzia nicolai , while further inland it occurs in wooded scrub. Apart from its occurrence on the African

Figure 3

E.ferox in habitat, Sileze area, Maputaland. The larger specimen with a basal sucker and the smal= ler plant on the right both show well-established trunks above ground level. Photo by Mr Mark Ward, Kwazulu Bureau of Natural Resources

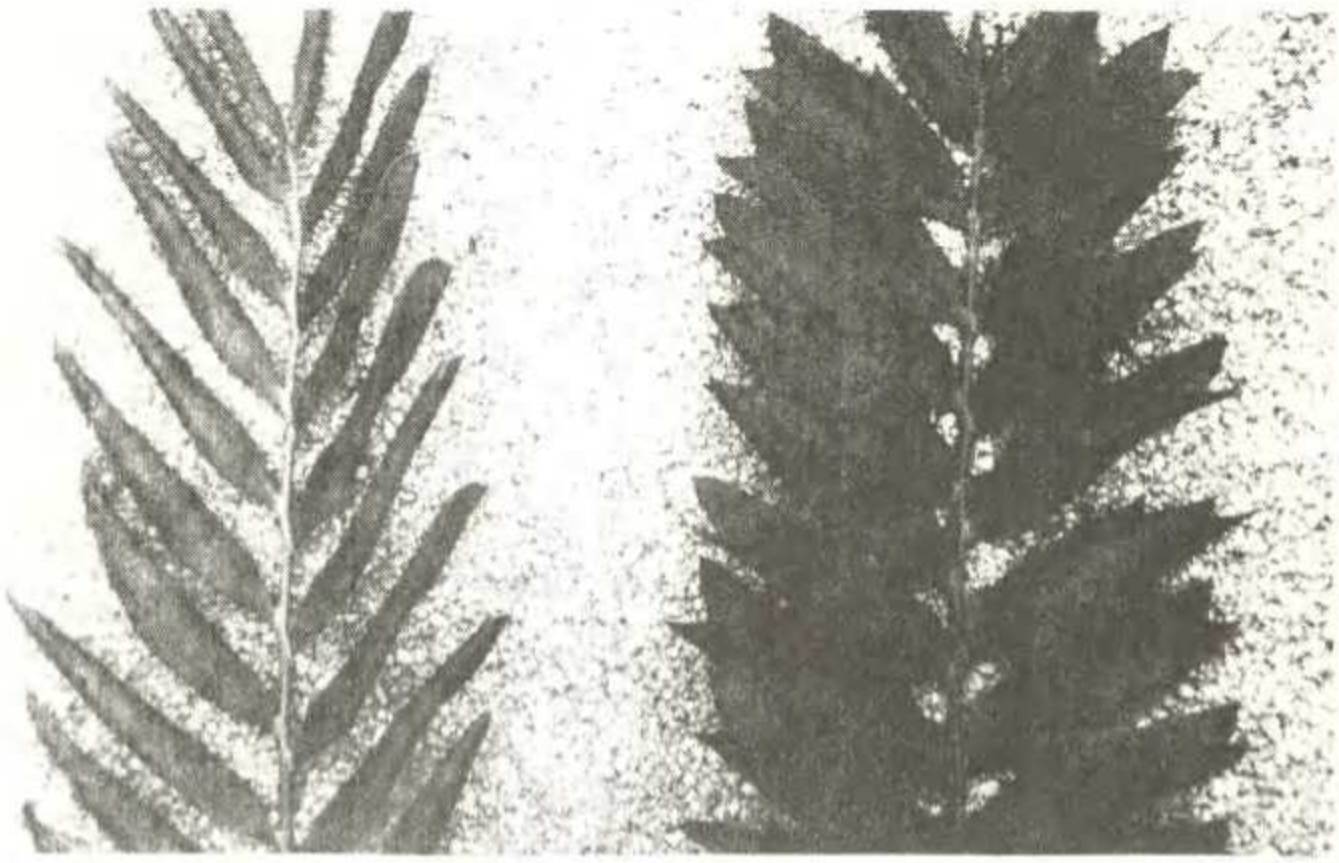

Figure 4

Leaves of E. ferox showing ex= treme examples of the 'normal' flat leaflets (right) and the 'tubular' leaflet form (left). Photographed by the author at the Research Centre, Fairchild Tropical Garden, Florida.

mainland, the species is also found on Inhaca Island, about 35 km east of Maputo. The habitat strip experiences typically hot and humid tropical weather with an annual rainfall, mostly falling in summer, of 1000 to 1250 mm. In certain of the grassland areas there are cyclical fires at about a four year frequency to which the species seems well adapted. Its occurrence on stabilised sand dunes is a character which E. ferox shares with E. arenarius in the Eastern Cape. However, plants of E. ferox do not grow right down to the shore itself, the latter quality amongst cycads apparently being confined to E. hildebrandtii in East Africa. The furthest inland occurrence of E. ferox is that of a solitary specimen found by Natal Parks Board officer I. Steyler in 1964 on the Makatini Flats about 40 km inland from Sordwana Bay. This does seem to be somewhat outside the usual narrow coastal range and Cynthia Giddy speculates that its presence might have arisen from transport of a seed by the Trumpeter Hornbill which is common in the area and has been observed swallowing whole cycad seed later to regurgitate the kernel.

The earlier report by Fornasini that the trunk of this species is used to provide a form a starch has been confirmed and may explain why the plant has at least three different vernacular names in Mocambique ("Chihanga, Chipissana, Untopani"). Possibly its usefulness in this sense as well as its aesthetic appeal were factors in selecting the species as a feature on the 1977 Mocambique "National Protection" stamp. The Zulu people refer to Encephalartos ferox (and also all other locally-occuring cycads) as "Isiqiki somkhovu" (literally, the small stool for the tokoloshe) or "Uthobani" and the occassional specimen planted adjacent to a tribal kraal is in the belief that its presence will prevent strikes by lightning or other misfortunes.

Figure 5
A one-year old seedling of E. ferox. Photograph by the author.

Figure 6
The 1977 Mocambique "National Protection" first day cover featuring E. ferox and the Nyala, Tragelaphus angasi (named in honour of Douglas Angas who brought the Nyala to the attention of the Western World). The first day cover was kindly provided by Mr D.V. Smith.

E. ferox is fairly well represented in public and private gardens the world over. According to CITES reports, local nurserymen have shipped plantlets to Australia, New Zealand, Brazil, U.S.A., Canada, England, France, Holland, Italy, Germany, Denmark, Switzerland, Japan and the Phillipines. Mature plants are established in many European botanic gardens including those in Warsaw, Amsterdam, Hamburg and Munich. Most major American botanic gardens have specimens with perhaps the finest plants being found at the Fairchild Tropical Gardens in Florida.

Description
1. Stems

E. ferox is not usually regarded as having much of an exposed trunk although it is certainly possible to find specimens in the wild with stems of up to 2 m above ground level. Branching of the trunk is uncommon and usually occurs only when the growing apex becomes physically damaged. In mature plants the trunk reaches 25 - 35 cm. in diameter.

