ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

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VOORBLAD/COVER

Stangeria eriopus

EDITORIAL

LET'S MAKE IT LEGAL

The closure of our 'Swop-Shop' (see elsewhere in this issue) and the recent announcement that all cycads in the Cape Province have been declared endangered plants, once again focus the attention on the laws, ordinances and regulations which affect all cycad lovers in some way or other. In South Africa, the most important of these regulations are the various provincial nature conservation ordinances which have (or should have) the aim of ensuring the survival of cycads in their natural habitat and the Plant Improvement Act which controls the registration and running of nurse= ries and the import and export of plants.

One of the Cycad Society's declared ob= jectives is to promote all aspects of the conservation of Southern African cycads. We therefore support any rea= listic regulations which are aimed at conserving cycads in their natural habi= tat.

REDAKSIONEEL

KOM ONS MAAK DIT WETTIG

Die sluiting van ons 'Ruilhoekie' (sien elders in hierdie uitgawe) en die on= langse aankondiging dat alle broodbome in Kaapland as bedreigde plante verklaar is, vestig die aandag opnuut op die wette, ordonnansies en regulasies wat alle broodboomliefhebbers op een of ander manier raak. Die belangrikste van hierdie regulasies in Suid-Afrika is die verskillende provinsiale natuur= bewarings-ordonnansies wat ten doel het (of behoort te hê) om die voortbestaan van broodbome in hulle natuurlike habi= tat te verseker, en die Plantverbete= ringswet wat beheer uitoefen oor die registrasie en bedryf van kwekerye en die invoer en uitvoer van plante.

Een van die Broodboomvereniging se ver= klaarde doelstellings is om alle aspekte van die bewaring van Suider-Afrikaanse broodbome te bevorder. Ons steun dus realistiese regulasies wat ten doel het om broodbome in hulle natuurlike habitat te bewaar.

EDITORIAL

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Another declared objective of the Socie=ty is to encourage the cultivation of cycads; an objective which is closely linked to the conservation of cycads. As more cycads are cultivated, the pressure on plants in their natural habitat should decrease.

It is very evident that more and more cycad lovers are becoming interested in the cultivation of plants from seed, very often after they have hand-polli=nated the cones in their own gardens. They do this, partly because of the pleasure they derive from the cultiva=tion of cycads, but also because it has become very difficult to obtain plants from their natural growth areas. By cultivating plants themselves, they can expand and increase their collections in a relatively cheap manner. It is a pleasure for the Cycad Society to help members cultivate cycads from seed through our new Pollen Exchange scheme (see the announcement elsewhere in this issue).

If it is kept in mind that in some cases more than 200 fertile seeds may be ob=tained from one female cone, it is ob=vious that most persons will end up with substantially more seeds and seedlings than they are interested in having. A logical step is to exchange the excess seeds and seedlings for seeds or seed=lings of other species which they need. The problem with the exchange of seed is that the risk always exists that the seeds may either not be fertile, or may not be of the species that they are supposed to be. Most people would there=fore prefer to exchange seedlings.

Although permits are often required, it is not impossible or even difficult to obtain the necessary permission from the provincial nature conservation authori=ties to donate and receive seedlings. From various directions praise and appre=ciation are often expressed for the helpfulness and sympathetic attitude of the provincial officials in this con=nection. The problem lies with the Plant Improvement Act, however, which makes the exchange of cycad seedlings illegal, except when both parties are

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-VERVOLG-

Nog 'n verklaarde doelstelling van die Vereniging is om die kweek van brood=bome aan te moedig; 'n doelstelling wat baie nou verband hou met die bewaring van broodbome. Soos meer broodbome ge=kweek word, behoort die druk op plante in hulle natuurlike habitat af te neem.

Dit is baie duidelik dat meer en meer broodboomliefhebbers daarin begin be=langstel om plante van saad te kweek, dikwels nadat hulle self die keëls in hulle eie tuine handbestuif het. Hulle doen dit, deels omdat die kweek van broodbome baie genot verskaf, maar ook omdat dit baie moeilik geword het om plante uit hulle natuurlike groeigebiede te kry. Deur self plante te kweek, kan hulle dus op 'n relatief goedkoop manier hulle versamelings aanvul en vergroot. Dit is vir Broodboomvereniging aange=naam om deur middel van ons nuwe Stuif=meelruilskema (sien die aankondiging elders in hierdie uitgawe) lede te help met die kweek van broodbome deur middel van saad.

As in gedagte gehou word dat in sommige gevalle meer as 200 vrugbare sade uit een vroulike keël verkry kan word, is dit duidelik dat die meeste persone met heelwat meer saad en saailinge eindig as wat hulle in belangstel om te hê. 'n Logiese stap is om die oorskot saad en saailinge te ruil vir saad of saailinge van ander spesies wat benodig word. Die probleem met die ruil van saad is dat daar altyd die risiko bestaan dat die saad óf nie bevrug is nie, óf nie van die spesie is wat dit veronderstel is om te wees nie. Die meeste persone sou dus verkies om saailinge te ruil.

