ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

NO. 12

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EDITOR/REDAKTEUR

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VOORBLAD/COVER

Encephalartos ghellinckii

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EDITORIAL

If there is one message that should be conveyed by the Cycad Society and all its members, it is that the mere possession of a cycad in itself is not a good enough reason to acquire one. One wonders how many cycads have been unnecessarily removed from nature and how may cycads have been destroyed by persons with only one objective: to possess a cycad. When one drives through the suburbs of our towns and cities, one is struck time and again by the number of cycads which stand somewhere next to the pavement, uncared for, struggling and alone, often in a position totally unsuitable for that specific species. And those you see are only those who have survived; many others' destiny was the compost heap.

The message we should convey is that true cycad lovers derive much more from their cycads than merely possessing them, and put much more into their cycads than merely planting them. True lovers of cycads plant them in the

REDAKSIONEEL

As daar een boodskap is wat uitgedra behoort te word deur die Broodboom-vereniging en al sy lede, is dit dat die blote besit van 'n broodboom op sigself nie genoeg rede is om een te bekom nie. 'n Mens wonder hoeveel broodbome al onnodig uit die natuur verwyder is en hoeveel broodbome al vernietig is deur persone wat net een doel voor oë gehad het: om 'n broodboom te besit. As 'n mens deur die voorstede van ons dorpe en stede ry, word jy telkens getref deur die baie broodbome wat onversorg, sukkelend en alleen êrens langs 'n sypaadjie staan, dikwels op 'n plek wat heeltemal onvanpas vir dié betrokke spesie is. En die wat jy sien is maar net dié wat oorgebly het; baie ander se lot was die komposhoop.

Die boodskap wat ons behoort uit te dra is dat ware broodboomliefhebbers baie meer uit hulle broodbome put as net om hulle te besit, en baie meer in hulle broodbome insit as net om hulle te

EDITORIAL
- CONTINUED -

right place, ensure that the plants fit nicely into their garden design, look after their cycads, study their cycads, try to obtain fertile seed from their cycads and always try to learn more about cycads. We must make it clear to others that, if their interest stretches no further than possessing a cycad, they should rather not try to acquire cycads. Cycads are unique plants which deserve responsible treatment.

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 -

plant. Ware liefhebbers van broodbome plant hulle op die regte plek, sorg dat die plante mooi in hulle tuin-uitleg inpas, versorg hulle broodbome, bestudeer hulle broodbome, probeer om vrugbare saad van hulle broodbome te verkry en probeer altyd meer van broodbome leer. Ons moet dit aan andere duidelik maak dat, as hulle belangstelling nie verder strek as om 'n broodboom te besit nie, hulle liewer nie broodbome moet probeer bekom nie. Broodbome is unieke plante wat verantwoordelike behandeling verdien.

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.

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

VAN
DIE PRESIDENT,
REDAKTEUR,
NASIONALE
EN
STREEKKOMITEES

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

FROM
THE PRESIDENT,
EDITOR,
NATIONAL
AND
REGIONAL COMMITTEES

NUWE HOOFBESTUUR

Nominasies vir die direk-verkose posisies op die Vereniging se Uitvoerende Komitee het op 31 Oktober 1987 gesluit. Ses lede het nominasies ingestuur vir die posisie van President en agt vir die twee posisies van Komiteelid. Vyf van die nominasies vir President en vyf van die nominasies vir Komiteelede was egter ongeldig aangesien dit nie die kandidate se handtekeninge bevat het om toestemming te gee vir hulle nominasie nie.

Toe dit duidelik geword het dat geen geldige nominasie vir die posisie van President ontvang sou word nie, het Roy Osborne ingestem om vir 'n verdere termyn genomineer te word. Aangesien sy nominasie die enigste geldige een vir die posisie was, is hy dus onbestrede verkies.

Die enigste geldige nominasies vir die posisies van Komiteelede was dié vir Piet Vorster en Maans Kemp. Hulle twee is dus ook onbestrede verkies.

Die Oos-Kaapse Streektak het vir Frank Marx aangewys as verteenwoordiger op die Uitvoerende Komitee. Teen druktyd het die ander streektakke nog nie hulle verteenwoordigers aangewys gehad nie.

Sodra die Uitvoerende Komitee volledig gekonstitueer is, sal die Komitee dit oorweeg om verdere lede te koöpteer indien dit nodig geag word, en sal spesifieke take aan ampsdraers opgedra word. Volledige besonderhede oor die nuwe Komitee sal in ENCEPHALARTOS no. 13 gepubliseer word.

NEW EXECUTIVE

Nominations for the directly-elected positions on the Society's Executive Committee closed on 31 October 1987. Six members sent in nominations for the position of President and eight for the two positions of Committee Member. Five of the nominations for President and five of the nominations for Committee Members were invalid, however, as they did not contain the signatures of the candidates to give permission for their nominations.

When it became evident that no valid nominations would be received for the position of President, Roy Osborne agreed to accept nomination for a further term of office. As his nomination was the only valid one for the position, he was elected unopposed.

The only valid nomination for the positions of Committee Members were those for Piet Vorster and Maans Kemp. These two were therefore also elected unopposed to the two vacant positions.

The Eastern Cape Regional Branch has elected Frank Marx as representative on the Executive Committee. At the time of printing the other regional branches had not yet elected their representatives.

As soon as the Executive Committee has been fully constituted, the Committee will consider co-opting more members if they deem it necessary. Specific tasks will also be allocated to the office-bearers. Full particulars on the new Committee will be published in ENCEPHALARTOS No. 13.

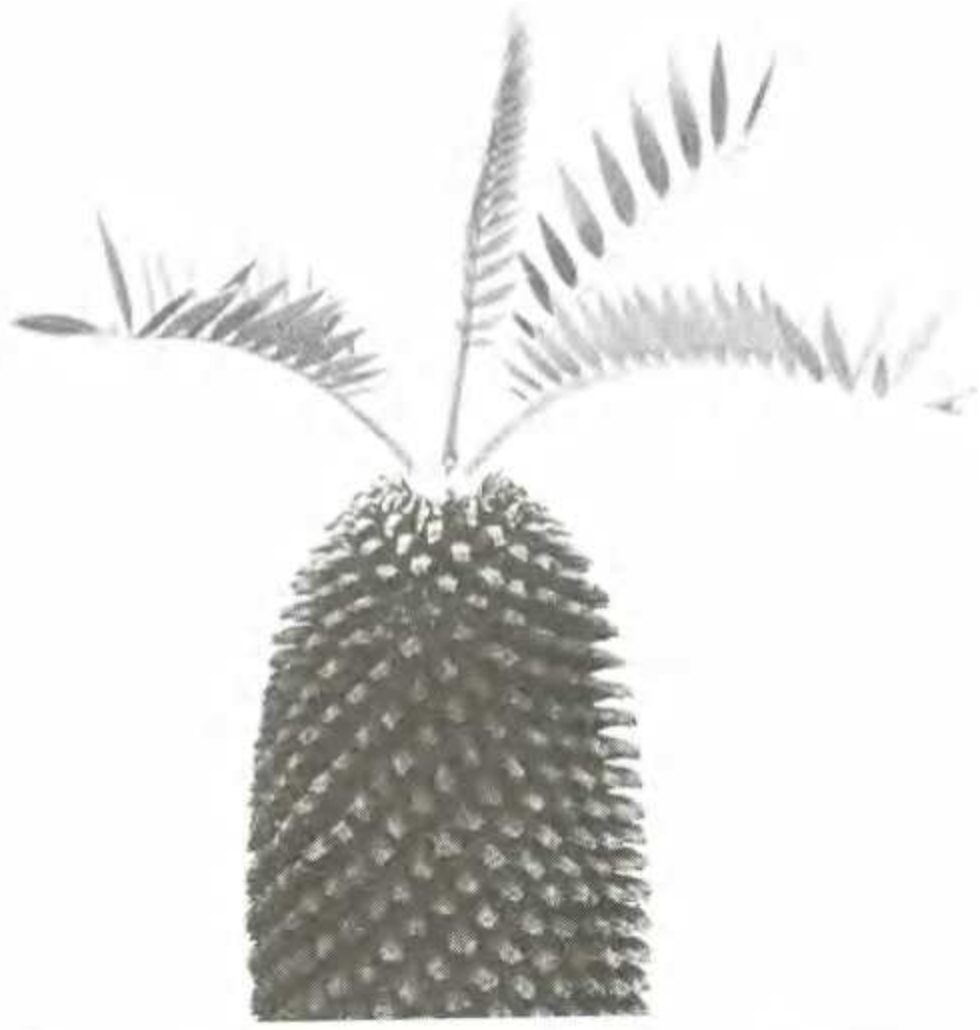
BITS AND PIECES STUKKIES EN BROKKIES

LEAVES ON CONES

Marion Debruyne's article on vegetative outgrowth from a female cone of Zamia furfuracea (ENCEPHALARTOS no. 11, p.16) has created a lot of interest.

Prof. Nat Grobbelaar of Pretoria has kindly sent us the accompanying photograph of a female cone of Encephalartos transvenosus, taken in the Modjadji Reserve, which shows distinct leaf outgrowths at its apex.

The other two photographs were kindly sent in by Dr Isabella Claassen, also of Pretoria. They show leaf growths from the top of a male cone of E. longifolius, the one taken when the cone was still closed and the other after the pollen had been shed. The plant grows in a garden in Villieria, Pretoria. After the cone had shed its pollen, the tip of the cone carrying the small leaves was cut off and planted. At this stage the axis was already brown and probably dead, and the little "plant" did not survive.



Leaf growths from male cone of E. longifolius

Leaf outgrowths on female cone of E. transvenosus

CYCAD POSTERS

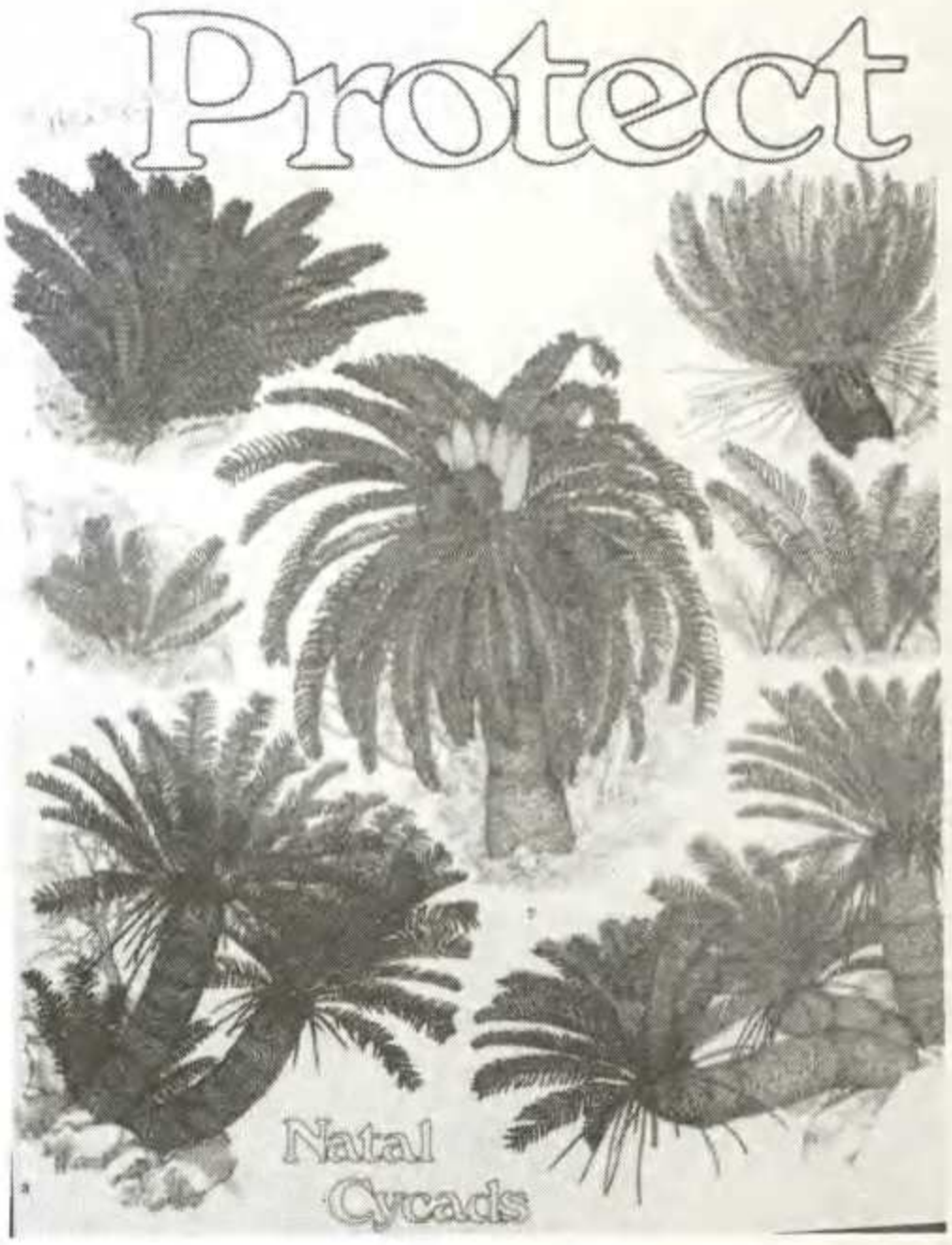
A series of four large colour posters, promoting cycad conservation, is being produced from the Durban Natural History Museum (see ENCEPHALARTOS no. 11, p. 24). The first of these, featuring the seven species of Encephalartos endemic in Natal, was released in September. With the title "Please Protect ... Natal cycads", the colour print measures 68 x 49 cm and is illustrated in detail with the aesthetically-delightful and scientifically-accurate drawings by local cycad artist, Douglas Goode. The production is a joint venture between the Durban Museum and the Natal Parks Board. Two similar posters, featuring Cape and Transvaal species, have since been printed in collaboration with the Cape Nature Conservation authorities and the Transvaal Museum respectively. A fourth poster, showing the different forms of Stangeria, is planned.

Copies of the first three posters are being sold at R5,00 each at the Durban and Transvaal Museums, while the Natal poster is also on sale from the offices of the Natal Parks Board in Pietermaritzburg. If any members are keen to obtain copies of these, but cannot buy them personally, the Society will arrange purchase and despatch. We require an advance payment of R7,50 per poster to cover purchase price, packaging and mailing costs. Overseas members are asked to submit US $7,50 or equivalent in view of the additional mailing costs.

Natal committee member, Robert Campbell (95 Everton Road, Everton 3610), has kindly offered to arrange this service and all orders should be sent to him directly. Cheques must be made out to the Cycad Society of Southern Africa.

NEW CYCAD BOOK

Member Knut Norstog has written to tell us that he has just spent two months in Bristol, U.K., where he has been collaborating with the staff of Bristol University on a new text on the Biology of Cycads. Members will be kept informed of the progress and publication of this book, which is certain to be an authoritative work on the subject.



Photograph of Natal Cycad Poster (Reproduced by kind permission of the Natal Parks Board.)

WEDDING BELLS FOR NANCY

Nancy Hammer, until recently Curator of Palms and Cycads at the Fairchild Tropical Gardens in Florida, U.S.A., is well known to many members of the Society (see ENCEPHALARTOS no. 8, p. 5). She now deserves our congratulations and best wishes on becoming Mrs Nancy Edmonson. Not satisfied with a simple taxonomic revision, Nancy is also undergoing continental drift - to take up a short-term position in Antananarivo, Madagascar, before settling with her husband in Nokomis, Florida, near the Selby Botanical Garden (another cycad mecca).

News from Fairchild Tropical Garden is that a particularly dry season has prevented coning of the rare Microcycas calocoma. Good news is that the Xamia skinneri plants, imported from Costa Rica, have become well established.

NEW CYCAD GARDEN UNDER WAY

Professor Hannes van Staden, Head of the Department of Botany at the Pietermaritzburg campus of the University of Natal, has informed us of his plans to establish a cycad garden in the Department's grounds. Starting with their modest collection of some 25 large specimens of local Encephalartos and Cycas species, Prof. Van Staden hopes to extend the collection to include five to six specimens of each species of Encephalartos. These would then ultimately become a source of pollen and seeds, apart from their use for various research projects by the University.

A new site of about 5 hectares has been set aside for this development. The soil is fertile and well-drained, the site is gently sloping and fully enclosed within security fencing and is under the immediate control of horticulturist Alison Bengham.