2. Leaves and leaflets

Leaves of this species are 1 - 2 m long and usually straight although sometimes a slight kink in the rachis is seen. The dark green leaflets, somewhat holly-like in appearance, occur as more-or-less opposite pairs set along the rachis to make a slight "V" angle and diminish in size to a series of prickles toward the leaf base. Median leaflets are typically flat or only slightly ruffled, 15 cm long and up to 5 cm broad. In some plants the leaflet margins are quite markedly rolled under to give each leaflet a rather tubular appearance. (An extreme of this leaflet type is seen in some of the specimens at Fairchild Tropical Garden which are said to be derived from Natal seed).The leaflets have 2 - 4 small teeth on each margin and 3 - 5 spiny lobes at the apex.

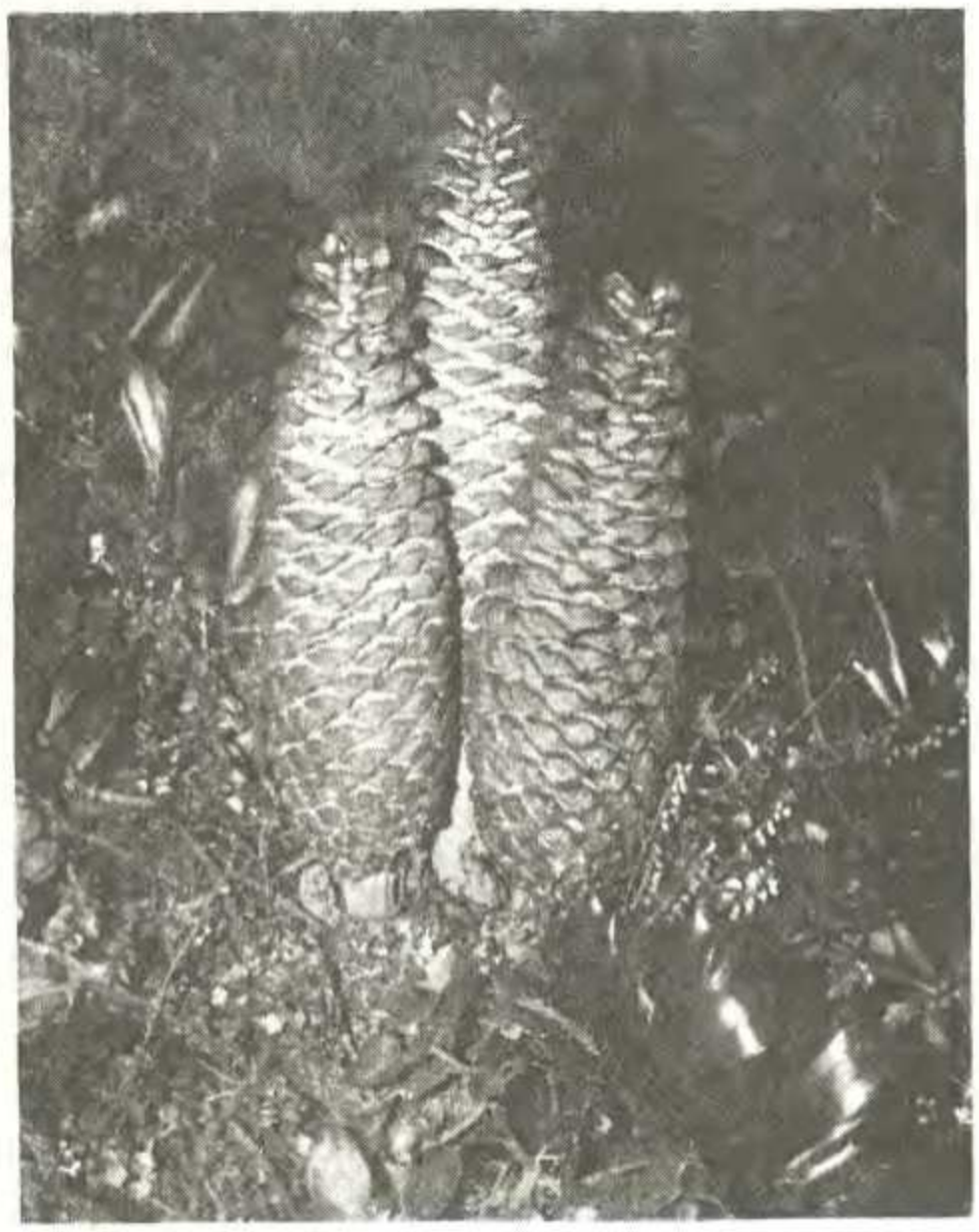

Figure 7
Male cones of E. ferox. Photograph by Maans Kemp.

3. Cones

E. ferox usually bears 1 - 3 cones but on older specimens as many as 5 or 10 cones are borne by female or male plants respectively. The cones are usually a brilliant scarlet colour, occassionally tending to pink shades and golden-yellow cones have been seen in plants in the Sileze area and from certain Mocambique localities. Male cones are subcylindric, 40 - 50 cm long and 7 - 10 cm in diameter. Female cones are more ovoid, 25 - 50 cm long and 20 - 40 cm in diameter. Cone scales are somewhat wrinkled and end in a pronouced beak. Each female cone bears about 500 seeds which have a bright red outer skin and are typically 4,5 - 5 cm long and 1,5 - 2 cm in diameter.

Cultivation

E. ferox grows well in frost-free areas and enjoys plenty of heat and water, consistent with its conditions in habitat. One of the fastest-growing of all cycads, it can cone within 12 years from the time of seed germination. Plants prefer shady conditions with well-drained soil and respond positively to both inorganic and organic fertilised applications. Whilst this species will serve well as a container plant, it is used to best advatage as a landscaping feature plant where its luxuriant foliage contributes dramatically to a tropical impression. Groupings of several plants compound this effect and of course increase the possibility of eventual seed production.

Hybrids, affinities and toxicity

E. ferox is something of a loner - its habitat is different to other S.A. cycads and possibly because of this, there are no records of natural hybrids with other species (although an artifical cross of E. ferox with E.trispinosus has been recorded). Similarly, there are no really close relatives but there seem to be some affinities to E. arenarius and E. latifrons . In common with other members of the genus, the seed of E. ferox contains the toxin macrozamin and smaller amounts of cycasin. The kernel and the outer flesh have been shown to be toxic to rabbits but there have been no documented cases of natural poisoning of humans or livestock.

Acknowledgments

I would like to express sincere thanks to those who assisted with the research into this article, especially Dr R.A.Dyer, Dr Piet Vorster, Cynthia Giddy, Prof Esme Hennessey, Maans Kemp, Nancy Hammer, Brian Schrire and Mark and Roddy Ward. Thanks are also due to Mark Ward for the use of photographs, Douglas Goode for artwork and to Rex Osborne and Mr D.V. Smith for tracking down the first-day cover featuring E. ferox .

Figure 8
Twin female cones of E. ferox on one of the mature specimens at the Durban Botanic Gardens. Photograph by the author.