Prof. van Staden has asked us to announce that he would be most grateful if any members were able to donate any cycad specimens to his Department. Following his request, a gift of 42 plants has already been made by a Natal member of the Society. Prof. van Staden may be contacted at the Department of Botany, University of Natal, Pietermaritzburg 3200, or by telephone at 0331-63320.

PLASTIC NURSERY BAGS

Natal member Robert Campbell is arranging a bulk order of heavy-gauge black plastic nursery bags in the "Long Toms" style, these being particularly suitable for cycads and other plants with deep tap-root growth. The bags are 300 mm deep and will be either 100 x 130 mm or 100 x 75 mm in width. The order will be for delivery in mid-January 1988.

Robert has kindly offered to make quantities of 100 available to members at R12,00 per 100, which allows for GST, packaging and postage. Any excess over cost will be donated to the Society. Members interested in obtaining these bags are invited to contact Robert at 031-742774, or by writing to him at 95 Everton Road, Everton, 3610.

HEAT PRODUCTION IN CYCAD CONES

The phenomenom of heat production in cycad cones has been known for some years and has long warranted a more detailed scientific study. This work has now been most adequately carried out by member Willie Tang and is reported in the "Botanical Gazette" (vol. 148, no. 2, pp. 165-174, 1987). This paper will undoubtedly stand as the authoritative document on the subject and represents a major contribution to cycad biology.

In a brief resumé of the report, the following points are abstracted:

Significant temperature increases were found in 42 out of 43 species, including representatives from all 10 cycad genera. (The exception was Stangeria eriopus where pollen release occurs over a much more extended time period). In virtually all examples, the male cones often reached temperatures of 10 degrees C or more above ambient temperatures. These temperature peaks followed a circadian rhythm, reaching a maximum in the late afternoon or early evening, and usually lasting for 1 to 5 hours. The heating is co-incident with the time of cone axis elongation and with pollen release, and was found to occur in both intact cones and those cut and monitored under laboratory conditions. The highest and most sustained temperature rises were found in the larger cones like those of Encephalartos and Dioon, and were much less dramatic in small cones like those of Zamia. The site of heating appears to be located in the sporophylls where high concentrations of starch granules are found in the cells.

The heating effect is also observed in female cones but is not as widespread and does not show such high temperature increases.

Willie also reports that virtually all cones release sweet, resiny or musty odours at the time of heating. Both the heating and the odour release phenomena are seen to be associated with insect-pollination mechanisms.

CYCAS "COX PENINSULA"

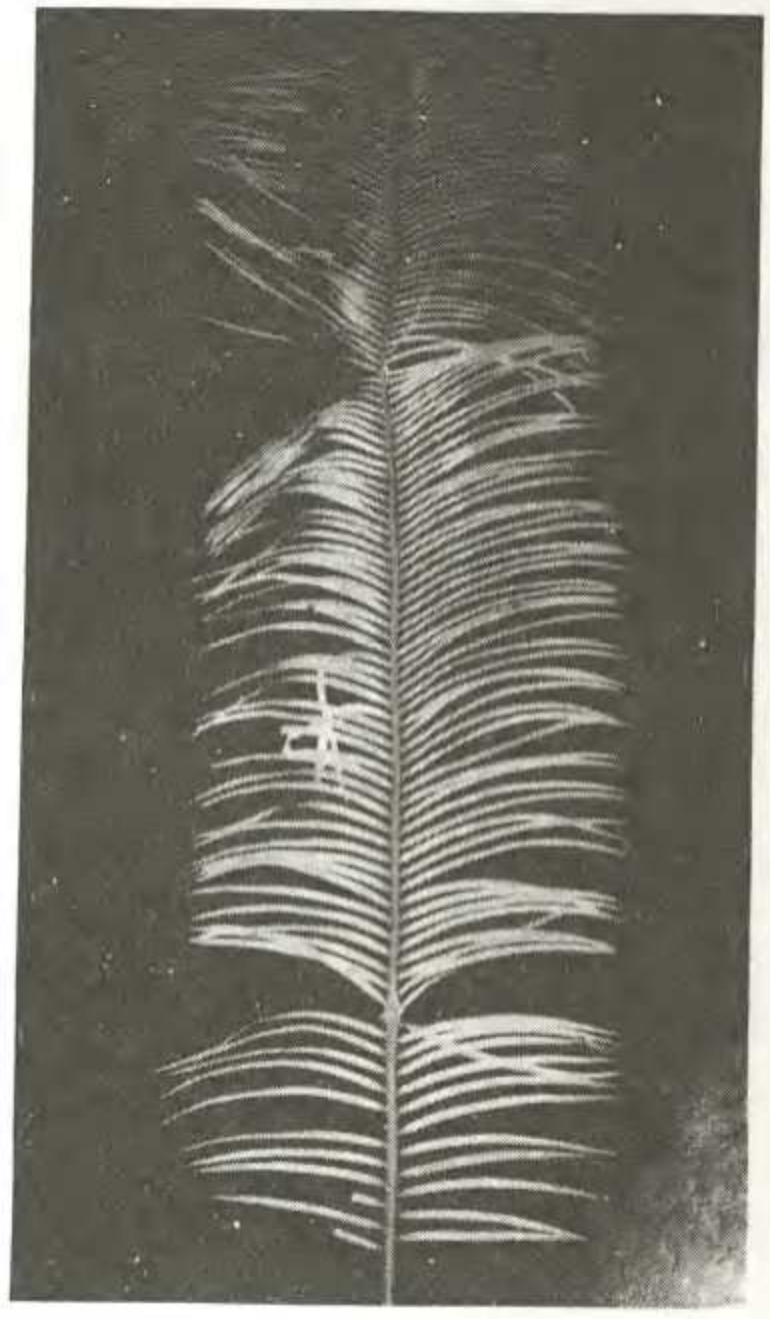
A new variety of Cycas, rather similar to Cycas armstrongii, has been located at the Cox Peninsula, some 20 km south-west of Darwin, Northern Territory, Australia. Len Butt and Don Stallard have written to tell us that the new cycad, temporarily called Cycas "Cox Peninsula", is well-distributed over many hectares in a high-rainfall (1500 mm p.a.) tropical woodland. It shares its habitat with Pandanus, Eucalyptus and Planchonia species and occurs as close as 100 m from the beach.

Trunks of this plant average about 2,3 m in height and about 15 cm in diameter and exhibit branching. The blue-grey deciduous leaves, occurring at about 40 per flush, extend to 1,1 m in length and have spines on the petiole.

Don Stallard has been doing much useful botanising in the Northern Territory and his work has resulted in the clarification of the conservation status of several species.

The accompanying photographs have been supplied by Len Butt.

Male cone of Cycas "Cox Peninsula"



Frond of Cycas "Cox Peninsula"

CERATOZAMIA LEAF PIGMENTS

Members who have grown plants of Ceratozamia will be familiar with the attractive and characteristic red-brown colours shown by the juvenile leaves. Italian workers Franco Cardini, Mauro Ginanneschi and Antonio Selva from the University of Florence, and Mario Chelli from the Milan Politechnik, have teamed up to make a detailed chemical study of this leaf pigmentation. Their report on an investigation into the pigments of C. fuscoviridis (a form of C. mexicana) and C. kuesteriana has just been published in the journal "Phytochemistry" (vol. 27, no. 4, pp. 2029-2031, 1987). After much painstaking preliminary separatory work, the principal component of the pigment has been isolated and identified. It is a rare secocarotenoid called semi-Beta-carotenone and is chemically related to the better-known carotene plant pigments. The compound has never before been found in any leaf tissues and was, until now, known only to occur in the fruits of a citrus plant, Murraja exotica.

LEWE EN DOOD

Die meegaande foto, ingestuur deur dr. Isabella Claassen (Departement Plantkunde, Universiteit van Pretoria, Pretoria, 0002), toon 'n Encephalartos altensteinii-plant se reaksie op weerskade. Gedurende die nag van 13 Julie 1985 het 'n deel van Pretoria "swartryp" gehad en die plant, wat in 'n tuin in Waterkloof groei, se blare het almal doodgegaan. In die middag van 1 November 1985 is die gebied deur 'n vernietigende haelbui getref, met haelkorrels so groot as gholfballe. Toe die plant weer blare stoot, het daar oral op die stam klein sytakkies begin ontwikkel, asook twee suiers aan die basis. Toe die foto geneem is, het dr. Claassen 23 sytakkies aan die stam getel. Die eienaars het toe reeds 'n verdere 20 sytakkies afgebreek en geplant, maar almal het doodgegaan. Dr. Claassen vra raad oor hoe die sytakkies verwyder en geplant kan word.

(Lede wat raad het, kan direk met dr. Claassen in verbinding tree. Aangesien sulke inligting ook vir ander lede van belang mag wees, sal ENCEPHALARTOS baie belangstel om dit te publiseer. Sien ook die artikel "Sex change in Cycas revoluta" in ENCEPHALARTOS no. 2, p.24, waarin 'n soortgelyke ontwikkeling vermeld word - REDAKTEUR.)

NEW NERVE POISON FROM CYCAS CIRCINALIS

In a recent report in the Journal "Brain Research" (vol. 410, no.2, pp. 375-379, 1987), research workers Peter Nunn, Mary Seelig, Joy Zagoren and Peter Spencer of New York's Albert Einstein College of Medicine, report that the compound Beta-N-methylamino-L-alanine (BMAA) is found in the seeds of Cycas circinalis. This has been found to cause a nerve disorder and may be associated with the problem of amyotrophic lateral sclerosis found in certain populations who have used these seeds as a foodstuff (see ENCEPHALARTOS no. 1, pp. 16-18).

ARCHIMEDES

Ons bedank graag, namens die Broodboomvereniging, die redaksie van die tydskrif "Archimedes" ('n publikasie van die Stigting vir Opleiding, Wetenskap en Tegnologie) vir die publisiteit wat in uitgawe no. 29:3 van 1987 aan die Broodboomvereniging verleen is. Die welwillendheid word waardeer.

Small branch shoots on stem of E. altensteinii formed after damage to the plant by frost and hail.

Op ons beurt herdruk ons graag elders in hierdie uitgawe inligting oor ander verenigings waarin ons lede mag belangstel. Hierdie inligting het, saam met die oor ons Vereniging, in die uitgawe van "Archimedes" verskyn.

SHOPPING LIST

1. 4 kg pool chlorine (including sales tax) R22,00

2. Meal in restaurant (including indigestion) R25,00

3. Bottle of whisky (including hangover) R18,00

4. Carton of cigarettes (including smoker's cough) R14,00

5. Membership of Cycad Society (including four copies of ENCEPHALARTOS) R20,00

INSECT POLLINATION IMPLICATIONS

by Stephen Compton

As we have seen in recent issues of ENCEPHALARTOS, there is growing evidence for insects having a role in the pollination of cycads. Conclusive evidence for insect pollination of the Southern African species is not yet available, but Rattray as early as 1913 believed that insects were involved in the pollination of Encephalartos. Insect and wind pollination are not mutually exclusive, however, and both may eventually prove to be significant.

The most likely pollinators of Southern African Encephalartos appear to be elongate weevils of the subfamily Rhynchophorinae. Larvae of these species feed in the scales of cycad cones, but do not appear to damage the seeds. Adult weevils may visit male cones mainly to feed on pollen, then visit female cones to lay their eggs, transmitting pollen as they do so.

If Southern African cycads are mainly insect-pollinated, this may have interesting consequences for natural populations of the plants. With the reductions in size of cycad populations, the distances between individual plants may well have increased. Increased isolation will be a more damaging situation for the cycads if they are wind-pollinated than if insects are involved. This is because weevils, for example, will be able to home in on even very isolated plants, bringing pollen with them, whereas random pollen transport by wind could be ineffectual at low plant densities.

As far as we know, the rhyncophorine weevils on cycads are found on no other types of plants. These beetles may prove to be even more host-specific, with some species restricted to certain cycads. Pollinator specificity could then be a factor that limits hybridisation between cycad species found growing together under natural conditions. This is the case with many orchids, where artificial hybrids are easy to produce, yet occur rarely in nature.

We know almost nothing about the interactions between populations of cycads and their associated insects. It is already too late to do so with several very rare species. The preservation of both our cycads and their unique insect faunas deserves our support.

(Dr Compton's address: Department of Zoology and Entomology, Rhodes University, Grahamstown 6140)

NURSERY NEWS

We have been informed by the Kangwane Parks and Environmental Affairs Board that they will shortly be in a position to offer Encephalartos paucidentatus seedlings to members of the Society at R20,00 each. Applications are limited to four per person and must be addressed to: The Director, Kangwane Parks and Environmental Affairs Board, PO Box 1990, Nelspruit 1200.

The Board is also actively progagating E. heenanii plants and will advise us when these too become available. We are indebted to Dr Anderson, Director of Nature Conservation of Kangwane, for his kind co-operation with the Society.

FROM THE PRESIDENT

ENCEPHALARTOS No. 12 sees the end of the third complete year of activities of your Society. The year has been a busy period of consolidation and growth. Finances are more or less within budget - the annual statement is expected to be available for publication in ENCEPHALARTOS No. 13.

Membership numbers approach a total of 600, some 200 up from the corresponding figure last year. Of our members, just over 100 are overseas cycad enthusiasts.

Sad news for the Society and all cycad-lovers was the death of Dr R.A. Dyer, honorary life member of our Society. Dr Dyer is survived by his daughter, Rosemary, two sons, Michael and Tristan, and grandchildren, to whom we offer our sincere condolences. We ask all our members and other readers of this page to pause for a few moments in quiet respect appropriate to Dr Dyer's memory. An orbituary appears elsewhere in this edition.It is also my sad duty to inform you of the death of member Ria Bell of Lynn East. We express our condolences to her family and friends.

Your committee has decided that the membership fee for 1988 should be R20 for local members and U.S. $20 or equivalent for overseas members. In an attempt to prevent the previous protracted difficulties in obtaining prompt payments, all members will shortly be invoiced for subscriptions. Please treat this as urgent and note that the membership of defaulters automatically lapses at the end of March, which also means that no further copies of ENCEPHALARTOS will be sent to them.

Good news for members in the South Eastern Transvaal is that plans are a little further advanced with respect to the formation of a new Regional Branch in that area. Ben Visser is acting as co-ordinating officer and any members

VAN DIE PRESIDENT

Die verskyning van ENCEPHALARTOS no. 12 beteken die einde van die derde volle jaar van aktiwiteite van u Vereniging. Hierdie jaar was 'n besige tydperk van konsolidasie en groei. Finansies is min of meer binne begroting - die jaarverslag behoort beskikbaar te wees vir publikasie in ENCEPHALARTOS no. 13.

Die ledetal nader 'n totaal van 600, ongeveer 200 meer as die vergelykende syfer verlede jaar. Van ons lede is net meer as 100 oorsese broodboomentoesiaste.

Slegte nuus vir die Vereniging en alle broodboomliefhebbers was die dood van dr. R.A. Dyer, ere-lewenslange lid van ons Vereniging. Dr. Dyer word oorleef deur sy dogter, Rosemary, twee seuns, Michael en Tristan, en kleinkinders, aan wie ons ons opregte meegevoel oordra. Ons vra al ons lede en ander lesers hiervan om vir 'n paar oomblikke stil te raak in stille respek vir dr. Dyer se nagedagtenis. 'n Doodsberig verskyn elders in hierdie uitgawe. Dit is ook my ongelukkige plig om u in kennis te stel van die dood van lid Ria Bell van Lynn East. Ons meegevoel gaan aan haar familie en vriende.

U komitee het besluit dat die ledegeld vir 1988 R20 sal weer vir plaaslike lede en VSA $20 of ekwivalent vir oorsese lede. In 'n poging om die voormalige uitgerekte probleme te voorkom om ledegeld betyds in te kry, sal alle lede binnekort fakture vir ledegeld ontvang. Beskou dit asseblief as dringend en let daarop dat die lidmaatskap van persone wat nie betaal nie, outomaties aan die einde van Maart verval, wat ook sal beteken dat geen verdere kopieë van ENCEPHALARTOS aan hulle gestuur sal word nie.

Goeie nuus vir lede in die Suidoos-Transvaal is dat planne met betrekking tot die stigting van 'n nuwe Streektak vir die gebied 'n bietjie verder gevor-

willing to become involved with the administration of this branch should contact him at 31 Troupand Street, Brits, 0250 or by telephone at 01211-20151 (W) or 01211-22928 (H).

As this will be the final ENCEPHALARTOS issued under the auspices of the present Executive Committee, it is appropriate for me to express the appreciation of all members to the outgoing Executive and Regional Committee members and other helpers for their various contributions to the functioning of the Society over the 1986/87 period. Without this valuable team of workers, there would be no Society and no ENCEPHALARTOS. We wish the incoming office-bearers well. May the Society continue to grow as steadily and surely as the plants we all cherish so dearly.

ROY OSBORNE

der het. Ben Visser tree as koördinerende beampte op en enige lede wat gewillig is om by die administrasie van hierdie tak betrokke te raak, word gevra om met hom in verbinding te tree by Troupandstraat 31, Brits, 0250 of telefonies by 01211-20151 (W) of 01211-22928 (H).

Aangesien hierdie die laaste ENCEPHALARTOS is wat onder die beskerming van die huidige Uitvoerende Komitee verskyn, is dit vir my gepas om my waardering te betuig aan al die lede van die uittredende Uitvoerende en Streekkomitees en ander helpers vir hulle verskillende bydraes tot die funksionering van die Vereniging gedurende die 1986/87-periode. Sonder hierdie waardevolle span werkers sou daar nie 'n Vereniging en 'n ENCEPHALARTOS wees nie. Ons wens die intredende ampsdraers alles van die beste toe. Mag die Vereniging aanhou om net so bestendig te groei as die plante wat vir ons so na aan die hart is.

ROY OSBORNE

FROM THE BOOKSHELF

LIST OF SOUTHERN AFRICAN PLANTS

A "List of Species of Southern African Plants" was first published in 1984 and was found to be an invaluable reference work to scientists and laymen with an interest in our local flora (about 24000 named species and subspecies). To update and extend this list, incorporating all current name changes, the Botanical Research Institute has now brought out a second edition in two parts:

PART 1, detailing the Cryptogams, Gymnosperms and Monocotyledons, constitutes no. 51 of the "Memoirs of the Botanical Survey of South Africa" (1985).

PART 2 deals with Dicotyledons and is no. 56 of the "Memoirs" (1987).

The 28 Southern African species of Encephalartos and Stangeria eriopus, together with their authors and the computer numbers on the BRI's PRECIS database, are found on page 41 of Part 1.

Dr B. de Winter, Director of the BRI, comments: ... 'The "List of Species of Southern African Plants" is essentially a precursor to the "Flora of Southern Africa" and will have to be used until the "Flora" is complete. The concept of maintaining the computerised list and publishing the annual summary of name changes in "Bothalia" is, as far as is known to me, a service rendered to biological researchers and other users of plant names which is unique in Southern Africa. All those who have assisted in its creation are to be congratulated on the establishment of a botanical aid of great value to taxonomists, ecologists and biologists in general.'

The two volumes of the second edition are available at the modest prices of R5,30 and R20,85 respectively (plus GST, but post-free), from the Director of Agricultural Information, Department of Agriculture and Water Supply, Private Bag X144, Pretoria 0001.

☆ R.A. DYER ☆

by Piet Vorster

Dr. R.A. Dyer, honorary life member of this Society, passed away on the evening of Sunday, 25 October 1987; just over a month after his 87th birthday.

Robert Allen Dyer was born on 21 September 1900 in Pietermaritzburg where he attended school and later enrolled at the University, where he was awarded the D.Sc degree in 1937 for a botanical survey of the Grahamstown and Bathurst districts.

He started his professional career in the employ of a sugar company in Zululand, where he contracted malaria rather badly. In 1925 a friend from his student days drew his attention to a vacancy at the Division of Botany, which was the forerunner of the present Botanical Research Institute. Without a moment's hesitation he applied for the position and, on appointment, was stationed at the Albany Museum Herbarium in Grahamstown. Although he was new to the disciplines of systematic botany and ecology, the mere six years which he spent at Grahamstown were incredibly productive. Apart from his primary curatorial duties he managed to complete a botanical survey of the district, which he used for his doctoral thesis, and he did much fieldwork on the succulent Euphorbieae which served as basis for "The succulent Euphorbieae" published in 1941 in collaboration with A. White and B.L. Sloane. From 1931 to 1934 he was the South African liaison officer at the Royal Botanic Gardens, Kew. On his return to South Africa he was transferred to the National Herbarium in Pretoria where in 1944 he became chief of the Division of Botany. While directing this institution he produced a steady stream of shorter publications, but those years are mainly memorable for the firm foundation laid for the future Institute: he started the Botanic Garden, worked tirelessly towards better facilities,

DR R.A. DYER

which culminated in the new headquarters building which was erected in the Botanic Garden in the early 1970's, and he initiated the publication series "Flora of Southern Africa" of which the first volume appeared in the year of his retirement.

After retirement in 1963 Dr Dyer stayed on the staff, and it was during these post-retirement years that he made his most visible contribution to South African botany. Throughout his administrative career he maintained an interest in plant groups such as the succulent Euphorbia species, Amaryllidaceae (especially Cyrtanthus and Brunsvigia), Pelargonium, succulent and tuberous Asclepiadaceae, and of course Encephalartos, and kept notes on these groups. Once freed from the burdens of running an institution, he was able to collate all this information and publications followed each other in rapid succession. Major milestones were "The cycads of Southern Africa" (Bothalia 8: 405--515; 1965) and the monumental

"Genera of Southern African flowering plants" (vol. 1, 1975; vol.2, 1976). By the early 1980's he considered his life's work largely complete and, in typical neat fashion, started tidying up his affairs. His final major contribution was an extended and beautifully illustrated account of the genera "Ceropegia, Brachystelma and Riocreuxia in Southern Africa" (1983), based on his account in the "Flora of Southern Africa", vol. 27, part 4 (1980). One of his very last publications was a revised edition of his "Review of the genus Cyrtanthus" which first appeared in 1939, incorporating the notes which he had kept meticulously over the 45 years since its first appearance. In all, his publications amount to between 400 and 500 titles. In 1971 he was awarded the first gold medal of the South African Association of Botanists, the citation describing him as "The doyen of South African Botanists".

There is no evidence that he was particularly interested in the cycads while stationed in the Eastern Cape where they are such a conspicuous feature of the vegetation. Yet he must have been aware of the taxonomic problems which they presented, as in the early 1950's he went back to these areas to study the cycads in the field. His first positive involvement with the cycads was in 1945 when he and Dr. Verdoorn started field work on what was finally in 1951 described as Encephalartos natalensis. The same year saw the description of E. umbeluziensis, while E. arenarius was described in 1965 and E. inopinus in 1964. These publications were the results of intense research during those years. At the time Dr Dyer expressed surprize at the discovery of a species as striking as E. inopinus at such a late stage in the botanical exploration of South Africa. By the time "The cycads of Southern Africa" was published in 1965 he did not consider further discoveries likely, but events were to prove him wrong. The immense enthusiasm evoked by "The cycads of Southern Africa" soon led to the disvovery of two more species, namely E. cupidus in 1971 and E. heenanii in 1972. A short visit by Dr Verdoorn and himself to Mr R.C. Münch of Rusape in order to view the latter's extensive collection of living plants from Rhodesia and Mozambique,

Dr Dyer admiring a specimen of E. eugene-maraisii (Reproduced from BOTHALIA, vol. 8, supplement no. 1, May 1966, by kind permission of the editor and the Botanical Research Institute.)

led to the description of E. munchii, E. pterogonus and E. concinnus in 1968/69. After 1972 Dr Dyer had become so disillusioned by the personal greed and vanity displayed by so many people associated with cycads that he published no more new data or species. Miss M.D. Gunn, for many years librarian and historian at the Division of Botany, continued collecting information for the book on cycads which she kept hoping Dr Dyer would write one day, but nothing came of it.

Dr Dyer never had any cycads in his private garden. In fact, only two indigenous plants readily come to mind: a large Phoenix reclinata which he planted as a seed, and a Calodendrum capense. He was not vain, but every year when his Calodendrum flowered he would exhort all within earshot to come and see this extraordinary sight. Most of his vegetables he grew himself, and he once told me that he never had to buy a potato - his were growing everywhere in the garden, often amongst flowers. He was equally successful with artichokes and often presented colleagues with parcels of these. A matter of pride were his African Marigolds (Afrikaners). Years ago he bought a packet of seed and every year selected the best heads for seed, until he had the biggest and most spectacular Afrikaners in Pretoria. He also kept

fowls even when such things became forbidden in the municipal area. I vividly remember how in the 1970's, when a section of natural grassland in the Botanic garden was mown every year, he used to stuff his car with the harvested grass as bedding for his fowls. He was interested in bowls, in which he excelled, and he made various pieces of utility furniture which lasted for many years. He was fond of experimenting with jellies, and never tired of making first-class jellies from a variety of untried fruits. He used to do all his own photographic processing until he simply no longer had the time to do everything himself. I remember two beautiful and evocative photographs of his adorning the walls of his office and testifying to his skill: one of Encephalartos transvenosus which eventually became the frontispiece to "The cycads of Southern Africa", and a sepia-tinted portrait of a pretty granddaughter framed by a tree fork.

I don't think he ever collected botanical books as such, and he often chided me for wasting my money on botanical publications. Yet he had a special feeling for books, and many of his were covered with brown paper for protection. Obviously he enjoyed writing his own books, which were all written in a very attractive style. He was one of the trustees who set up a publication fund for publishing G.W. Reynolds' book "The aloes of South Africa", probably the first botanical book to be published in this way in South Africa. It will probably never be known to what extent he funded publications by others. He always had a special regard for the art of botanical illustration, as shown by his unstinting support for the series "Flowering plants of Africa" which he edited while Chief, and he was the driving force behind the production of Cythna Letty's "Wild flowers of the Transvaal". In recent years he patronized illustrated botanical works in no small way. He contributed substantially to publications such as Van der Walt and Vorster's "Pelargoniums of Southern Africa", was instrumental in the publication of Auriel Batten's beautiful "Flowers of Southern Africa" and, just before his death, once again committed himself to the production of a monograph on Dierama with text by O.M. Hilliard and B.L. Burtt, and illustrated by Auriel Batten, whom he recognized to be a botanical artist of great talent.

As a man Dr Dyer will firstly be remembered for his devotion to duty. This is exemplified by the amount of work which he achieved during his tenure at Grahamstown, the thorough groundwork done for the improvement of the Division of Botany when Chief, and by the way he served botany until past his 80th birthday. Even in the late 1970's he was almost always the last person to leave the Institute at the end of the day. During 1937 he got an opportunity to travel to the botanically virtually unexplored island of Tristan da Cunha on board a supply ship. He was on the island for only 48 hours during which he worked almost continuously collecting herbarium specimens in extremely rugged terrain, under sub-zero temperatures and in torrential rain driven by an antarctic blizzard. He once told me that this was the one occasion when he thought he would not see his home again. First and foremost he was a South African, and during the Second World War he joined the National Volunteer Brigade for guard and home protection duties. These were troubled years for the Division of Botany with staff members holding widely divergent political views. Realizing his personal inability to heal the rift, he asked a young girl on the staff whose exceptional qualities he had recognized, to try and unify the staff.

His humble, warm nature earned him many devoted friends. He made a point of being nice to any particularly coquettish girls on the staff, to the amusement of younger male staff members, and he comforted many a staff member who fell out of favour with the rulers of the establishment. Early in 1970 I brought him material of a cycad which I had discovered, which excited him very much. "Go tell Miss Verdoorn to come here immediately!", he shouted. Then, as I reached the door of his office, he called me back, saying: "Wait. Please ask Miss Verdoorn whether she could come by if she has a moment to spare."

He could also be very firm, such as when asked by Alain White to collaborate on "The succulent Euphorbieae" at a time when he had already done much research towards his own monograph on the group, on which occasion he insisted on being no less than second author. When in 1956 Bullock wanted to name a new genus in the Malvaceae Dyera after him, he insisted on having it named Radyera (after R.A. Dyer) to avoid confusion with W.T. Thistleton Dyer. To this day there are people who believe that he was responsible for the internment during the Second World War of a staff member with a "dangerously unpatriotic attitude". His ready but occasionally acerbic wit came to the fore during incidents such as the discovery of Encephalartos cupidus of which almost the entire known population was removed to the discoverer's premises for commercial purposes before the discovery was made known. The epithet means "desirous", "...the tarnished meaning of the specific epithet implying a passionate desire to the extent of greed or lust." On another occasion he wrote a most scathing letter to someone who had disappointed his trust and yielded to the temptation of commercializing his discovery, I am sad to say, of a cycad. Investigation of yet another very promising find was promptly terminated when the discoverer suggested that the species be called after him.

His last years were not without difficulties, though he never gave any hint of his problems. In 1970 he was struck down with coronary thrombosis while playing bowls, but miraculously he survived. Various major and minor operations followed. A very sad experience was the drawn-out death of his wife from an incurable disease. One day when she was in a particularly bad way, he said to me: " I cannot wish her to live longer". Still he used to visit the Botanical Research Institute at least once a week until his car got stolen a few years ago, leaving him immobile. Up to his final hospitalization he stayed in his house, where his last birthday was celebrated as an "open house" for his friends. He wrote that "it all went off most enjoyably". Some days later he was struck down by two heart attacks in rapid succession, from which he did not recover.

A full biography with a list of his publications, written by someone better qualified to do so than myself, is expected to appear in the next issue of "Bothalia".

REGIONAL NEWS STREEKNUUS

Oos-Kaap / Eastern Cape

Die jaarvergadering van die tak is op Saterdag, 7 November 1987 in die Setlaarspark in Port Elizabeth gehou. Na die vergadering het die lede en hulle gesinne gesellig saam vleis gebraai in die pragtige, rustige omgewing.

Tydens die vergadering is die volgende lede vir die volgende termyn tot die streektak se komitee verkies: Frank Marx (Voorsitter), Maans Kemp (Ondervoorsitter), Pieter Stroebel (Sekretaris/Tesourier), Grey Greyling, Olga Bovijn, Vernon Rathbone, Andries Jonker, Henry Abbott, Roy Clemence en Leon Vermaak. Frank Marx is as die streek se verteenwoordiger op die Uitvoerende Komitee van die Vereniging verkies.

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 GHELLINCKII

by Roy Osborne

INTRODUCTION

Encephalartos ghellinckii is perhaps one of the less appreciated of the South African cycads so far described in the series of "Focus On..." articles. The reason for this probably lies in the fact that it does not adapt as readily as other species of Encephalartos to the average garden or to glasshouse conditions. But E. ghellinckii is unique among the cycads in at least three ways: it is the only species of Encephalartos with leaflet edges rolled under (i.e. with "revolute" leaflets, like Cycas revoluta), it has a quite remarkable distribution in terms of altitudes, and it is the only cycad which has ever featured on currency (see the "flip side" of a South African R50 note, and the background to this as described in ENCEPHALARTOS no 2, p. 23).

DISCOVERY

E. ghellinckii was named by Prof. Charles Lemaire when he published a description of the plant in his "Illustration Horticole" journal in 1867 - the same magazine in which he wrote up the description of E. villosus (see ENCEPHALARTOS no. 10, pp. 16-23). Although we do not know for certain, it is probable that he obtained the specimens in the same way; i.e. that Curator M.J. McKen of the Durban Botanic Gardens sent samples to Ambroise Verschaffelt in Belgium, and that Verschaffelt in turn passed material onto Lemaire for examination. The question has previously been raised (ENCEPHALARTOS no. 1, p. 20) why Lemaire named the new species after one M. Ed. de Ghellinck de Walle, but it is now clear that the latter gentleman was a most highly-esteemed amateur botanist who interacted vigorously with European scientists. Ghellinck himself had a wonderful private plant collection at Wondelghem, near Ghent, in Belgium.