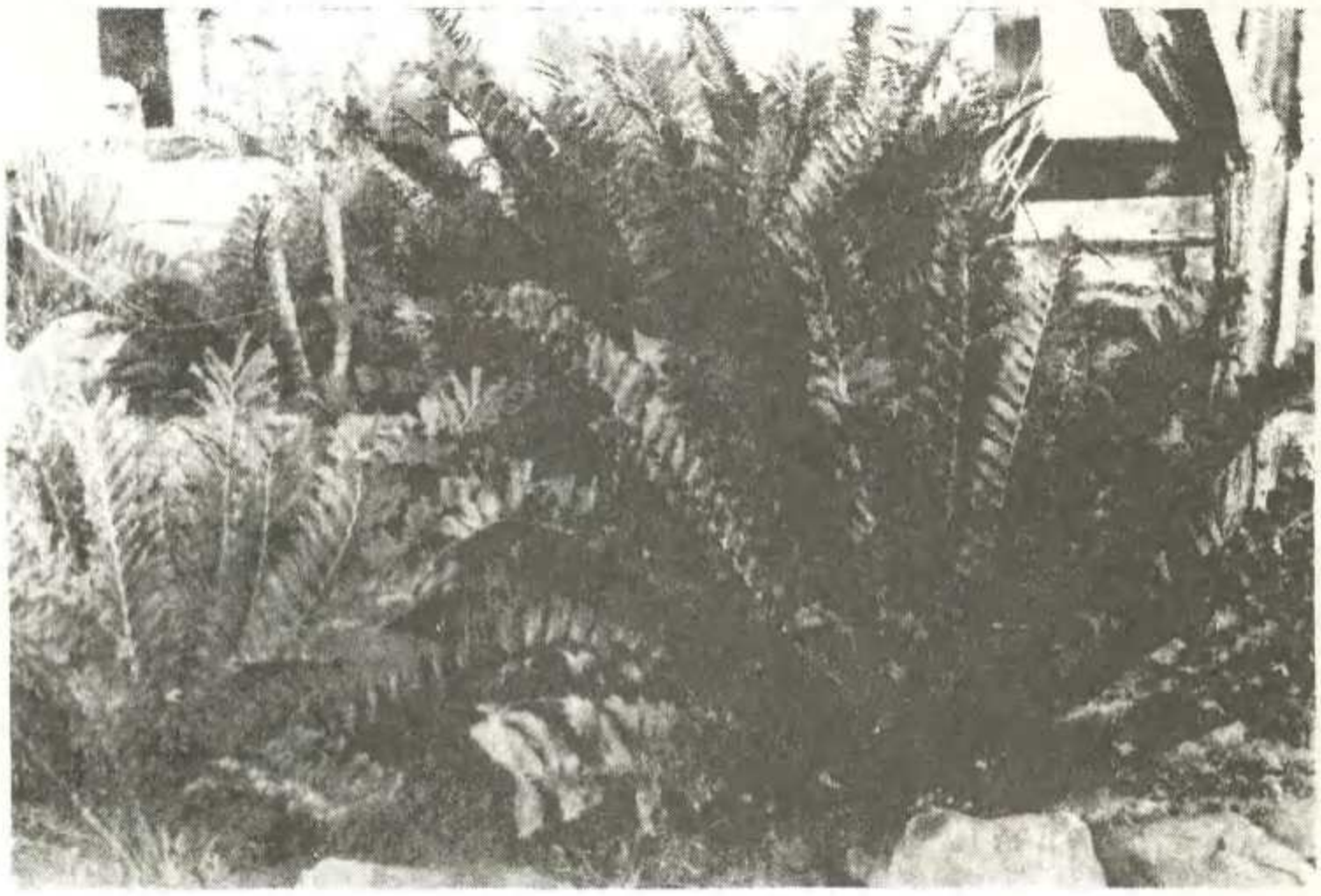

Figure 9

A group of young E. ferox plants in the author's garden. Photograph by the author.

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Front cover:
Female E. ferox in cone, open grassland habitat near Kosi Bay. This particular cone was yellow in colour. Photograph by Mr Mark Ward, Kwazulu Bureau of Natural Resources.

TO ZAIRE AFTER CYCADS

by Ian Turner

On 28 September 1981 I left my home in Zimbabwe and headed north on a trip which would take me 4 512 km in my Mazda one-ton Pickup. The main object of the journey was to find two relatively unknown cycads, Encephalartos schmitzii and Encephalartos marunguensis, which grow in Zaire. Accompanying me were my nephew, Hamish, and two men who work for me, Samuel and Benito.

We crossed the Zambezi, which is the border between Zimbabwe and Zambia, and spent a pleasant night at a motel in Zambia. We started off early the next morning and were advised at a petrol station near the Zaire border to buy some bags of maize meal for gifts to the officials at the Zaire side of the border. This was a help for us to get through the formalities in good time. It was quite late when we arrived in Lubumbashe, which is the main town of the Shaba Province of Zaire, so the first thing we did was to look for the University - this was to try to contact Professor Malaisse, the man who described the two cycads I was looking for.

We camped in the grounds of the Guest House, which belongs to the University, and the next morning we met Professor Malaisse. At the time I did not realise how much the success of my search for the cycads would depend on Prof. Malaisse, but I can now say that had I not had the good fortune to contact him, my stay in Zaire would have had problems to say the least. The main problem of travelling in Zaire is that petrol is in very short supply and is not available out of the main centres. I had to carry enough petrol in the back of my truck to last for the five days it was to take us to go where E. marunguensis is to be found and to return to Lubumbashe. I knew nothing about this and, had Prof. Malaisse not been there to organise things for us, we would most likely still be looking for petrol about 500 km from Lubumbashe and I now know that I would not have found any.

Another problem in Zaire is that of language, since I do not speak French. It was not easy to find our way around, but fortunately Prof. Malaisse had a man working for him in the herbarium who not only knew the area where the E. marunguensis are growing, but who also could speak a bit of the Nyanja language, which I also speak; so we were again very lucky to be able to have this man, named Kisimba, to come with us. With the truck loaded up with fuel and enough food to last us for about a week, we set out for the Marungu Mountains. We travelled up the length of Lake Mweru to a small village called Pweto, which was on the other side of a wide river which drains the water from the lake. There is a ferry at Pweto to carry cars across but it had a flat battery. We tried to get it started with the battery from our truck but the small battery would not turn the very big diesel engine on the ferry, so, while the battery was being charged at the mission in Pweto, we spent our first night camping near Lake Mwero.

We eventually got across the river the next morning and travelled for the rest of the day over quite rough roads, most of the time through quite heavily timbered countryside. We could see the Marungu Mountains in the distance for a long time and it seemed as if we would never reach them. The road up into the mountains was very steep in some places and at one time Hamish, Samuel, Kisimba and Benito had to push the truck to help it up the very rocky road. Once on top, the countryside broke into a rolling plateau which continued for many kilometres. We travelled on to a small village called Muhila, where we arrived after dark, but Kisimba knew his way around and soon got us a room for the night at a mess which is used by people who visit the area. Muhila is the centre for a government-owned ranch which runs cattle on the plateau, and the plateau is in fact called the Muhila Plateau.

The next morning we left Muhila village and went to the area where the E. marunguensis are to be found. This species grows in isolated groups; a group consisting of up to eleven plants which all originate from the same root=stock. No small suckers were seen but some multi-headed plants were found in some of the clumps, so it seemed to me as if the plants split up by forming two or more heads. All trunks of the plants were underground. The first colony we visited consisted of four groups of female plants. It was a great pity to see hundreds of infertile seeds lying around. I was particularly keen to collect some plants of both sexes. On making enquiries from some of the local inhabitants, we were told that there were more plants about three km away. We located a single group of plants and were very pleased to find old male cones on some of them. There were no female plants anywhere near the males, so in that area there was no re=production possible by seed. I now have both sexes growing together so in time should be able to get some fertile seed.

We were very lucky to have had Kisimba with us because, travelling in Zaire, one runs into numerous army road blocks, and in Pweto all travellers have to check in at the District Commissioner's Office. Without Kisimba it is doubtful if we would have got through. He had the great ability of being able to talk us out of what could have at times been a difficult situation. Foreign travel=lers in the countryside of Zaire are few and far between and are treated with some suspicion.

We left the Muhila Plateau and on the way down the mountain we stopped where a river runs over a waterfall and through a deep gorge. This was a really beauti=ful place with many kinds of ferns grow=ing there, including a lovely Drynaria high in the trees. I was also able to collect a Lycopodium species which had fronds hanging down, a metre long. Begonias, Impatiens, wild bananas and many other interesting plants were also to be found.

We entered the gorge below the waterfall and walked up the river bed, climbing over big boulders, since it was the end of the dry season and there was not too much water in the river. When we got to the bottom of the waterfall, we thought that, rather than walk all the way back down the river, we would try to get out by climbing the waterfall which, although it was about 50 metres high, was not too steep. It was a decision which almost ended in tragedy because, halfway up the falls, Kisimba lost his hold on the slippery rocks and started to slide down. I grabbed his shirt as he passed me and Benito, who was just below me, was able to get hold of his trousers and, between us, we broke his fall. It was a very frightening experience.

We spent one night camping near the water=fall and then carried on to spend a very comfortable night at the Mission in Pweto. The next morning we crossed on the ferry again and travelled the whole day towards Lubumbashe. Since it was not wise to travel on the roads after dark in Zaire, we again made camp under the stars. After a good meal cooked on the camp fire, just to lie back in the clear African air and to go to sleep with only the sound of crickets and the beat of some drums in the distance, is to me a very nice way to live.

We arrived safely in Lubumbashe and un=loaded our plants. Kisimba, who has a good knowledge of the plants in Zaire, had collected a lot of specimens for the university herbarium and Prof. Malaisse was pleased with what we brought back.

The next cycad in question was E. schmit=zii. This species was described from two plants found growing on the Kundelungu Plateau. No other plants have been lo=cated there. One plant was transplanted to a garden in Lubumbashe and died some time later, so, as far as is known, only one plant of the species remains in Zaire. I did not go to see this plant, however. A leaf in the Univer=sity of Lubumbashe herbarium looked exactly like a leaf I had taken with me from a plant I have in cultivation, which was collected in Zambia. My plant is coning for the first time this year, so it will be interesting to see if in fact E. schmitzii also comes from Zambia.

Prof. Malaisse had organised another trip for us to go to the Manika Plateau because he had seen a cycad growing in an African village there and felt sure we should be able to find more growing in the wild. On the way there he also wanted to show me two other cycads

which were growing near the main road on the way to Manika. So, the next day we left Lubumbashe with Prof. Malaisse and visited the site of the two cycads, both of which were just starting to cone. I took a lot of photographs and collected some leaves, which were completely different from the cycad from Marungu. As soon as the cones mature, Prof. Malaisse will be able to see if they are in fact a new species. We made enquiries from people living in the area to try to find out if any more plants were growing nearby, but no-one had ever seen any. A very thorough search was made of the area and we came to the conclusion that there were in=deed only two plants growing here.

We carried on to the copper-mining town of Kolwezi where we spent the night in a very comfortable motel owned by a big mining company. The next day saw us on our way to the Manika Plateau. We lo=cated the cycad in the village and eventually found a man who knew where some more plants were growing. He agreed to take us to the locality and there we found one clump of female plants, the leaves of which were very different to the Marungu plants. Again Prof. Malaisse is waiting to get cones so that he can perhaps describe this cycad as a new species. I collected a few specimens and, since I wanted to get some male plants of this species also, we returned to the village to see if anyone else knew where there were more plants. We were very lucky to find the man who had collected the cycad which was in cultivation, so we set off with him. We travelled first in the truck and then, after a long walk, came to another group of cycads. I could hardly believe my eyes when I saw old male cones. It is unusual to have so much luck in one day. Unfortunately, since the cycads on Manika are in such isolated groups, no viable seed is ever produced. But now, fortunately, as with the E. marunguensis, I have both sexes growing together and feel confi=dent of being able to propagate both species. So, one day, in stead of only a few plants growing in the back of beyond where there is absolutely no chance of reproduction, there should be seed and seedlings available to send to botanical gardens around the world.

We spent another night in Kolwezi and, on the way back to Lubumbashe the next day, we made a detour which took us on some side roads in the vicinity of the two cycads we had seen near the main road. We asked many people and travelled a long way but no more cycads were found. We arrived in Lubumbashe in time to get the truck loaded up; ready for an early start the next morning for our homeward jour=ney. We had an uneventful trip home with no problems at any of the borders because I had the necessary papers for the plants.

I planted the cycads the day after I arrived home. The E. marunguensis had only just put up new leaves when they were taken out and, after only a few weeks, new leaves were again growing. This is very unusual indeed. Now, three months after being planted, most of the E. marunguensis have leaves. The plants from the Manika Plateau are starting to put out new leaves, but not so quickly as the other species.

Since I am also interested in palms, I kept a look-out for anything of interest. The only species seen were Borassus aethiopium and Phoenix reclinata in Zaire, and a species of Hyphaene and more Borassus in Zambia. Prof. Malaisse told me about a climbing palm species he had seen in Zaire, but I was unfortunately unable to get to where they were growing.

(Reprinted from the Cycad Newsletter (USA), Vol. VI (II), July 1983; with the kind permission of the author and the editor.)

MIRIAM ROTHSCHILD'S BUTTERFLY STUDIES

by Stephen Compton

Miriam Rothschild is one of the most unusual entomologists in Britain. A member of the famous Rothschild banking family, she has published over three hundred scientific papers and several books, yet had no formal university education. Her particular interests are fleas (her father produced the world's largest collection of fleas) and chemical defences of insects. Her ec= centricity is well known. She recently received an award from the Queen- and was wearing bright white Wellington boots at the ceremony!