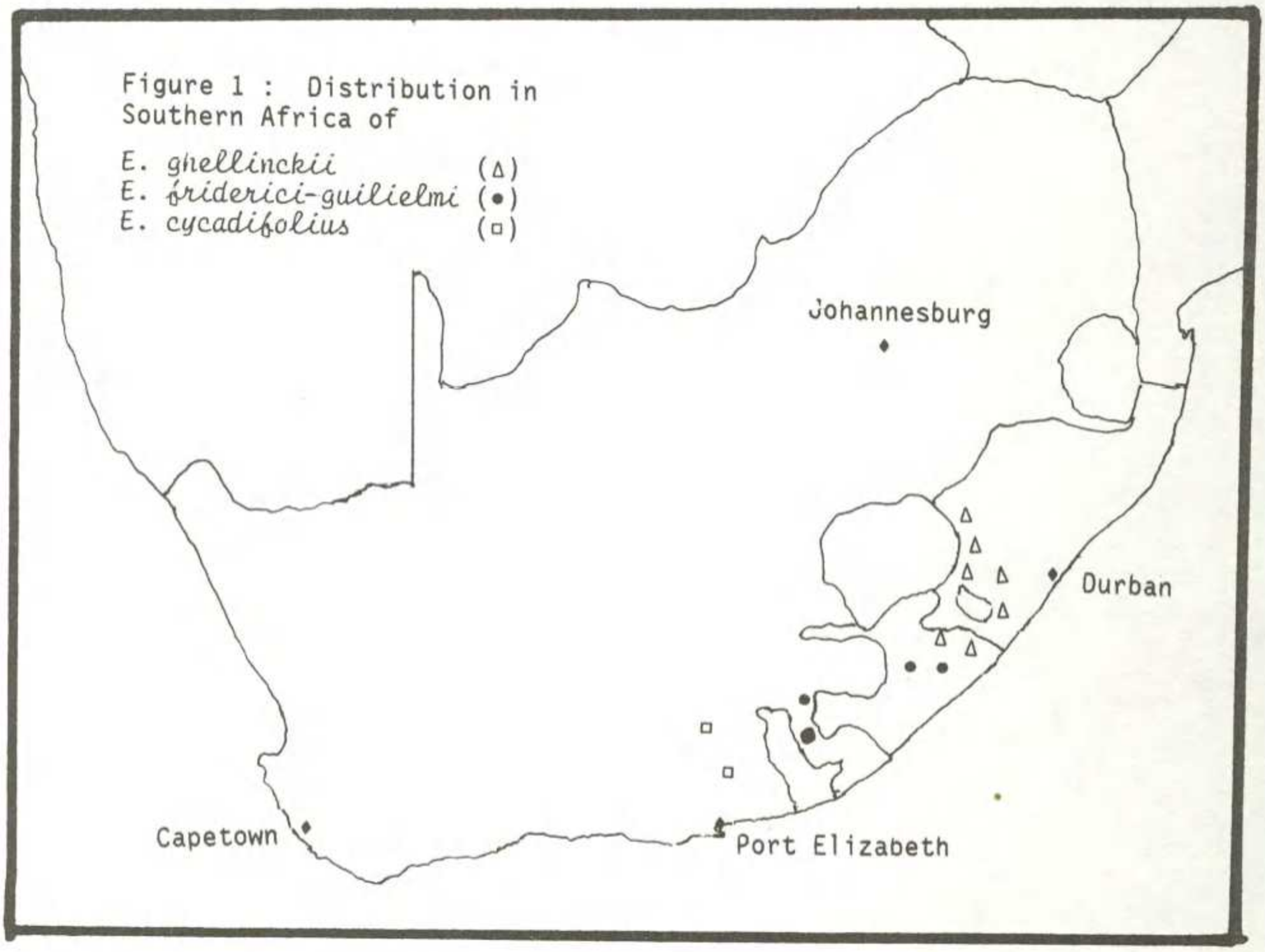
The species was first named unofficially as Zamia ghellinckii by Verschaffelt. In addition, it was at one time listed as E. gracilis, and was also regarded at one time as being synonomous with E. frederici-guilielmi (which at that time was called E. cycadifolius var. friderici-guilielmi!). The nomenclature was eventually sorted out, with the species being recognised as distinct, and Lemaire's description of 1867 being accepted as the valid botanical publication.

PRESENT DISTRIBUTION

The distribution of E. ghellinckii is remarkable in terms of the wide range of altitudes at which it is found. In the Transkei it occurs in grasslands in the Flagstaff and Tabankulu districts at just over 1000 m . In Natal stands are found at Izingolweni at 700 m and at other sites near the coast between Port Shepstone and Umzimto. Further north it occurs at between 1200 and 1800 m in the Natal midlands near Richmond, Bulwer, Bergville and Estcourt, again in grassy areas and often amongst rocky outcrops on south and east-facing slopes. In the Drakensberg mountains it is usually found at altitudes around 2000 to 2400 m, often immediately above and below sandstone cliffs and associated with the montane "fynbos" vegetation. Small groups are located from Giant's Castle in the south to the slopes of Mont-aux-Sources in the north, but undoubtedly the largest stands are those in the upper section of the Mlambonja Valley in the Cathkin area. Members of the Natal section of the Society will not easily forget the sight, nor the experience, of these prolific stands seen during the 18 km hike along the contour path above the Mlambonja valley in December 1984 (see ENCEPHALARTOS no. 1, p. 23).

Figure 1 : Distribution in Southern Africa of

E. ghellinckii (Δ)
E. friderici-guilielmi (•)
E. cycadifolius (□)



Like many of the grassland species, stands of E. ghellinckii are associated with a fire cycle. Periodic (usually natural) fires certainly seem to stimulate the production of new leaf flushes and may also be necessary for regular coning. Unfortunately an experiment to evaluate this aspect could not be concluded when access to the research site at the confluence of the Umkomaas and the Ncwadi Rivers was no longer feasible (see ENCEPHALARTOS no. 1, p. 5).

Because of the difficulty of re-establishing plants outside their habitat areas, specimens of E. ghellinckii are not as common as other cycads in botanic gardens internationally. However, plants have been successfully cultivated at Fairchild Tropical Gardens in Florida, at Huntington Gardens in California and at the Foster Gardens at Honolulu. Closer to home, specimens may be seen at Kirstenbosch, at the Botanic Research Institute and the University gardens in Pretoria and at Ewanrigg gardens near Harare in Zimbabwe.

DESCRIPTION

1. STEM

Initially plants of E. ghellinckii have single stems which eventually grow to a height of about 1 m and a diameter of 30 to 40 cm. Stem lengths may ultimately reach 3 m, but in these plants the stem usually leans, sometimes almost horizontally, and a number of basal suckers develop to give typically five or six trunks on the same rootstock. The stems terminate in open, brown, woolly crowns.

Figure 2: A large specimen of E. ghellinckii shortly after a veld fire. Fortunately the plants recover well from the temporary damage. Photographed in the Mlambonja Valley by Muriel Zonneveld.

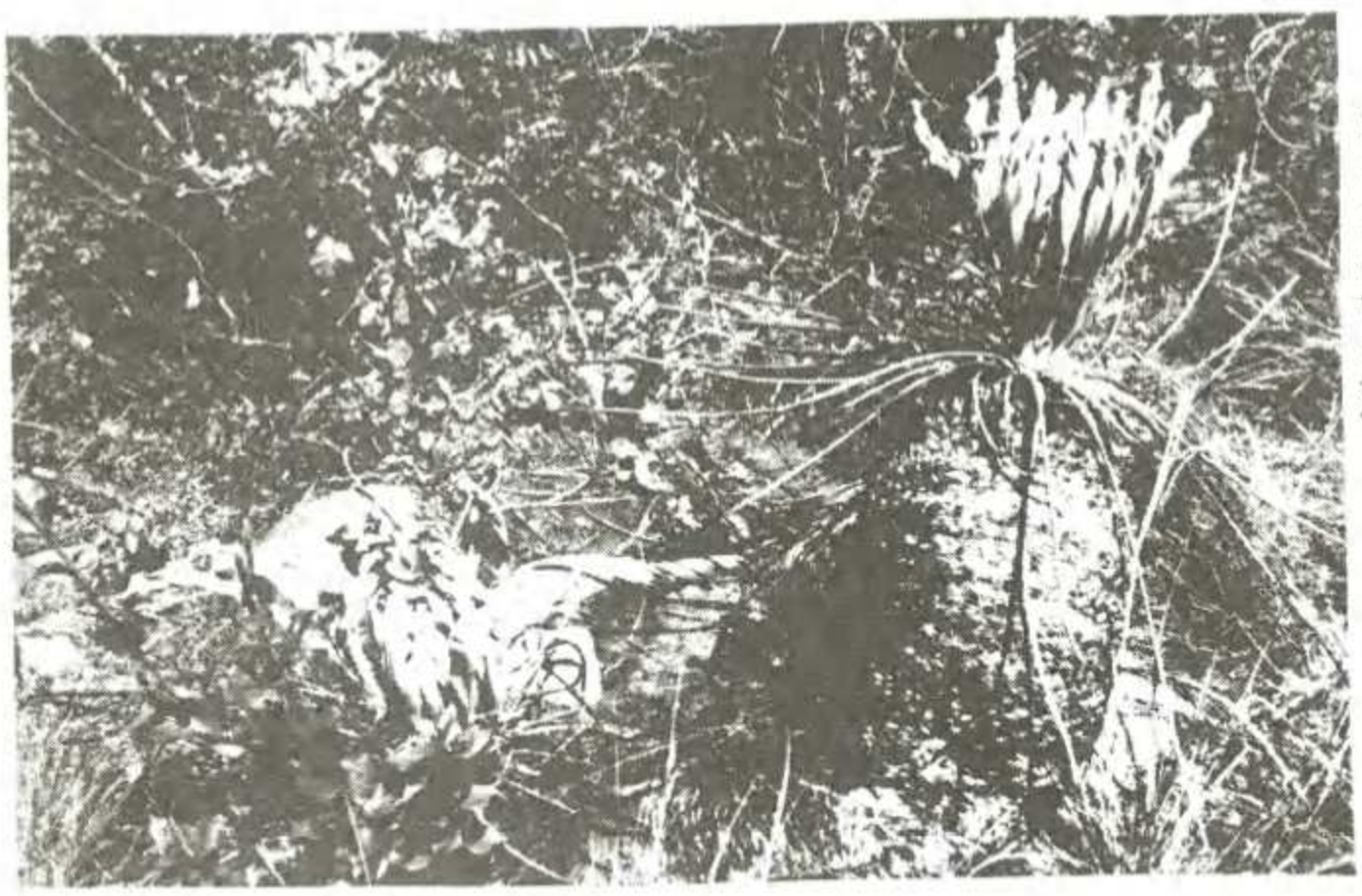


Figure 3: Healthy new leaf flushes occurring just a few weeks after fire had swept through this Winter's Valley stand of E. ghellinckii. Photograph by M. Huntley.

Figure 4: Part of the Natal Drakensberg showing, from left to right, Champagne Castel, Cathkin Peak, Sterkhorn and the Dragon's Back. E. ghellinckii occur on the slopes of the "Little Berg" in the foreground. Photograph by the author.

2. LEAVES AND LEAFLETS

Leaves are typically about 75 cm long and rarely exceed 1 m. The closely-packed leaflets are set into a stiff yellowish rachis at an inverted "V" angle of about 200 to 280 degrees, the whole leaf often being somewhat spirally twisted. Median leaflets are about 8 to 14 cm long and 2 to 4 mm wide, the edges characteristically rolled under to give the needle-like appearance which is a key criterion in the identification of this species. Both the leaflet insertion angle and the revolute margins are adaptations against the often bleak conditions (heavy snowfalls and desiccating winds) to which the plants may be exposed. Although sharply pointed at the ends, the leaflets are without spines or thorns but are reduced in size towards both upper and lower ends of the leaf. At the lower end the rachis becomes a bare petiole for about 20 to 25 cm, again without spines or prickles. The foliage is covered with a dense grey mat of hairs when young, which is soon shed to show the underlying dark green leaf colour.

There are characteristic differences in the leaves of the coastal and the Berg forms; the lower altitude plants having generally longer and narrower leaflets than those of their montane counterparts. However, the plants from the Natal midlands are intermediate in character and it seems that the whole taxon varies in a typically discontinuous distribution pattern between the low and high altitude extremes.

Figure 5: A mature specimen of E. ghellinckii at an altitude of 2200 m in the Cathkin area. This particular specimen had a procumbent trunk approximately 2 m long. Photograph by George Norval.

Figure 6: E. ghellinckii on the slopes of the "Little Berg" in the Cathkin area. Photograph by the author.

3. CONES AND SEEDS

E. ghellinckii plants bear up to five female or seven male cones on short stout peduncles, the cones being covered with a thick pale-brown mat of hairs. Male cones are 20 to 25 cm long, 6 to 7 cm in diameter, cylindrical and narrowing at each end, and often slightly curved. Female cones are about the same length, but 12 to 15 cm in diameter, and have a barrel-shaped appearance. The golden-yellow seeds measure about 3 x 2 cm. When the fleshy outer layer is removed, the irregularly three-sided inner shell is seen with numerous small grooves along its length. The dried seeds displace a volume of just over 6 ml, slightly greater than most other Encephalartos seeds. The seeds have the star-shaped micropyle and the heavily-pitted chalaza typical of all Encephalartos seeds.

AFFINITIES AND HYBRIDS

E. ghellinckii is thought to be related to E. friderici-guilielmi and E. cycadifolius. The distribution areas of the former two species just meet in the Transkei near Tabankulu, but no evidence of any natural hybrids has been recorded. Neither has there been any report of an artificial hybrid between E. ghellinckii and any other species.

Figure 7: Upper sections on leaves of E. ghellinckii. The leaf on the left, from a plant in the Izingolweni area, shows the smaller and more revolute leaflets than that on the right, from a plant in the Cathkin area. Photograph by the author.

CULTIVATION AND CONSERVATION

E. ghellinckii does not grow well away from its native habitat. In garden cultivation, transplanted specimens are slow to re-establish themselves and mature specimens rarely cone. Seeds of this species are not readily available, although seedlings would probably stand a better chance of survival in "artificial" habitats than mature plants. The high-altitude plants seem to be particularly unhappy in our warm, humid coastal gardens where other species of Encephalartos do so well.

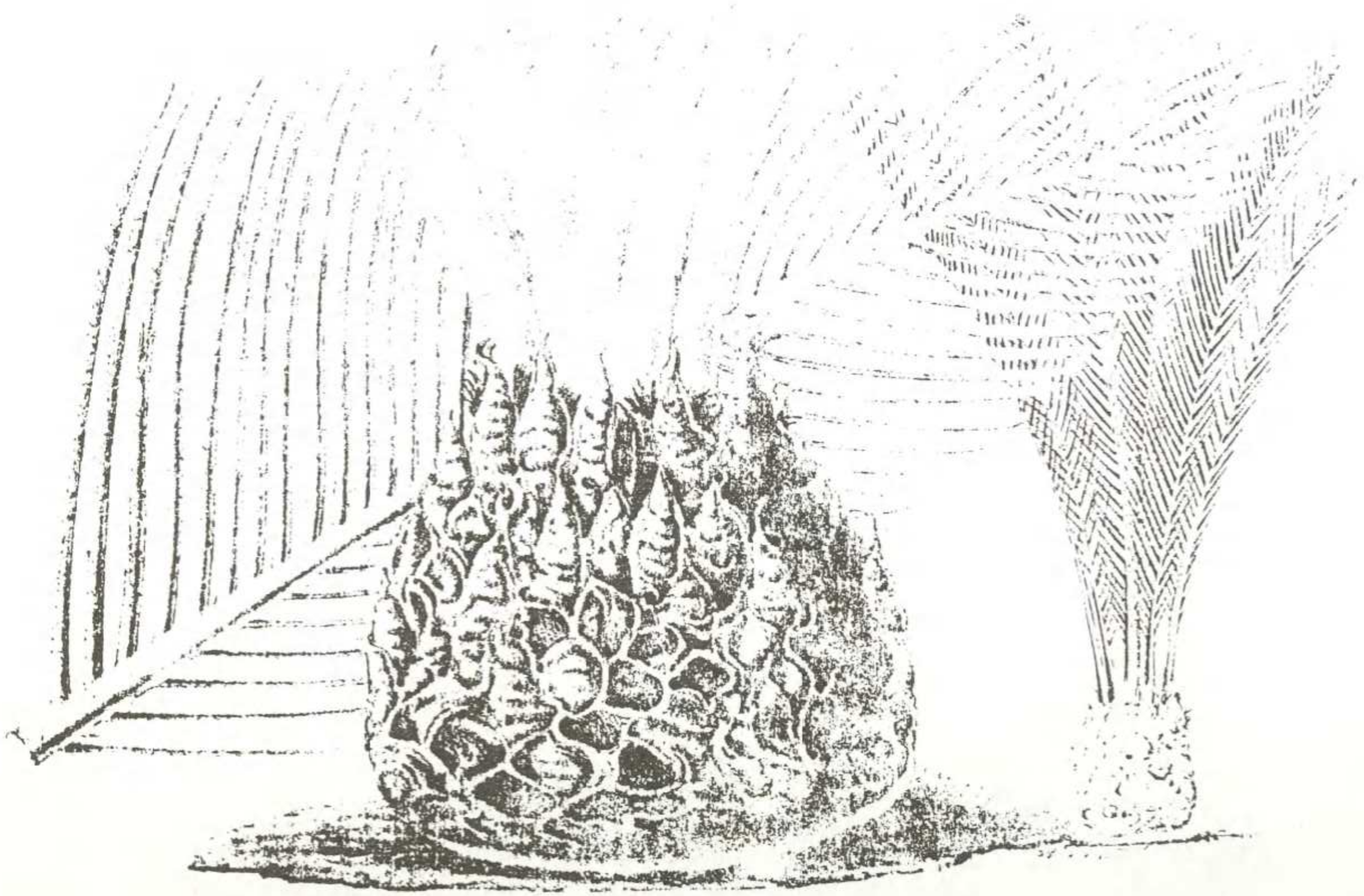


Figure 8: Copy of the original painting by P. Stroobant (1868) of a plant in Vershaffelt's garden on which Lemaire based his description of E. ghellinckii.

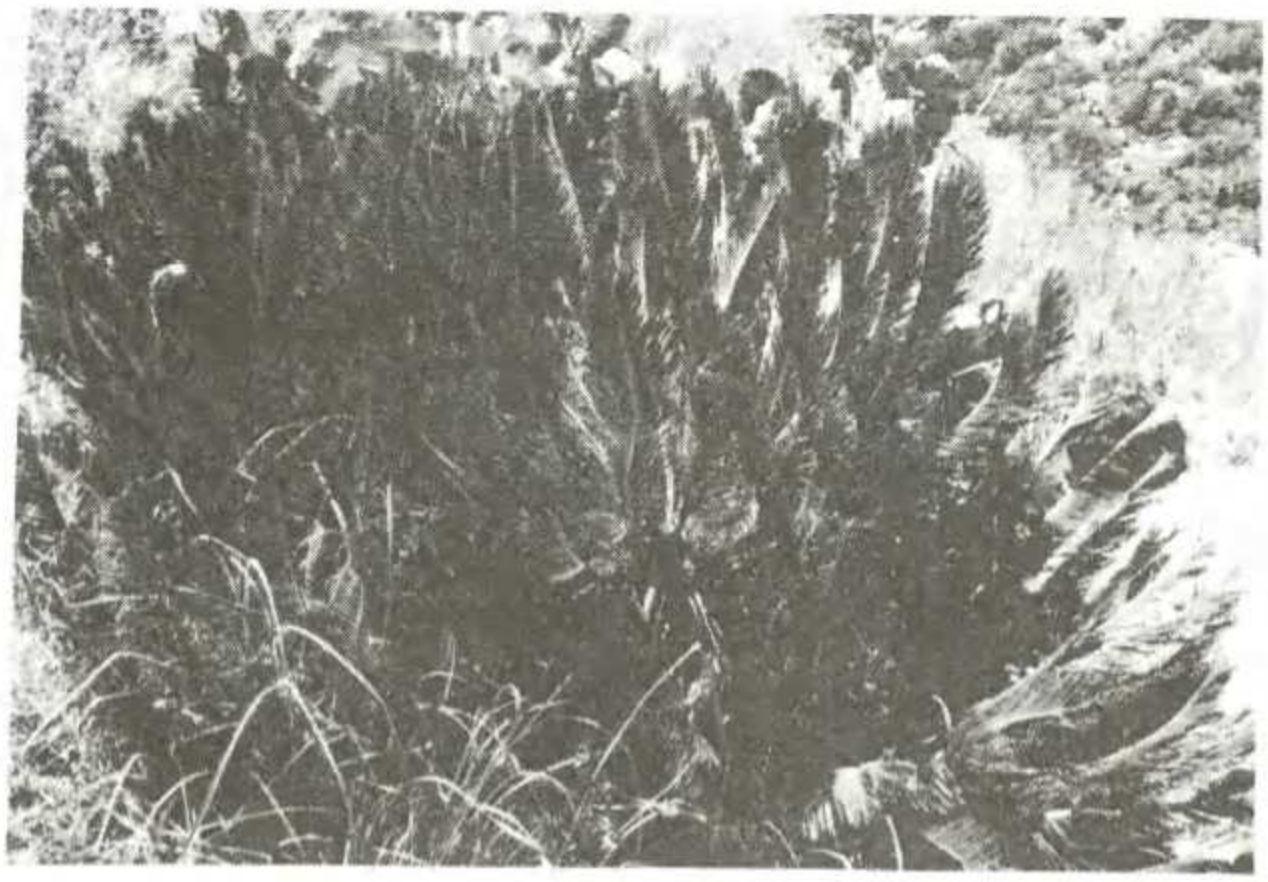


Figure 9: A well-established clump of E. ghellinckii in the Winter's Valley area. Photograph by M. Huntley.

The species is classified as "vulnerable" in terms of the Threatened Plant Unit's categories. There have been reports of removal of specimens from protected lands. The seeds are favoured by baboons, but it seems likely that these animals probably eat only the outer flesh and discard the kernels, thus aiding in distribution. Leaves of plants in the more settled areas are often grazed by goats, but plants are not unduly damaged under those circumstances.

ACKNOWLEDGEMENTS

I am grateful to Brian Schrire, presently at Kew Gardens, and to the Botanic Research Institute in Pretoria for providing backround information; to Mr R.O. Pearse, author of "Mountain Splendour" for his help and to Muriel Zonneveld, Mick Huntley and George Norval for the use of their photographs.

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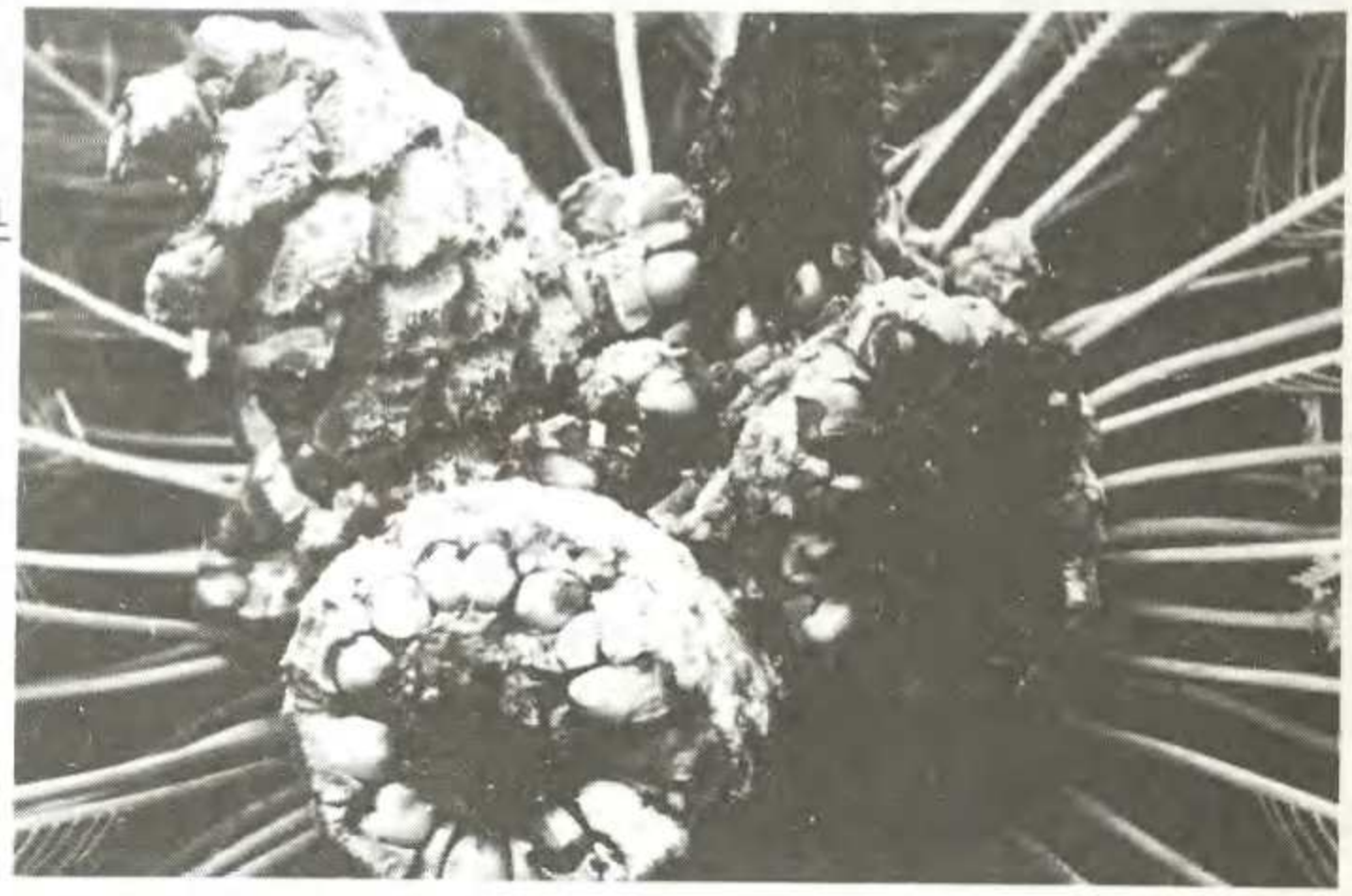

Figure 10: Female cones of E. ghellinckii at the time of seed shedding. Photograph by Muriel Zonneveld. This photograph was used to illustrate R.O. Pearse's well-known book, "Mountain Splendour", on the flora of the Drakensberg.

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Figure 11: A three year old seedling of E. ghellinckii. The leaves are already beginning to show spiralling. Photograph by the author.

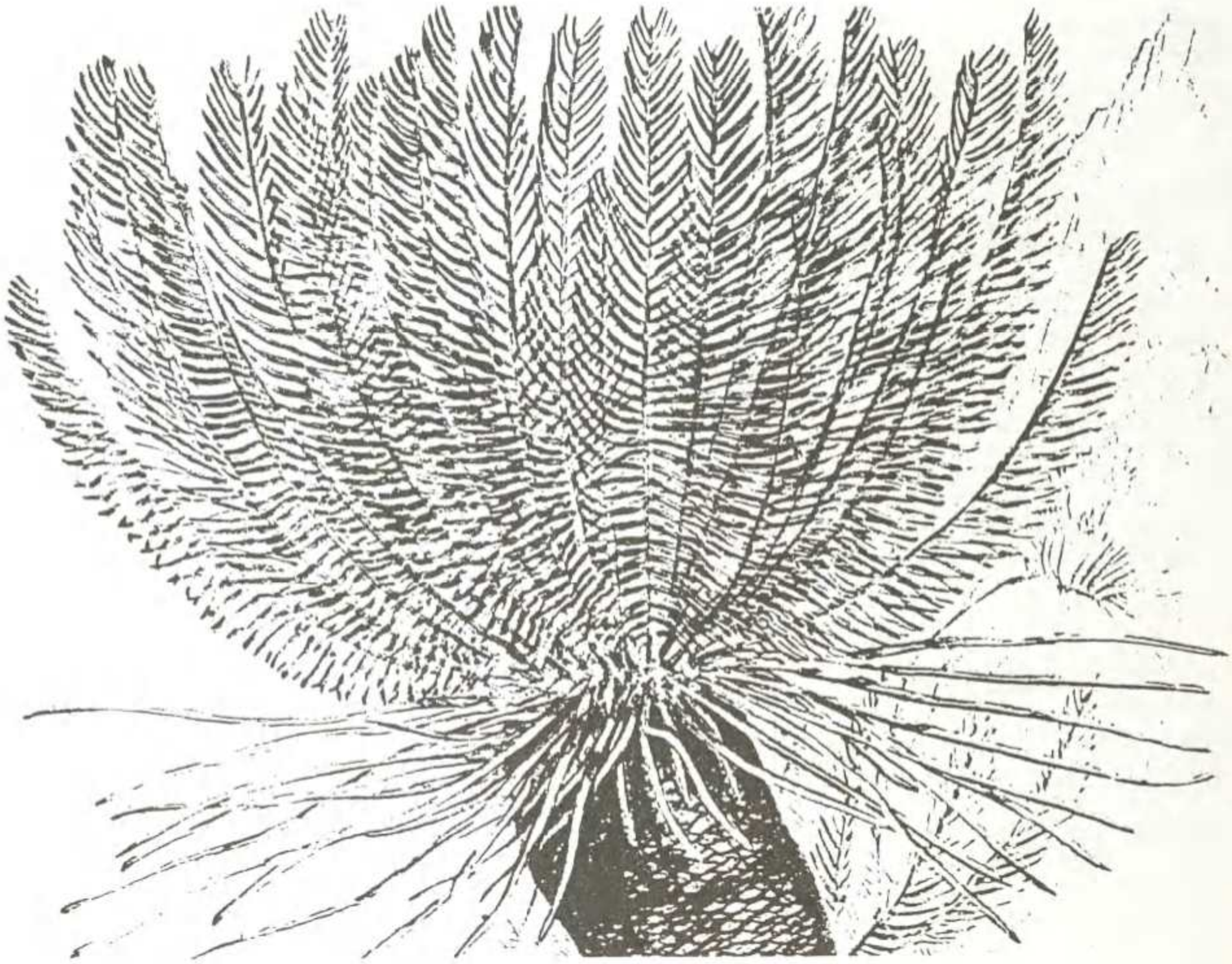


Figure 12: E. ghellinckii. A drawing of a mature specimen in habitat as used in the "Please Protect Natal Cycads" poster by Douglas Goode, as published by the Durban Natural History Museum and the Natal Parks Board. (Reproduced by permission of the Natal Parks Board.)

HUMILIS ON THE MOVE

by Kevin Zunckel

Most readers are probably aware of the planting ceremony that was held on 5 February 1986 to mark the beginning of an operation to plant 1 000 mature Encephalartos humilis plants back into their natural habitat. There were various newspaper reports and a programme on SATV which showed Dr S.S. du Plessis, Director of Nature Conservation, Transvaal Provincial Administration, and Mr A. van der Dussen, Deputy Director General of the Department of Environment Affairs, each planting a cycad.

The Nature Conservation Division of the T.P.A. removed these plants from under the canopy of exotic plantations before harvesting operations could damage them and looked after them in their Harte-beeshoek nursery. When the Department of Environment Affairs decided to leave an area of E. humilis habitat open as a nature reserve, the idea of the re-establishment of the plants was conceived.

The plants were divided into two groups of 500 to be planted into two different areas within the reserve. Within each of these groups they were planted in sub-groups of 20. Espacement was approximately 20 m between each group and 1 to 2 m between plants within each sub-group. In this way it is hoped that there will be a significant ratio of male and female plants to ensure sexual propagation.

The plants are being monitored by the Flora section of the T.P.A.'s Conservation Division and the latest monitoring indicates an 18% mortality. Although this is an acceptable percentage, we do have fears that a fungal infection might be the cause of the deaths and that the percentage mortality might increase above this acceptable limit. Dead plants have been removed by the T.P.A. for laboratory analysis. If the results of the analysis confirm our fears of a fungal infection, steps will be taken to prevent more of the population from being infected and to save those that have not degenerated too badly.

Uprooted young specimen of E. humilis. (Reproduced from BOTHALIA, vol. 4, part 4, 1965 by kind permission from the editor and the Botanical Research Institute.)

If the analysis shows that there is no fungal infection, we will have to accept the mortality rate as it is and enrich the populations with plants which are still to be found within the plantations.

We hope to translocate as many as possible of the E. humilis plants that are still within the plantations to the reserve as soon as possible. The greatest threat to this cycad is the take-over of its habitat by forms of momo-culture, whether it be trees or potatoes, but it is hoped that our reserve will host a thriving population of E. humilis in the near future, thanks to the combined efforts of the Department of Environment Affairs and the Nature Conservation Division of the T.P.A.

(Kevin Zunckel is Conservation Planner of the Southern Transvaal Forest Region of the Department of Environment Affairs, and his address is: Private Bag 11201, Nelspruit 1200)

CYCADS OF AUSTRALIA

by Len Butt

Small cycads of N.S.W.

Macrozamia species occur in dense colonies in many areas of New South Wales, principally the northern and central coastal areas. The most remarkable thing I have observed about these New South Wales species is the difference in the formation of the pinnae. In some, each pinna divides into two lobes near the base, and in others the division is multiple. This feature appears to be only in the species from New South Wales, as no plant in Queensland possesses this peculiarity to my knowledge.