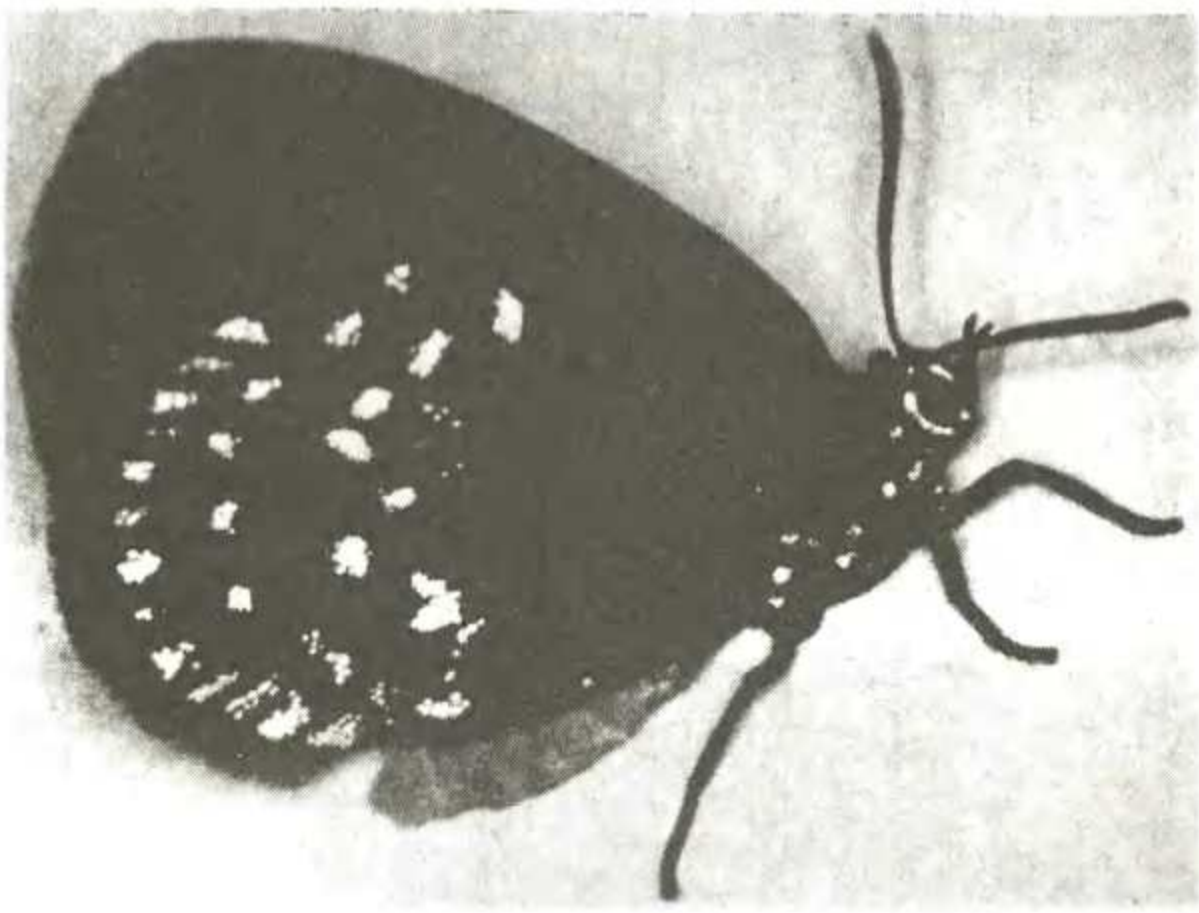
A research paper written by Miriam Rothschild has appeared recently which describes how a cycad-feeding butterfly makes use of the poisonous chemicals found in cycads (Rothschild, Nash and Bell. 1986. Phytochemistry 25: 1853-54).

The butterfly in question is the very rare Eumaeus atala florida, which feeds on the leaves of Zamia floridana in the United States. Z. floridana, together with other cycads, contains cycasin, a poisonous and cancer-producing compound. The caterpillars of the butterfly feed on the young leaves of the plant and these young leaves contain the highest concentrations of the poison. Miriam Rothschild and her co-workers have shown that the butterfly is not only immune to the toxin, but actually uses it for its own protection. By storing the compound in its body, the insect itself becomes poisonous and unpleasant when eaten by a predator. The caterpillars, pupae and adults all have bright warning coloura= tion which tells potential predators to stay away. The pupa also squeaks if it is disturbed!

It is interesting to speculate on whether or not a similar situation may apply to the well-known leopard moth (Zeronopsis leopardina) which feeds on cycads in South Africa. The leopard moth has bright orange and black warning coloura= tion which is there to tell predators, such as birds, that it is unpleasant to eat. However, this may be a false war= ning and the moth may be pretending to be distasteful and only mimicing other moths that are genuinely nasty.

If the leopard moth is distasteful, it may be storing cycasin in the same way that Eumaeus does. Alternatively, it may produce its own unpleasant chemicals and may not need to borrow them from a cycad. This would be relatively easy to test because leopard moth caterpillars also feed on other plants besides cycads. If the moth does need to obtain its defences from cycads, adults reared from these other food plants will not be as distaste= ful to birds as cycad-fed moths.

(Dr Compton's address: Department of Zoology and Entomology, Rhodes University, PO Box 94, Grahamstown 6140, RSA.)



Female Eumaeus atala florida Roeber, double normal size.

BITS AND PIECES STUKKIES EN BROKKIES

AUSTRALIAN SOCIETY

Elsewhere in this issue we publish a membership application form of the Palm and Cycad Society of Australia, for those members who would like to join. We thank our Australian friends for a gene=rous donation to our Society for publi=shing this information. They will, in addition, publish our Society's membership form in their magazine "firstly as a service to our readers and secondly as a promotion of palm and cycad societies in general". We sincerely appreciate the Australian Society's gesture of goodwill and friendship.

ANONYMOUS CONTRIBUTER

Will the Transvaal member who anonymously sent in a photocopy of a series of pho=tographs depicting the growth of a cycad, please contact the editor. We would very much like to publish this very interesting information but we can unfortunately not use the photocopied material and would need the original photographs. Your anonymity is guarenteed and the photo=graphs will be returned. Thank you.

HERNUWING VAN LIDMAATSKAP

Lede wat nog nie hulle ledegeld vir 1987 betaal het nie, word versoek om dit so gou as moontlik te doen. Voltooi asse=blief die vorm wat in ENCEPHALARTOS no. 8 (Desember 1986) verskyn het en stuur dit, saam met u ledegeld, na ons Lidmaatskap=beampte, Marion Debruyne. Haar adres verskyn op die vorm. Ledegeld vir gewone lede beloop R12,00 per jaar, vir pensioe=narisse en studente R6,00 en vir oorsese lede R25,00.

Volgens die Vereniging se grondwet verval die lidmaatskap van 'n lid wat nie teen 31 Maart sy/haar ledegeld betaal het nie.

MEMBERSHIP RENEWAL

Members who have not yet paid their mem=bership subscription for 1987, are re=quested to do so as soon as possible. Please complete the form which appeared in ENCEPHALARTOS no. 8 (December 1986) and send it, together with your subscrip=tion,to our Membership Officer, Marion Debruyne. Her address appears on the form. Subscription for ordinary members amounts to R12,00 per year, for pensio=ners and students R6,00 and for overseas members R25,00.