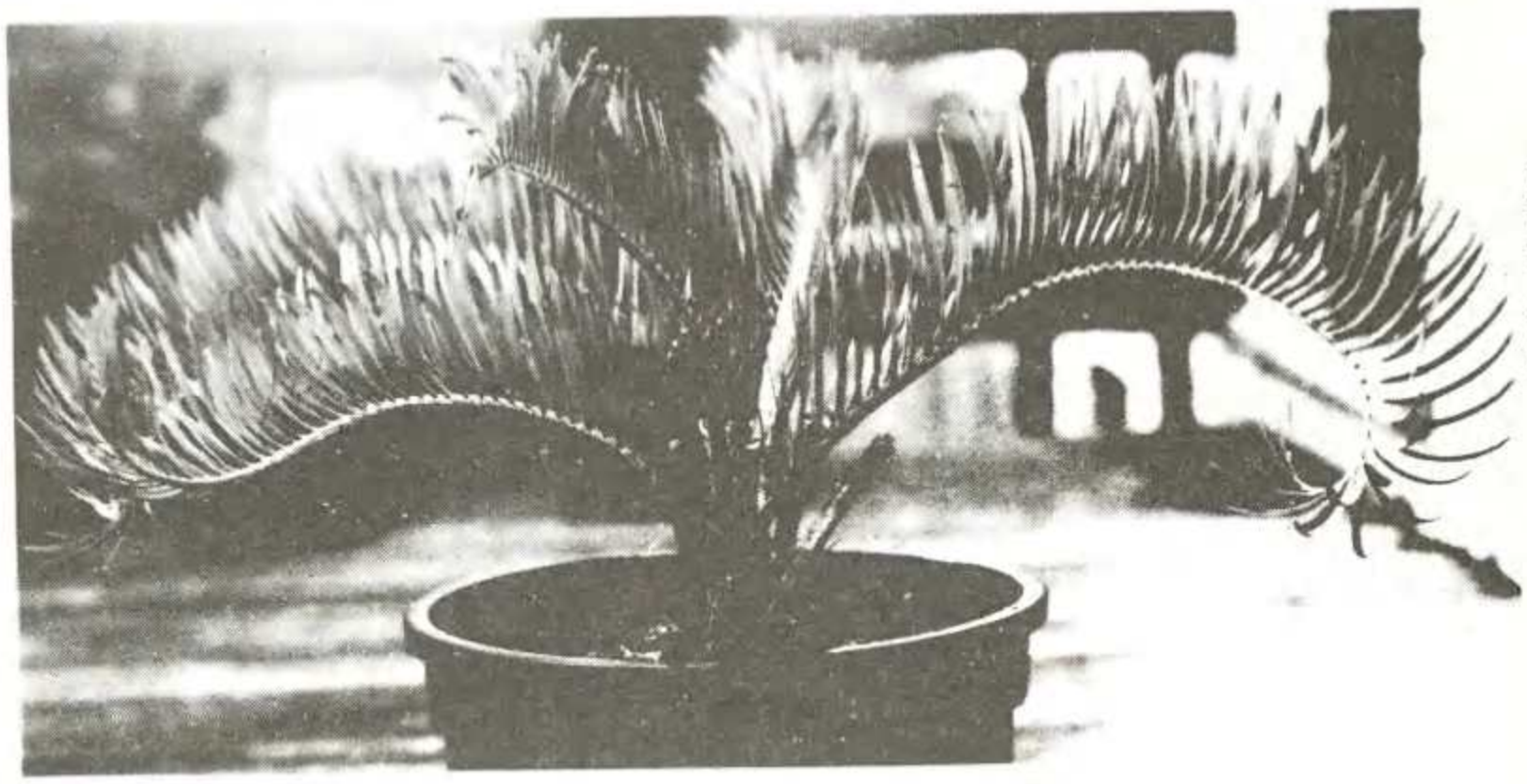
MACROZAMIA DIPLOMERA

This Macrozamia of low stature has a degree of similarity to M. communis. The caudex is generally fully subterranean, about 40 cm in diameter. The fronds of a mature plant can number up to forty or fifty, and the pinnae are often divided into two lobes. M. diplomera has a straighter and more angular rachis than the other species in its habitat, M. heteromera, though in some respects they are rather similar. It is found on the north-west slopes of the Great Divide near Coonabarabran and parts of the Warrumbungle Ranges, New South Wales. It seems to prefer sandy to stony soils.

MACROZAMIA HETEROMERA

This cycad has also a similarity to both M. communis and M. diplomera but is a smaller plant than the former. The caudex at most would be 20 to 25 cm, and the fronds only up to ten in a mature crown. A single cone is usual on female plants, but up to four on males. The pinnae are often divided twice in rather divergent shapes, and in colour are rather glaucous (blue-green). This species occurs in the same habitat as M. diplomera, such as throughout the Warrumbungle Ranges, but spreads further into the districts of Narrabri, Gunnedah and Warialda.

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



Macrozamia heteromera in a container. (Photograph by Paul Kennedy.)

CYCAD LEAF WAXES

by Roy Osborne, Maria Luiza Salatino

and Antonio Salatino

Even a very cursory inspection of the glossy leaflets of Encephalartos natalensis and the blue-grey bloom on E. horridus show that these leaf surfaces, like those of most cycads, are covered with a waxy deposit. The way water forms spherical "beads" on leaf surfaces substantiates this simple observation. What is this wax and where does it come from?

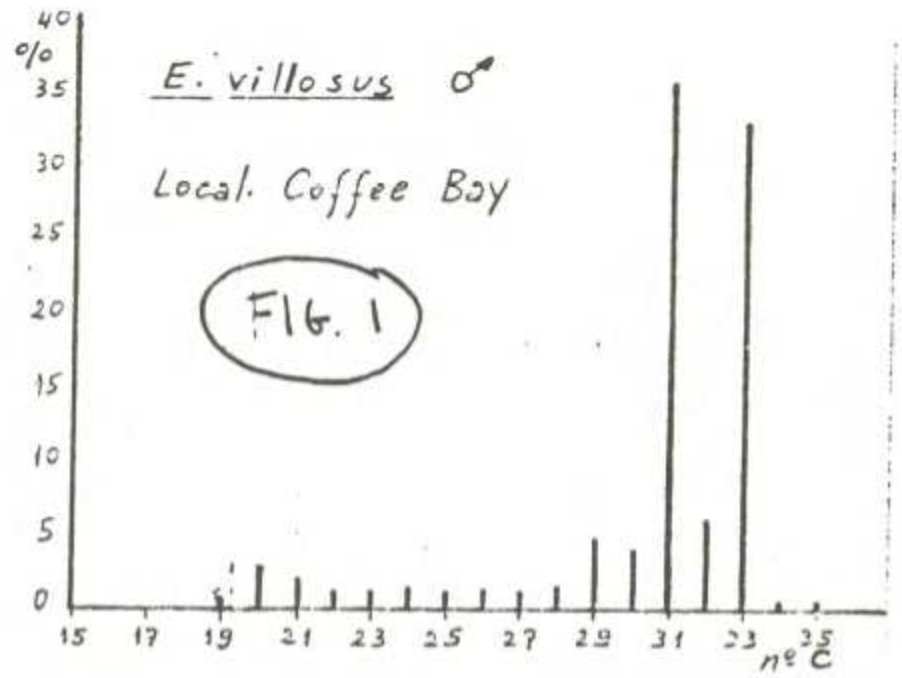
We cannot yet answer these questions, but we can draw upon researches that have been carried out in other plant groups. The current belief is that the hydrocarbon component of the wax deposits starts from simple fatty acid molecules like palmitic and stearic acid which become longer and longer by incorporating pairs of carbon atoms through the agency of a metabolic complex called malonyl coenzyme A. The net effect is that the original fatty acid chains, usually with about 16 or 18 carbon atoms, become progressively longer but always maintain an even number of carbon atoms. This elongation process occurs in the cytolasm of cells in the leaf epidermis. At this stage the lengthened fatty acid molecules enter a portion of the cell known as the endoplasmic reticulum where they lose one carbon atom, as carbon dioxide, to form the hydrocarbon (alkane) molecules. Thus all the molecules with even numbers of carbon atoms now become waxy hydrocarbons with odd numbers of carbons, those with 29 and 31 atoms being typical of very many higher plants. The final stage is where these alkane units, still in a dissolved state, are extruded through pores in the leaf cuticle. The solvents then evaporate and the waxy components are deposited as (often quite beautiful) microscopic crystals on the leaf surface. Other components of the wax include fatty acids, long-chain alcohols, esters, aldehydes, ketones and unsaturated molecules.

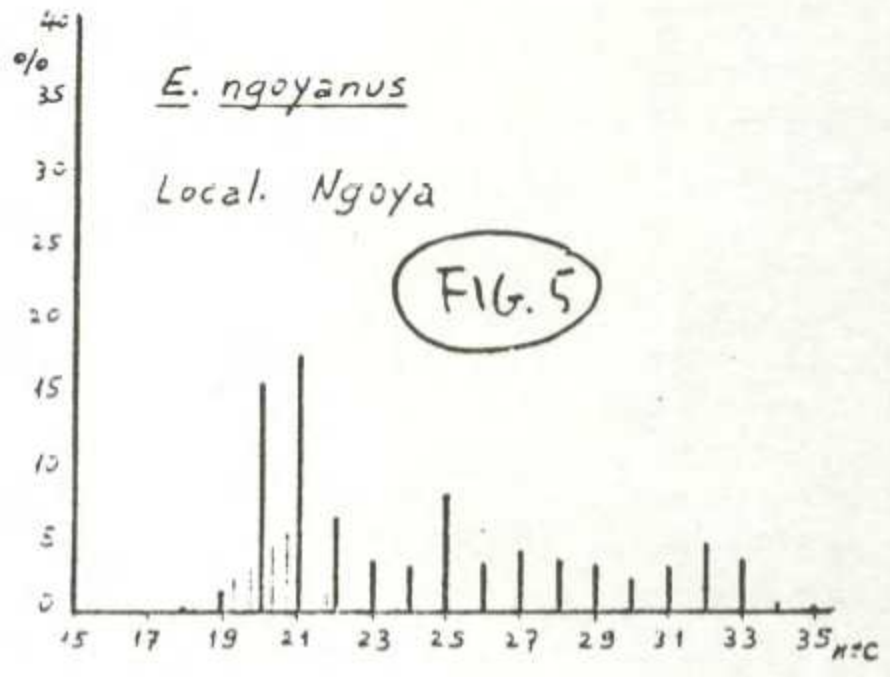
We commenced a preliminary survey earlier this year, using material from plants growing in local Durban gardens. Using sophisticated gaschromatographic analytical techniques, it is possible to get complete hydrocarbon wax "profiles" which seem to be characteristic for each species tested. Leaf samples of E. villosus from three different localities gave almost identical results with high proportions of C31 and C33 hydrocarbons (Figs 1, 2 & 3). E. ferox gave a similar profile but with surprisingly high (and unexplained) proportions of the C30 and C32 even-numbered alkanes (Fig. 4). The other species tested showed quite unexpected results. E. ngoyanus from two different areas gave a C21 major component but with almost as much of an even-numbered C20 hydrocarbon (Figs 5 & 6).

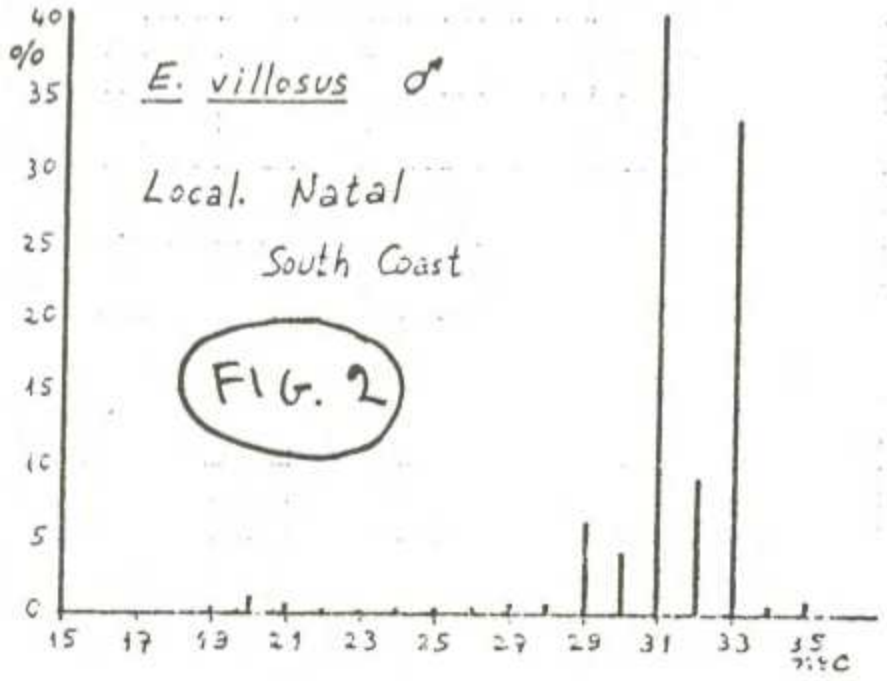
E. natalensis and E. lebomboensis gave broadly similar patterns (with important minor differences) in which the hydrocarbons were distributed through a wide range of odd and even-numbered molecules (Figs 7 & 8).

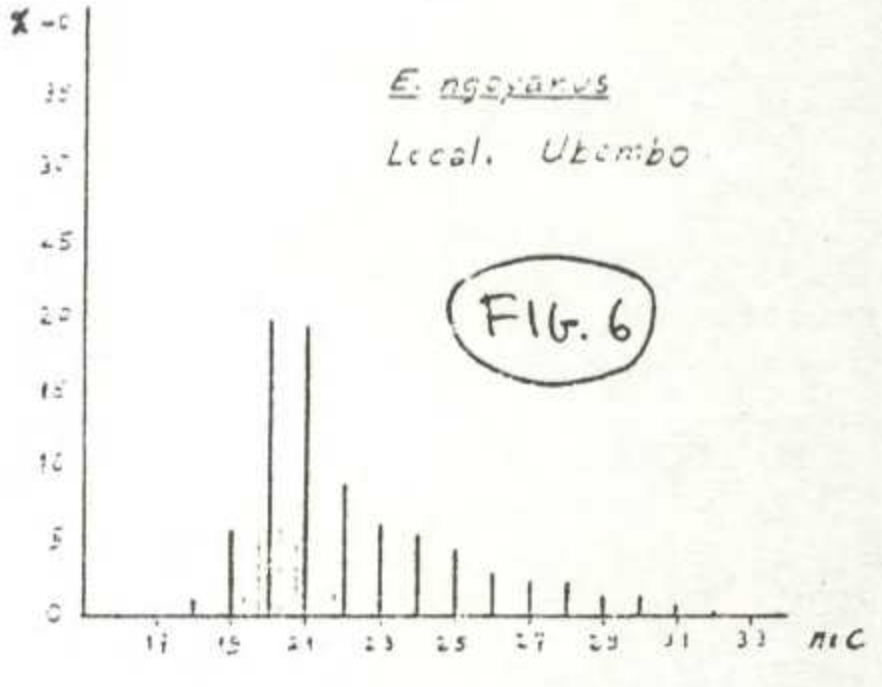
These preliminary results certainly raise more questions than they provide answers, and it is clear that a great deal of painstaking data-collection must be done. However, we believe that further work will provide vital clues in two fundamental aspects. Firstly, we may be able to reach a conclusion as to how the biosynthetic route of hydrocarbons in cycads differs from that in higher plants. Secondly, the data will certainly be significant in our continuing attempts to find out more about relationships between the various groups of cycads.

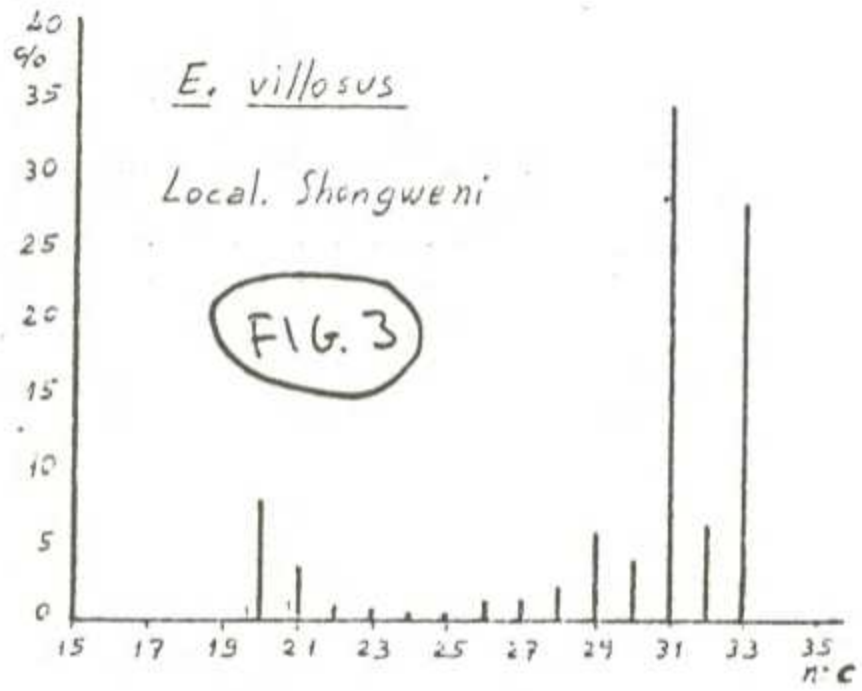
(Maria Luiza and Antonio Salatino are from the University of São Paulo, Brazil)

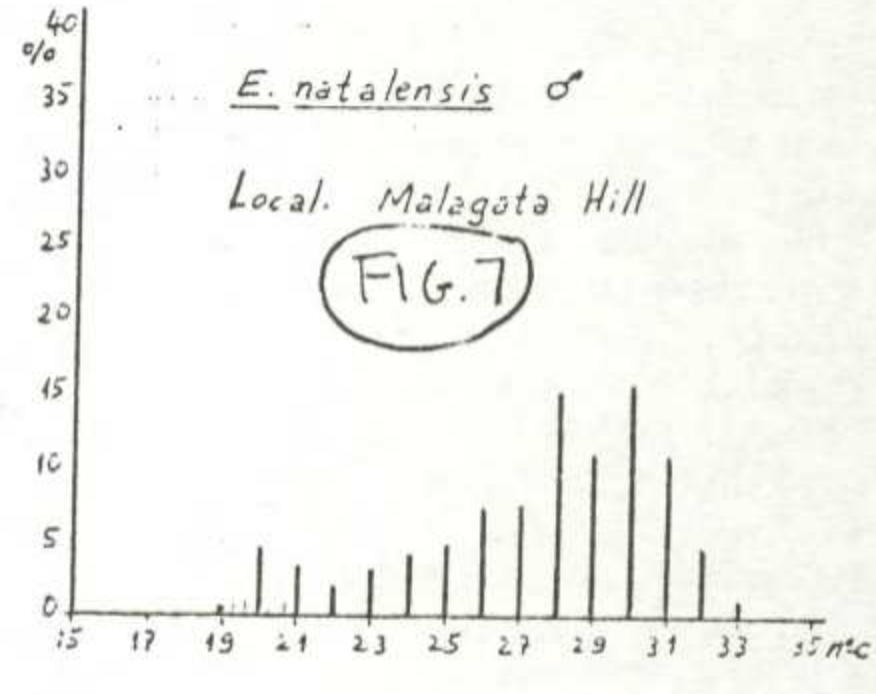

E. villosus ♂
Local. Coffee Bay
FIG. 1
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nº C

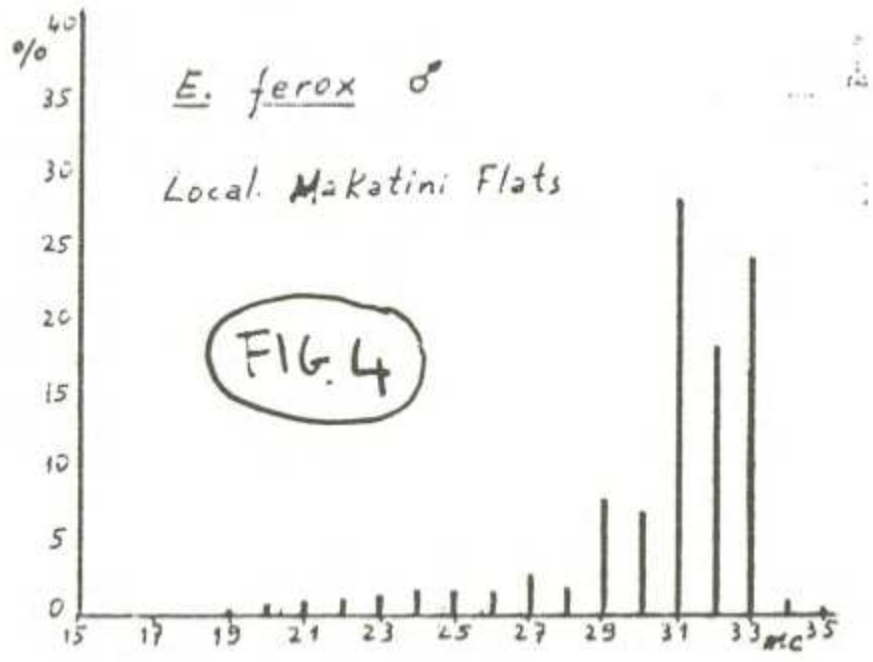

E. ngoyanus
Local. Ngoya
FIG. 5
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC

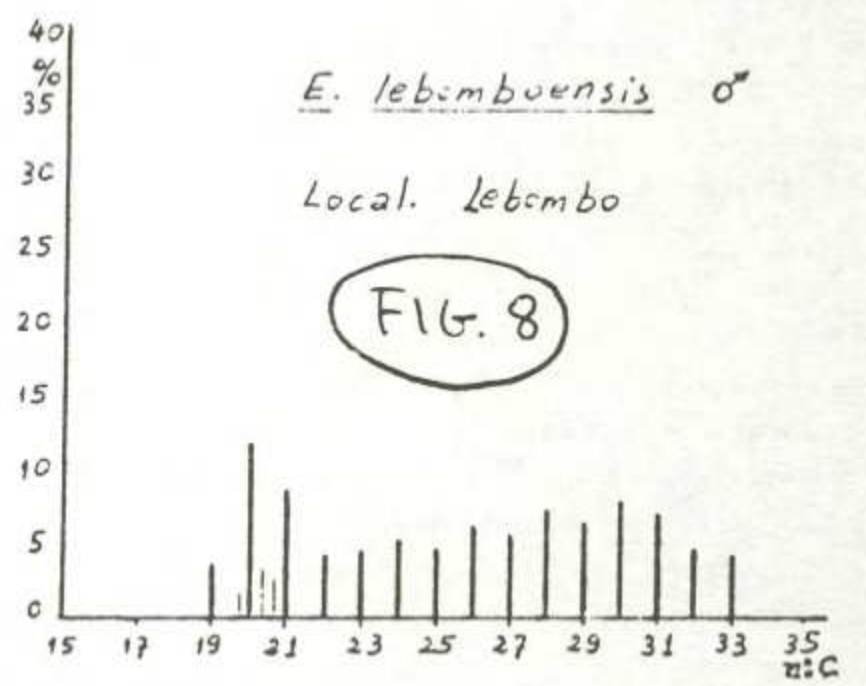

E. villosus ♂
Local. Natal
South Coast
FIG. 2
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC


E. ngoyanus
Local. Ubombo
FIG. 6
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33
nºC


E. villosus
Local. Shongweni
FIG. 3
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC


E. natalensis ♂
Local. Malagata Hill
FIG. 7
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC


E. ferox ♂
Local. Makatini Flats
FIG. 4
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC


E. lebombuensis ♂
Local. Lebombo
FIG. 8
%
40
35
30
25
20
15
10
5
0
15 17 19 21 23 25 27 29 31 33 35
nºC

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.

Sir

I enjoy reading ENCEPHALARTOS and appreciate all that you are doing to promote conservation of cycads.

DR. JOHN POPENOE
DIRECTOR, FAIRCHILD TROPICAL GARDEN
MIAMI
FLORIDA, USA

Dear Sir

In the June 1987 issue of ENCEPHALARTOS an article was published regarding the suitability of various types of cycads for hybridization. The reasons given by the author for the necessity for this procedure seem to me based on the debatable premise that a hybrid plant is a desirable one.

Natural hybrids of Encephalartos species are not rare in the veld, this undoubtedly being part of the evolutionary process whereby, in a few millenniums "all cats will be grey". The meddlesome hand of man in moving cycads from their natural habitat to his gardens and collections has naturally increased the rate of this bastardization immeasurably.

Fr. Mendel in his horticultural experiments used the annual sweet pea - this made it possible for him to complete his Laws of Heredity in the span of his lifetime. It should be noted that plants whose breeding lines were no longer required for experimentation were destroyed.

In experiments with the crossbreeding of Encephalartos species I take it that a term of fifteen years will be required before an evaluation of the progeny's characteristics such as growth rate, viability of seed and general suitability for the purpose the breeder has in mind, can be made. A question that arises is: what happens to those plants that do not conform to the criteria set by the breeder of those plants?

If I may digress slightly: one of my hobbies is the breeding of pedigree English Bulldogs. A long waiting list for puppies at top prices is on my files. My yard dog, "Frankie", is a beautiful animal but, like the character she is named after, Frankenstein's monster, her ancestry is derived from many different sources. She has been sterilized for the simple reason that her puppies could not be given away - no one wants a mongrel!

To return to the vegetable kingdom: those unsuitable specimens of hybrid Encephalartos that have taken a decade and more to produce, will undoubtedly not be pulled out and discarded like a sweet pea vine. They will reach the open market and be sold by nurseries as "No Name Brand" cycads to the man in the street. This state of affairs will ensure that the survival of these aberrations will be continued ad infinitum.

I appeal to all breeders of cycads to concentrate on our own presently known twenty eight varieties, to select the very best specimens and to breed from them. In this manner only will the integrity and beauty of each variety be maintained and enhanced. The practice of hybridization, or should I say miscegenation, of the sovereign species of our indigenous cycads can only lead to an ecological disaster which will be intensely regretted by all Encephalartos lovers.

JACK VAN DER MERWE
DUIWELSKLOOF

Meneer

Verlede jaar het wyle dr. Chris Botha van die Ferox-kwekery naby Pretoria-Noord, ons vertel van 'n Encephalartos ferox-plant in sy tuin wat 'n vroulike keël gevorm het. 'n Ruk later het 'n manlike keël deur die bopunt van die vroulike keël gevorm (soos die blare wat soms bo-op keëls groei). Hy het aan ons foto's van hierdie keël gewys, maar ongelukkig was die foto's taamlik onduidelik. 'n Mens kon egter duidelik die manlike keël bo-op die vroulike keël waarneem. Het iemand anders dalk al iets soortgelyks waargeneem?

ISABELLA CLAASSEN
PRETORIA

Lede wat al so iets waargeneem het, word gevra om aan ENCEPHALARTOS te skryf - REDAKTEUR

Sir

Perhaps members can tell us what methods they use for successful germination of seeds. I grow my seeds in a warming box with a temperature of 25 - 30 degrees C but many still fail to germinate. Recently I have begun to plant them in a box of vermiculite. As soon as the root emerges, I plant the seed in a polythene pot, also in vermiculite. I would like to know what other people do. What fungicide do they use to prevent damping off? What medium do they plant the seed in? Do they remove the seed from the shell? I shelled some seeds and they were covered with mould inside. Thompson and Morgan, seed suppliers in the U.K., recommend opening the shells and planting the seeds of Cycas revoluta 'bare'.

Does anyone grow plants hydroponically? I plan to grow some plants in vermiculite with hydroponic solution.

DAVE TATE
WITBANK

We invite members to comment on Dave's questions. Please write to us.

EDITOR

Geagte Meneer

Baie dankie vir die interessante leesstof. As nuwe lid en groentjie in die geledere van die Broodboomvereniging het ek al die vorige uitgawes bestel en woord by die daad gevoeg en begin lees. Ek het toe ook die artikel van Roy Osborne in ENCEPHALARTOS no. 1, bl. 11 gelees, waarin verwys word na die ervaring van Genl. Jan Smuts en sy manskappe soos aangeteken in Denys Reitz se boek "Commando". Ek het so pas dié publikasie gelees en merk toe dat daar na E. altensteinii verwys word en nie na E. longifolius nie. Is dit dalk 'n drukkersglips?

Is dit dalk moontlik om 'n naamlys van alle Suid-Afrikaanse lede in een van die volgende uitgawes te plaas?

DR. JOHAN VORSTER
PINETOWN

Die verwysing na E. altensteinii is klaarblyklik 'n fout in die boek, aangesien hierdie spesie nie in die Zuurberg-omgewing voorkom nie. E. longifolius is die enigste broodboomspesie wat in daardie omgewing voorkom.

Afdrukke van die Vereniging se ledelys is by die President, Roy Osborne, beskikbaar. Sy adres verskyn op die agter-binneblad. 'n Donasie om die koste van die fotokopiëring te dek, sal waardeer word.

REDAKTEUR

EX PRESS

Albany farmer charged with selling cycads

By BARBARA ORPEN

CYCADS — classified as endangered flora since May 1985 — had become a status symbol in the last few years and great value had been attached to the plant, a nature conservation officer told the Grahamstown Magistrate's Court yesterday.

Mr Graham Munro was testifying at the trial of an Albany farmer, Mr Douw Kruger, who was charged with five counts under the Nature and Environmental Conservation Ordinance.

The State alleges that Mr Kruger:

■ Unlawfully sold five cycads (encephalartos spp) to Mr Ingram Graham Reed without being in possession of a permit to do so, on September 23, 1986, at the farm, Newingreen.

■ Unlawfully donated five cycads to Mr Reed without a permit.

■ Unlawfully possessed 303 cycads and 76 seedlings on his farm, Kingsmead, without being in possession of a permit to do so.

■ Unlawfully sold three cycads to Allison Margaret Colville-Reeves in Port Alfred in April, 1986, without possessing a permit.

■ Made a false statement in an application to possess endangered flora in that he said he had 450 cycads in his garden.

Mr Kruger pleaded not guilty to all five counts and was acquitted on the second count during the trial.

In his evidence, Mr Munro said there was extreme pressure on cycads in their natural state, and for that reason strict legislation had been introduced.

The legal status of the cycad had changed in May, 1985, when all species of the plant became classified as endangered flora.

Prior to that, all but four species had been classified as "protected flora".

To be in possession of endangered flora required a permit, whereas protected flora required a letter of donation.

Mr Kruger, who is a cattle farmer, but who also runs a nursery, told the court he sold four cycads to Mr Reed at a cost of R100 each and gave him another.

He said Mr Reed asked for more cycads and he told Mr Reed he would be able to get some from his cousin's farm.

Mr Reed lent him his truck and his staff and he went and dug out some of the trees from the veld and gave five of them to Mr Reed.

He said he was in possession of "at least as many" cycads as cited in the charge against him and although he did not have a permit to possess them, his wife had applied for one.

Judgment will be given on Friday.

Mr S van Zyl Stander was on the Bench. Mrs B Hartle appeared for the State. Mr E Ford, instructed by Espin and Espin, appeared for Mr Kruger.

E.P. Herald, 19 September 1987

Farmer fined R400 for unlawful sale of protected plant

By BARBARA ORPEN

AN Albany farmer was yesterday fined an effective R400 or two months' imprisonment by the Grahamstown Magistrate's Court, after he was found guilty of unlawfully selling and possessing cycads.

Douw Kruger, who was charged with five counts under the Nature and Environmental Conservation Ordinance, was sentenced to a fine of R1 200, or six months' imprisonment, of which R800 or four months were conditionally suspended for four years.

He pleaded not guilty to all five counts and was convicted on three.

Kruger was found guilty of:

■ Having unlawfully sold five cycads (encephalartos spp) to Ingram Graham Reed without being in possession of a permit to do so on September 23, 1986, at the farm Newingreen.

■ Possessing 303 cycads and 76 seedlings on his farm Kingsmead, without being in possession of a permit to do so.

■ Unlawfully selling three cycads to Allison Margaret Colville-Reeves in Port Alfred in April 1986, without being in possession of a permit.

The magistrate, Mr S Stander, said that because of the popularity of the plant, cycads had become an endangered species and therefore had to be protected.

The maximum fine could however only be appropriate in the case of someone who denuded the countryside for his own enrichment.

It was clear that Kruger was struggling financially when he sold his cycads.

Living on a farm in the Albany district could not be seen as living in isolation, and Kruger had clearly misled the court in saying he did not know much about the requirements of permits for cycads.