According to the Society's constitution, the membership of a member who has not paid his/her subscription by 31 March, is terminated.

PAMPAS GRASS CONTROVERSY

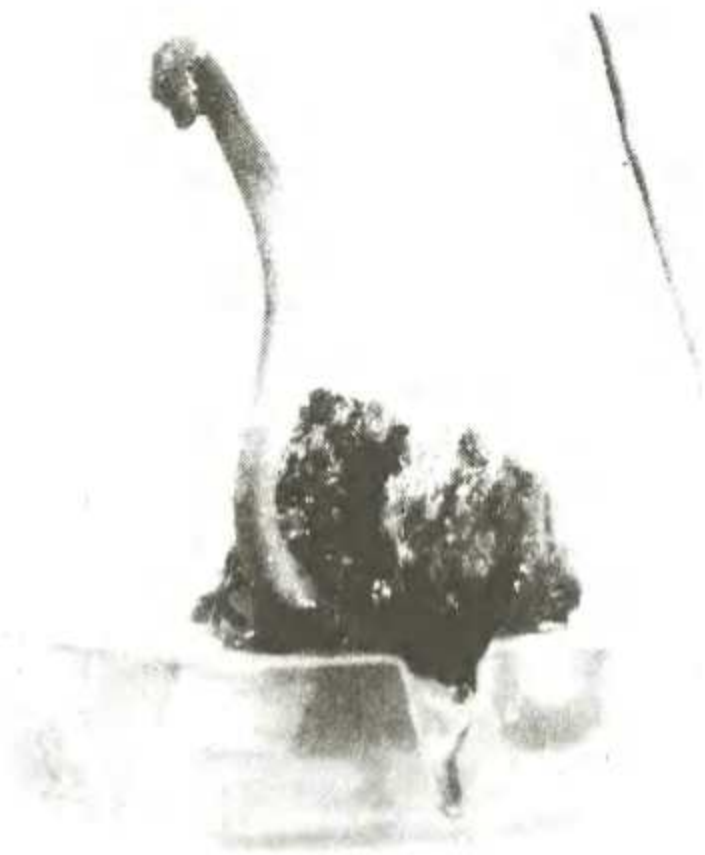
Dr Amy Jacot-Guillarmod (75), Research Associate at Rhodes University, well-known in botanical circles and a keen member and supporter of our Society, has been in the news recently. Dr Jacot-Guillarmod is deeply concerned about the extensive use of the ornamental Argenti=nian pampas grass (Cortaderia selloana) and the resulting suffering of those who show an allergenic response when the de=corative white flower plumes appear. She is proposing an eradication programme to get rid of the plant, particularly where extensive use is made of it (e.g. on mine dumps in the Transvaal). Her proposals have caused some debate as evidenced by the recent 'pro' and 'con' interviews on T.V.

Dr Jacot-Guillarmod is better known to our members for her reports on tempera=ture increases in the male cycad cone of cycads at the time of pollen release (see ENCEPHALARTOS no, 8, page 26).

TISSUE CULTURE NEWS

The biggest problem in cycad tissue cul=ture has been the difficulty in 'per=suading' callus material to differen=tiate - i.e. to form stems, leaves, roots, etc. (see ENCEPHALARTOS no. 5, page 21 and no. 6, page 15). Roy Os=borne has now reported a major break=through in his present range of experi=ments. "I am delighted with our present successes", he said. "We have reached the stage where callus can be quickly established for just about all the South African species and there seems to be good potential for morphogenesis from the resulting callus."

The photograph shows an example of the present state of experimentation; a leaf of Stangeria eriopus has been re=generated from callus, which in turn had been grown from a small section of root tissue.



S.A.A.B. CONGRESS

The 1987 congress of the South African Association of Botanists was held at the University of Natal's Durban campus over the period 13 to 16 January this year. Approximately 300 delegates attended and lively discussions, posters and exhibits were presented. Amongst the delegates were several of our members, including Piet Vorster, Nat Grobbelaar and Roy Osborne. Roy, our president, gave a congress lecture entitled "The largely-unexplored research potential offered by the South African cycad flora" which por=trayed something of the wide variety of projects which could usefully be underta=ken by researchers in both strictly aca=demic and also applied botanical fields. A copy of this paper can be obtained from Roy.

NICE CYCAD CONGRESS

Society member and conference organiser, Jean-Pierre Sclavo, writes to tell us that plans for the forthcoming Nice (France) Cycad Conference are well in hand. The meeting is sponsored jointly by the Alpes-Maritimes Department and by the Naples Botanical Garden. The pro=gramme is in two parts: a large exhibi=tion of cycads and a series of scientific talks. The following researchers will be presenting papers: Paolo de Luca, Sergio Sabato, Aldo Moretti (Italy), Knut Nor=stog, Dennis Stevenson (U.S.A.) Mario Vasquez-Torres (Mexico), Peter Lindblad (Sweden), Roy Osborne (R.S.A.) and other academics. Also participating are well-known cycadologists Loran Whitelock, Ian Turner, Bruce Bursey, Cynthia Giddy and many others. Any enquiries at this stage should be directed to Mr Sclavo at Villa 'La Finca', Plateau du Mont Boron, 06300 Nice, France.

SPONSORSHIP

The Society gratefully acknowledges a do=nation from Messrs Honingklip Nursery and Book Sales towards the postage costs of this issue of ENCEPHALARTOS. Readers are referred to the sales brochure from our sponsor which is enclosed with those copies distributed to South African members.

EX PRESS

Treasured cycads ravaged by thieves

By ANDRE ERASMUS

THE removal of ancient cycads has incensed a well-known 1820 Settler descendant, Mr Stan Butt.

More than 60 cycads — some estimated at close on 1 000 years old — have been removed from his family land overlooking the banks of the Bushman's River and the police are investigating the theft of the endangered species.

And he is not the only resident in the area who has had these valuable plants stolen.

"Some of the cycads I recall from when I was a youngster," said 69-year-old Mr Butt "and even then they towered above me — now they have been removed, and some of the plants just wantonly hacked down and left lying in the bush."

Mr Butt has estimated the value of the stolen plants at more than R200 000. "But what is more upsetting is that these plants are part of our heritage and irreplaceable. Also there are seemingly badly planned laws allowing these plants to be sold.

"I can get a R200 fine if I am caught digging up my own plants, yet there are people who have permits to sell cycads.

"And I find it hard to accept that these people have grown their own plants as I've seen some of these plants on sale standing three metres high — these must be at least 100 years old.

"These plants were probably here when the 1820 Settlers — our forefathers — arrived."

Mr Butt said cycads were looked after and respected by earlier generations of settler stock in the area.

"My great-grandfather, who was one of the first people to settle in the Bushman's River area, has his grave in the town marked by a cycad. My father told me that the old people said these plants were so long-lasting they would make ideal tombstones — and that is how they were used in some cases."

Last week an upset Mr Butt took the Eastern Province Herald on a tour of the area from where the cycads had been removed.

Gaping holes in the thick vegetation on the banks of the Bushman's River showed where the cycads had once stood.

In more than one place cycads, stripped of their leaves and roots had just been left lying in the bush to die — probably too heavy to be carried away or left when the thieves were disturbed.

"We discovered the thefts when we came down to the river banks one Sunday for a braai," said Mr Butt.

"Our little dog started barking and we heard noises in the bush behind us as if people were running away.

"My son and I went to investigate and found a cycad which had been just been dug out of the ground and lying nearby a pick, spade and even some cigarettes."

Mr Butt said the matter was reported to the police and workers in the area had been questioned.

A search through the hilly banks revealed that many plants had been dug up and taken away and some plants chopped down and left to die.

"Perhaps the thieves were too lazy, or maybe they broke the roots off and then just left the plants. I don't know."

It appeared as if the thefts had been going on for some months, he said.

He complained that the "conservation people" did not seem over bothered by the theft.

The chief nature conservator of the Department of Nature and Environmental Conservation in Grahamstown, Mr Willem Smit, said although the matter was not being taken any further by his department, information gathered from a preliminary investigation had been handed to the police.

Mr Butt said that cycads were either male or female and indiscriminate separation of the plants could endanger their continued propagation.

Mr Butt said the thieving would not stop until and end was put to the legal sales of cycads by permit holders.

Eastern Province Herald, 16 February 1987

Two stole plants from Mitchell Park

Court Reporter

A 21-YEAR-OLD man who stole two cycads and 10 bromeliads from Mitchell Park between October 21 and November 14 was fined a total of R500 (or 10 months) by Mr L J van der Schyff in the Durban Magistrate's Court yesterday.

Barry Muller pleaded guilty.

The Court was told the cycads were worth between R300 and R400 each.The value of the bromeliads was between R5 and R25 each. Muller had sold the plants for R950.

In addition to the fine Muller was also sentenced to a further four months' imprisonment, suspended for three years on both counts of stealing the cycads and to three months' imprisonment, suspended for three years, for stealing the bromeliads.

Appearing with him was 21-year-old Anthony Pape, who was charged with stealing the bromeliads in the company of Muller.

He pleaded guilty and was fined R150 (or 150 days). A further 150 days' imprisonment was suspended for three years.

Mrs T A Woker appeared for the State.

The Natal Mercury, 10 December 1986.

Man fined for theft of plants

Daily News Reporter

AN unemployed young man has been fined a total of R400 (or four months' imprisonment) for stealing two protected cycads from Mitchell Park.

Barry Muller (21) pleaded guilty before Mr L.van der Schyff in the Durban Magistrate's Court to stealing two cycads and 10 bromeliads between October 21 and November 14 this year.

He was fined R200 (or four months) on each of the two counts of stealing cycads. A further two months on each count was suspended for three years. He was fined R100 (or two months' imprisonment) for stealing the bromeliads. A further three months' imprisonment was suspended for three years.

Passing sentence, Mr van der Schyff said Muller committed three separate offences. He had ample time to consider the wrongness of his actions.

The cycads were protected species of plants. They were worth between R300 and R400 each. The other plants were worth between R5 and R25 each.

The magistrate said that thefts from the parks department were thefts from the general public because parks were for the benefit of the public.

The Daily News, 10 December 1986.

SAADBANK

Die volgende saad is nou beskikbaar: Encephalartos natalensis, E. villosus, E. ferox en Lepidozamia peroffskyana uit Australië. Die L.peroffskyana-saad is versamel aan die rande van die reënwoud wes en noordwes van Brisbane, in Nieu-Suid-Wallis. Dit is 'n pragtige spesie met lang, glansende blare.

DANIE NEL (Saadbankbeampte)
Bowkerweg 120
Escombe
4093
Tel. no. 031-442505

SEED BANK

The following seed is now available: Encephalartos natalensis, E. villosus, E. ferox and Lepidozamia peroffskyana from Australia. The L. peroffskyana seed was collected at the rainforest edges, west and north-west of Brisbane, in New South Wales. It is a beautiful species with long glossy fronds.

DANIE NEL (Seed Bank Officer)
120 Bowker Road
Escombe
4093
Tel. no. 031-442505

GIVE AND TAKE GEE EN NEEM

The exchange of plants is illegal in terms of the Plant Improvement Act. This act has however no bearing on the exchange of pollen and seeds and the unconditional donation of plants. Members are invited to use this column for offer's and requests in this connection.

The Nature Conservation Ordinances of the various provinces may however control the exchange and donation of seeds and plants and members are advised to contact their local provincial nature conservation office for information, permits, etc.

Persons who want to arrange overseas exchanges should consult the Department of Agriculture, Division of Plant and Seed Control. In this case import and export permits are usually required and a phytosanitary certificate is generally necessary.

The 'Give and Take' column is also available for requests concerning any other items of interest to members, e.g. books, photographs, etc.

Die ruil van plante is onwettig in terme van die Plantverbeteringswet. Hierdie wet het egter geen betrekking op die ruil van stuifmeel en saad en die onvoorwaardelike skenking van plante nie. Lede word genooi om hierdie kolom te gebruik vir aanbiedings en versoeke in hierdie verband.

Die Natuurbewarings-ordonnansies van die verskillende provinsies mag egter die ruil en skenking van saad en plante beheer en lede word aangeraai om met hulle plaaslike provinsiale natuurbewaringskantoor in verbinding te tree t.o.v. inligting, permitte, ens.

Persone wat oorsese ruilings wil reël moet met die Departement van Landbou, Afdeling Plant- en Saadbeheer in verbinding tree. In hierdie geval is invoer- en uitvoerpermitte gewoonlik nodig en 'n phytosanitêre sertifikaat word algemeen vereis.

Die 'Gee en Neem'-kolom is ook beskikbaar vir versoeke t.o.v. enige ander items wat vir lede van belang mag wees, bv. boeke, foto's, ens.

-Marion Debruyne (18 Jakkalsbessie Crescent, Phalaborwa, 1390; tel. no. 01524-2357) would like to buy mature large or medium-sized specimens of East African cycads, e.g. E. pterogonus, E. laurentianus, E.murunguensis, E. barteri, E. bubalinus, E. chimanimaniensis, E. hildebrandtii, E. munchii and E. concinnus.

-Roy Osborne (20 Maryvale Road, Westville, 3630; tel. no. 031-866953) would be very pleased to hear from anyone who has a few seeds of E. cupidus to spare.

-Erwin Schroeder (PO Box 3, Hermannsburg, 3508; tel. no. 03345-930) would appreciate any information on Encephalartos hybrids, for research purposes. Photographs showing cone and leaf detail, as well as a description of the plant, would be especially appreciated. If it is a natural hybrid, information on its area of origin would also be important. Should it be impossible to send photographs, portions of a leaf (top, middle, etc.) as well as cone scales would be welcome.

LETTERS BRIEWE LETTERS BRIEWE

Readers are invited to write to the editor (See address elsewhere.) Where applicable, experts will be asked to deal with specific questions.

Lesers word genooi om aan die redakteur te skryf (sien adres elders). Waar van toepassing sal kenners gevra word om spesifieke vrae te beantwoord.