Mr S van Zyl Stander was on the Bench. Mrs B Hartle appeared for the State. Mr E Ford, instructed by Espin and Espin, appeared for the defence.

E.P. Herald, 16 September 1987

Doomed tree donated to airport

A cycass tree estimated to be between 150 and 200 years old was handed over to the Louis Botha Airport authorities yesterday by the Borough of Queensburgh after the site in Malvern on which it had been standing was earmarked for development. The tree was uprooted and transported on a South African Air Force vehicle to the airport, where it was replanted in front of the terminal buildings. Present at the handing-over ceremony at the airport were (from left) Mr Rai Invernizzi, the Mayor of Queensburgh, and Mr Roy Blount, the manager of Louis Botha Airport.

The Natal Mercury, 24 September 1987

Valuable tree to be given to State

Daily News Reporter

A cycass tree which was donated by the borough of Queensburgh to the Department of Transport will be formally handed over this week at a ceremony outside its new home — in front of the revamped Louis Botha Airport terminal building, Reunion.

It had been growing on council property next to Alphen Mews in Leeway Road, Malvern.

The cycass is quite distinct from the well-known South African cycad: it looks almost like a palm. A native of Mauritius and Mozambique, it is foreign to Natal, though a few specimens are found in the province, probably brought in by immigrants.

The donated specimen is about 10-12 metres tall, according to a municipal official.

Members of the Queensburgh Council have been invited to attend the function at 9am on Wednesday, September 23. The tree will be officially handed over by the mayor of Queensburgh, Mr R.A.R. Invernizzi.

In terms of a council resolution, the council had no objection to the replanting of the tree "in order to ensure the safety and existence of this valuable species".

A plaque will show that the tree was donated by Queensburgh.

The Daily News, 22 September 1987

Illegal sale of plants on roadsides

The sale of indigenous plants such as these cycads, which are being sold here at prices of R2,00 to R10.00, is illegal. Offenders found purchasing plants or carrying plants not purchased at a recognized nursery are liable to heavy fines (up to R3 000 for cycad plants). If you wish to purchase cycads you should contact the Cycad Society (see information on page 69 for more details)

ARCHIMEDES, 29:3, August 1987. (Photograph by D.A. Everard, kindly supplied by Department of Plant Sciences, Rhodes University.)

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.

- Roy Osborne (20 Maryvale Road, Westville, 3630; tel. no. 031-866953) would be very pleased to obtain a few seeds of Encephalartos hildebrandtii. Can anyone help?

- Maans Kemp (51 Constance Road, Broadwood, Port Elizabeth, 6070; tel. no. 041-323344) is very keen to obtain a few seeds of any of the non-South African Encephalartos species.

- Willie Pretorius (Posbus 338, Tzaneen, 0850) is op soek na een of twee plante van Encephalartos latifrons, asook van die vorm van E. villosus sonder dorinkies aan die blare.

- Roy Osborne (20 Maryvale Road, Westville, 3630; tel. no. 031-866953) would be grateful for any notes on, and especially photographs of, the various forms of Encephalartos eugene-maraisii, These are required for a future "Focus On..." article for ENCEPHALARTOS.

- Johan Grundlingh (Posbus 615, Groblersdal, 0470; tel. no. 01202-2557) soek dringend na 'n Encephalartos latifrons-plant van enige grootte, of na saad van die spesie.

Die Suid-Afrikaanse Genootskap van Plantkundiges
The South African Association of Botanists

The South African Association of Botanists is the professional body which represents Botany and botanists in southern Africa. Membership numbers about 500 and is open to all botanists who meet the required qualifications. Affiliate members who have an interest in Botany, but not the required qualification, and student members who are in training, are also accepted by the Association. All branches of Botany are represented and its members work in universities, technikons, colleges, schools, the public service, research institutes and private enterprise.

The South African Association of Botanists:

- Advances the science of Botany in South Africa
- Promotes the status of the botanical profession
- Publishes the *South African Journal of Botany* and *Forum Botanicum* (both free to members)
- Supplies information on careers in Botany
- Awards medals and certificates for outstanding achievements in Botany
- Organizes Annual Botanical Congresses
- Represents Botany and botanists at a national level
- Makes representation on nature-conservation matters
- Supports regional branches which organize lectures, meetings, excursions and workshops.

For more information contact:
Mr A R Palmer (Secretary)
SA Association of Botanists
Private Bag 101
Grahamstown 6140
Telephone (0461) 22023 × 593.

Die Suid-Afrikaanse Aalwyn- en Vetplantvereniging
The South African Aloe and Succulent Society

Meer as 3 000 van die ongeveer 20 000 Suid-Afrikaanse plantsoorte is vetplante. Daar is dus 'n groot en wêreldwye belangstelling in hierdie aspek van ons Suid-Afrikaanse flora. Die *Suid-Afrikaanse Aalwyn- en Vetplantvereniging* se doelstelling is dan ook om die studie, kweek en bewaring van vetplante plaaslik en internasionaal te bevorder en aan te moedig.

Die vereniging het tans ongeveer 1 000 lede waarvan omtrent 300 van buite die landsgrense is.

Die kwartaalblad *Aloe* van die Vereniging trag om inligting oor sukkulente en hulle verbouing, aan plantkundiges en leke te verskaf. Die tydskrif spesialiseer hoofsaaklik in Suid-Afrikaanse soorte en hul habitatte, en publiseer ook nuwe taksa.

As deel van sy funksie bied die Vereniging aan sy lede die voordele van 'n saadbank wat wetenskaplik bedryf word en waardeur die sade van veral Suid-Afrikaanse vetplantsoorte bekom kan word. Takke van die Vereniging is aktief in sentra soos Pretoria, Johannesburg, Bloemfontein, Vanderbijlpark en Kaapstad.

Navrae: Die Sekretaris *SAAVV* Posbus 1193 Pretoria 0001

President: J A Retief

Ere-President: Prof H P van der Schijff.

The Botanical Society of South Africa
Die Botaniese Vereniging van Suid-Afrika

The Botanical Society of South Africa was formed in 1913 and its original members were instrumental in the establishment of Kirstenbosch as a botanic garden.

Today with nearly fifteen thousand members worldwide, the Society has two main objectives:

- to support the *National Botanic Gardens*, assist in their improvement and development and to interest the people of South Africa and other countries in their progress and development
- to promote the cultivation and conservation of the indigenous flora of South Africa.

Present annual subscription fees are R18 for ordinary membership and R25 for family membership. Apart from the opportunity to participate in the attainment of the aims of the Society, benefits enjoyed by members include:

- free entry to all *National Botanic Gardens*
- a quarterly journal *Veld & Flora*
- an annual allocation of indigenous plant seed
- participation in lectures, meetings and excursions.

The administrative offices are situated in the grounds of the *Kirstenbosch National Botanic Garden* in Cape Town and the Society has branches at Betty's Bay, Bloemfontein, Bredasdorp, Harrismith, Johannesburg, Nelspruit, Pietermaritzburg, Roodepoort, Villiersdorp and Worcester.

Enquiries or membership applications may be directed to *The Botanical Society of South Africa*, Kirstenbosch, Claremont 7735.

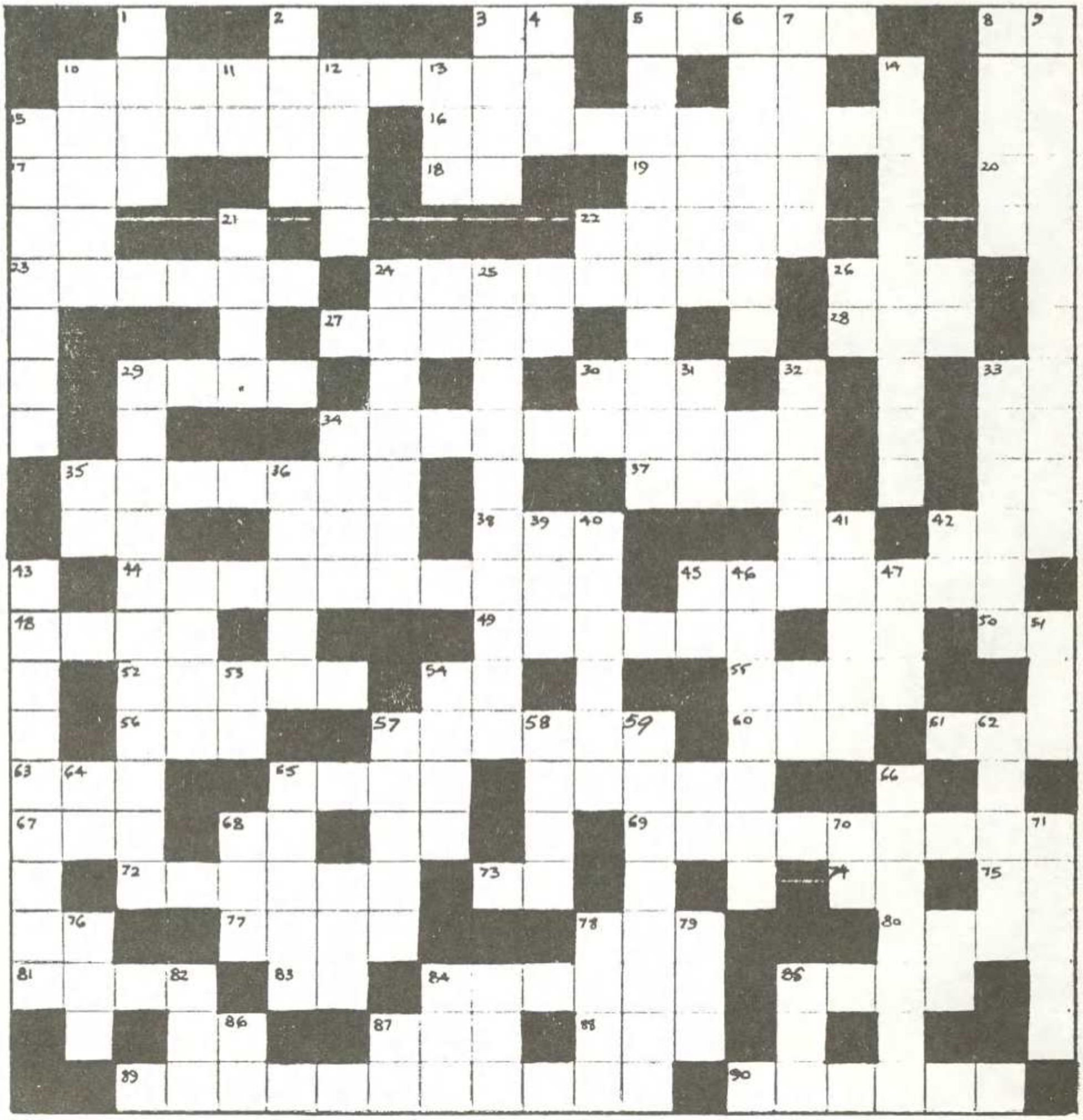
Telephone (021) 77-1725 or 71-3365.

CYCAD CROSSWORD

The accompanying crossword was designed and sent in by Craig Thompson (6 Rocklea Crescent, Sylvania 2224, Australia). Cynthia Giddy has kindly offered to donate a copy of the latest edition of her book "Cycads of South Africa" as a prize. Please send your completed crossword to the Editor, to reach him by 31 January 1988. The first correct entry drawn by the editor from those received will be the winner. The editor's decision in the matter is final.

We sincerely thank Craig and Cynthia for their very kind interest.

Happy crossworded!



ACROSS

5. -------- Cycadopsida
10. Plants that survive with minimal water
15. First name of cycad book author
16. Australian species of cycad
17. Age of mature cycads
18. Encephalartos princeps (abbreviation)
19. Cycads go dormant when it is ----
20. Encephalartos inopinus (abbreviation)
22. Cycads can survive frequent -----
23. Genus (abbreviation) and species of Australian cycad
24. Species name of Australian cycad
26. Abbreviation of the three major requirements of plants
27. This society
28. Mammal that may carry cycad seeds away
29 Reproductive organ of cycad
30. The whole lot
33. Degree or mother
34. Species of cycad that grows in Queensland
35. Species name of monotypic genus
37. Leaf disease
38. Animal attraction
42. Period of time
44. Cycas -------
45. At an angle
48. Underground part of cycad
49. Country where lots of cycads grow
50. Exists
52. Country in Africa
54. Spanish "yes"
55. Surname of man after whom a cycad was named
56. Mammal
57. Cycad seeds contain this
60. An age
61. Part of the foot
63. Electrical resistance unit
65. Crossword hint
67. Hawaiian necklace
68. Encephalartos hórridus (abbreviation)
69. Genus (abbreviation) and species of African cycad
72. Continent
73. Pronoun
74. ---- home
75. Home of Huntington Gardens (abbreviation)
77. Abbreviation for unknown person
78. Sheep bleat
80. Not odd
81. Blue-green ----
83. ---- apple
84. Name the natives of Guam use for seeds of Cycas circinalis
85. Middle of the cortex
87. Under
88. Untruth
89. African cycad species
90. Italian botanist (surname)

DOWN

1. Opposite of borrow
2. Long narrow strip of sand
3. Cycad seedlings need this type of pot
4. Eastern Standard Time (abbreviation)
5. Species of cycad
6. Without arms
7. Reproductive structures
8. Paperwork needed before export (abbreviation)
9. Genus name
10. Conductive tubes
11. Hydroxide symbol
12. Two quarters
13. --- more --- merrier
14. Mexican cycad species
15. African cycad species, minus last two letters
21. Previous spelling of Mexican genus
22. First two letters of Zamia species
24. Cycas poison
25. Cycad genus
26. First two letters of South African species
29. Cycad genus
30. Same as 73 across
31. Where your child sits
32. South African province
33. Species of cycad found in Australia
34. Island rich in cycads
35. Same as 68 across
36. Strength
39. Unit
40. Mexican state where Dioon califanoi is found
41. Mexican genus
42. First two letters of name of continent
43. Genus (abbreviation) and species of cycad native to Nansei Island
45. Officer commanding (abbreviation)
46. Cycad genus
47. 46 down found in this Australian state (abbreviation)
51. Opposite of 64 down
53. That is (abbreviation)
54. Trunk
57. African country

58. A cycad ---- if the drainage is poor
59. African cycad species
62. Reproductive structure
64. Opposite of 51 down
65. Vast Asian country with possible new cycads
66. Japanese name for Cycas revoluta
68. Period of time
70. Same as 75 across
71. Cycads usually grow in this type of soil
76. Mature cycads may be like this
78. Island where Cycas rumphii is found
79. Cycads may live to a great ----
82. Material that may be used in potting mix
84. Amusement
85. Snack food
86. Encephalartos eugene-maraisii (abbreviation)
87. Same as 54 across

SAADBANK

Collecting cycads may once have been regarded as a hobby for the rich. With the increasing availability of seedlings and fertile seeds, however, everyone can now start a collection. Growing cycads from seed is becoming more and more popular, especially with people in cities who do not have all that much direct contact with nature.

Overseas interest in South African cycad seed is also growing and the number of requests for Encephalartos seed from the seed bank has increased greatly.

Those members who have never grown cycads from seeds will find it a very interesting and rewarding activity. The process of germination and early growth is particularly fascinating. Cycad seedlings also grow much quicker than is generally thought.

It is not difficult to grow cycads from seed. It is essential, however, to provide the right elements for germination and growth: good soil, light, water, air and warmth. One can use a simple box with a glass lid to germinate the seeds. A mixture of river sand and potting soil can be used. The glass top will keep the seeds warm and moist, while allowing enough light. The sandy mixture will ensure good drainage, which is essential. After the seeds have germinated, the glass lid should be opened about 10 cm for ventilation. More about the growing of cycads can be read in Willie Tang's article "Cycad seeds and seedlings" in ENCEPHALARTOS no. 9, pages 8 to 11.

By growing cycads from seed we can secure the future of our cycads, while we are enjoying an interesting hobby.

DANIE NEL

Saad van Encephalartos natalensis en Macrozamia miquellii vanaf Australië is nou by die saadbank beskikbaar.

DANIE NEL (Saadbankbeampte)
Bowkerweg 120
Escombe
4093
Tel. no. 031-442505 (na 17h00)

SEED BANK

Seed of Encephalartos natalensis and Macrozamia miquellii from Australia is now available from the seed bank.

DANIE NEL (Seed Bank Officer)
120 Bowker Road
Escombe
4093
Tel. no. 031-442505 (after 17h00)