Dear Sir

I was surprised recently to hear that the collection of cycad seeds in habitat is illegal. This is just another rule which is impossible to enforce. It will also have little value from a conservation point of view. The mortality rate of seeds and seedlings in natural conditions will probably be in the 95% region. Seeds are eaten or rot. Seedlings find themselves in 10 cm of soil on solid rock.

What is practical? What can be done to conserve cycads? Every province should establish nurseries in habitat areas. Mature specimen plants should be cultivated in secure and ideal conditions. Cones should be pollinated by hand to produce large quantities of seed. Seed should be propagated and seedlings made available to nurseries. Seedlings should be sold like ferns or roses. Availability will prevent exploitation of plants in their natural habitat. Availability will also make selling prices competitive and prevent exploitation.

I believe that the Hartbeeshoek nursery near Pretoria is moving in the right direction. The only problem is that their efforts are not adequate to cope with growing demands for seedlings. The result: high prices and exploitation by nurseries.

Conservation resources should be invested where a positive financial return can guarantee the growth of the conservation movement. If the state is not prepared to establish nurseries in habitat areas, they should actively encourage private enterprise to do so. Leasehold property could be made available in conservation areas. Mature field collected specimen plants must be provided on loan for propagation purposes. If mature specimen plants are not collected, seed will not be available. A shortage of seed and seedlings will naturally encourage poachers and under-cover market activities.

In the centre of Durban I witnessed a number of large female E. natalensis plants coning. One of the largest plants had four cones and could have produced over 1000 fertile seeds if pollinated by hand. No efforts were made to pollinate these cones or collect the seeds. The infertile seeds fell to the ground and were swept up and dumped on a compost heap.

I believe the time has come for conservation authorities to focus their time and energy on conservation. Patrolling a country the size of ours is virtually impossible. The emphasis should be on conservation and not on enforcement. Publicity given to thefts and legal action has a negative effect on conservation. Poachers become more determined and use more sophisticated methods to achieve their goal.

I recently imported South African succulent seeds from Germany. The seed was not available in South Africa. When are South African conservationists going to wake up to reality? Propagation from seed is conservation.

HARRY GERBER
CHAIRMAN, NATAL CACTUS AND SUCCULENT CLUB

CYCADS OF AUSTRALIA

by Len Butt

Macrozamia pauli-guilielmi

The type form of Macrozamia pauli-guilielmi occurs on sandy ridge country intermittently along the length of Tin Can Bay Road,and also in the country between Maryborough and Gympie. Some finds have also been made in the Rainbow Beach area. All specimens I have seen so far occur very close to the coast growing in the grey sandy wallum soil along with Banksia robur, Hakea gibbosa, and similar wallum plants.

M.pauli-guilielmi is one of a number of small Macrozamia species grouped in this Section Parazamia. The relatively few fronds (generally about three, but never more than about ten) measure only around 100 cm in mature plants, and although this plant is rather insignificant in its habitat the unusually pronounced spiral twisting of the rachis give the appearance that the pinnae radiate all around the frond. The pinnae are very slender, and under cultivation this feature could make this species a very desirable pot plant. Although the type subspecies is confined to south-east Queensland, there are two other subspecies of M. pauli-guilielmi. M. pauli-guilielmi subspecies plurinervia, the "Blackfellow's pineapple", is native to the northern New South Wales tablelands across to extreme southern Queensland. The petiole and rachis of every frond is spirally twisted but not as strongly as in the Queensland type form. The broader, stiffer, grey-green pinnae have reddish bases.

M. pauli-guilielmi subspecies flexuosa, the "Kangaroo nut", occurs on the New South Wales coast and in eucalypt forests from the west side of Lake Macquarie northward to the Manning River. The twist in the rachis is commonly two complete revolutions. With the subspecies M. pauli-guilielmi the white based pinnae are much more slender and longer than either of the other forms.

M. pauli-guilielmi with male cones.

Although the distinctive spiralling of the rachis of M. pauli-guilielmi is quite marked (at least in the Queens= land type form), there is quite a bit of variability. The form that occurs around the Elliot River near Bundaberg is different in structure. The M. pau= li-guilielmi at Tin Can Bay has very linear pinnae, sometimes only about 3mm wide, whereas the Bundaberg species has quite wide pinnae up to 5 mm. The spirals in the rachis are generally similar, but the number of fronds is about double the number of the Tin Can Bay form.

(Reprinted from "Australian Plants", Volume 13, no. 101, December 1984, with the kind permission of the author and the editor.)

M.pauli-guilielmi

FINANSIËLE VERSLAG

Die geouditeerde finansiële state van die Vereniging vir die periode 1 Januarie tot 31 Desember 1986 is gefinaliseer. Die balansstaat en staat van inkomste word hierby gepubliseer vir die inligting van ons lede. Kopieë van die volledige fi= nansiële verslag is versprei onder die lede van die Uitvoerende Komitee. Addi= sionele kopieë is verkrygbaar van ons President, Roy Osborne (Maryvaleweg 20, Westville, 3630). Die Vereniging bedank graag mnr. W.D. Nel vir sy vriendelike en baie deeglike aandag aan die oudite= ringsproses.

FINANCIAL REPORT

The audited financial statements of the Society for the period 1 January to 31 December 1986 have been finalised. The balance sheet and income statement are published herewith for the information of our members. Copies of the complete financial report have been distributed to all members of the Executive Commit= tee. Additional copies are available from our President, Roy Osborne (20 Maryvale Road, Westville, 3630). The Society is grateful to Mr W.D. Nel for his kind and most thorough attention in the auditing process.

THE CYCAD SOCIETY OF SOUTHERN AFRICA

BALANCE SHEET AS ON THE 31 DECEMBER 1986

	1986		1985	
	R		R	
CAPITAL EMPLOYED				
CAPITAL FUND ACCOUNT		2 764		980
Current Year	1 784		1 223	
Accumulated	980		(243)	
		2 764		980
EMPLOYMENT OF CAPITAL				
FIXED ASSETS				
Educational Equipment		61		
NETT CURRENT ASSETS		2 703		980
CURRENT ASSETS		3 069		1 230
Bank	2 400		1 230	
Petty Cash	144			
Stock	525			
CURRENT LIABILITIES		366		250
Prepaid Subscriptions	366		200	
Creditors			50	
		2 764		980

THE CYCAD SOCIETY OF SOUTHERN AFRICA

INCOME STATEMENT FOR THE YEAR ENDING 31 DECEMBER 1986

	1986	1985
	R	R
INCOME	7 176	4 267
Advertisements		265
Commissions	8	8
Donations	310	204
Donations-Seedbank	1 154	
Encephalartos: Back-copies	314	
Fundraising	70	
Interest Received	76	8
Subscriptions	5 244	3 782
EXPENDITURE	(5 392)	(3 044)
Depreciation	3	
Encephalartos	3 808	1 849
Entertainment	54	
Honorarium		50
Postage	477	527
Printing	359	259
Seedbank	425	65
Stationary	234	232
Travelling	32	62
NETT SURPLUS	1 784	1 223