Alhoewel permitte dikwels vereis word, is dit nie onmoontlik of selfs moeilik om die nodige toestemming van die provinsiale natuurbewaringsowerhede te kry om saai=linge te skenk en te ontvang nie. Uit verskeie oorde kom daar gereeld lof en waardering vir die behulpsaamheid en simpatieke benadering van die provinsiale amptenare in hierdie verband. Die pro=bleem lê egter by die Plantverbeterings=wet wat die uitruil van broodboomsaailinge onwettig maak, behalwe as albei partye geregistreerde kwekers is. As in gedagte

EDITORIAL

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registered nurserymen. If it is kept in mind that the immediate cost to register as a nursery is currently R200,00 and there-after R100,00 per year, it becomes obvious that it is made impossible for those persons who wish to exchange a few seedlings for a few others of species which they do not have in their collec=tions.

Has the time therefore not come to re=consider the application of the Plant Improvement Act in this connection? Should it not be attempted to make it possible for cycad lovers to legally exchange small numbers of seedlings? We are of the opinion that such a step would encourage people to cultivate cycads, which would in turn contribute to the conservation of cycads in their natural habitat. It could even have the result that cultivated plants may be taken back and resettled in the natural habitat.

The opinion is sometimes expressed that such exchanges of seedlings could be a threat to our nurserymen. We do not be=lieve that this would be the case, espe=cially not if the nurseries charge rea=listic prices for their plants. We are also of the opinion that the numbers of plants involved in such legal exchanges could be restricted to a small amount. The argument that people who want cycads should simply buy them legally, unfor=tunately has the result that only rich people would have any hope of ever ob=taining a representative collection of even young plants.

There is, in our opinion, sufficient reason for all those concerned to jointly reflect upon a possible modifi=cation in the application of the Plant Improvement Act. The need for that will only become greater.

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-

gehou word dat die onmiddellike koste om as kweker te registreer tans R200,00 en daarna R100,00 per jaar is, is dit dui=delik dat dit prakties onmoontlik gemaak word vir dié persone wat 'n paar saailinge wil ruil vir 'n paar ander van 'n spesies wat hulle nie in hulle versamelings het nie.
Het dit dus nie tyd geword om weer te kyk na die toepassing van die Plantverbete=ringswet in hierdie verband nie? Moet daar nie gepoog word om dit moontlik te maak vir broodboom-liefhebbers om klein getalle saailinge wettiglik uit te ruil nie? Ons is van mening dat so'n stap mense sal aanmoedig om broodbome self te kweek, wat weer op sy beurt tot die be=waring van broodbome in hulle natuurlike staat sal bydra. Dit kan selfs tot ge=volg hê dat gekweekte plante na die natuurlike habitatte teruggeneem en her=vestig kan word.

Die mening word soms uitgespreek dat so=danige ruilings van saailinge 'n bedrei=ging vir ons broodboomkwekers mag inhou. Ons glo nie dit sal die geval wees nie, veral nie as die kwekers realistiese pryse vir hulle plante vra nie. Ons is ook van mening dat die getalle plante betrokke by sodanige wettige ruilings tot 'n klein aantal beperk kan word.

Die argument dat mense wat broodbome wil hê, dit maar wettiglik moet koop, het on=gelukkig ook die noodwendige gevolg dat slegs ryk mense enige hoop het om verteen=woordigende versamelings van selfs jong plante te bekom.

Daar is volgens ons mening voldoende rede vir alle betrokkenes om saam te besin oor 'n moontlike wysiging in die toepassing van die Plantverbeteringswet. Die behoefte daaraan sal net al groter word.

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.

FROM THE CHAIRMAN

It is appropriate for me to congratulate your newsletter editor, Maans Kemp, for his achievements in the production of ENCEPHALARTOS No.1 and No.2. Maans has produced a well-balanced, very readable, magazine-style publication which is fac=tually correct in detail and has costed out within the limits of our rather re=strictive budget. Many members have told me how impressed they were with the first issue. I know they will be equally delighted with this issue. Well done, Maans!

A second pleasant item for me to report is the continued growth of membership of the Society. The number of members has increased from 139 reported in ENCEPHALARTOS No.1 to 250 at the time of writing (28 April). The distribution is currently:

Transvaal	101	OFS	10
Natal	64	Other, African	4
Cape	62	Overseas	9

May I extend a cordial welcome to all new members?

Not all is roses; there have been a few inevitable teething troubles. There has been criticism that the Transvaal Sec=tion has not yet arranged meetings and that the seedbank and pollenbank are not yet operative. May I ask for patience - your committee is aware of the situa=tion and work is being done. (See the article "Pollen Exchange" elsewhere in this issue - Editor.)

Criticism has also been received in con=nection with the closure of the 'Swop-shop' for plant material. This step was necessitated by compliance with the law and was taken in response to represen=tations from the Department of Agricul=ture. I must hasten to add that most officials of the various Government and Provincial Departments with which the Society has had dealings have been con=sistently helpful and sympathetic. Your incoming committee will be asked to re=view the 'Swop-shop' situation and may make further representations to the various officials in respect of exchange of plant material by members.

I am also obliged to refer to the spate of thefts of cycad plants from private collections and public gardens. The Director of Parks in Durban, Errol Scarr, has told me that the various iron poles and grids around plants in the Botanic Gardens have been forced on them because of theft of plants; the absence of labels is for the same rea=son. I have responded to this by assuring Mr Scarr that any member found guilty of the theft of cycads would, in terms of our constitution, be expelled from the Society forthwith. May I also appeal to members not to purchase plants from any source where the origin of the plants may be questionable? A good practice and a step necessary for one's own protection, is to insist on a written receipt for any cycad purchased and further to insist that the seller's authority to sell the plants is recorded on the receipt.

To return to the more positive side: I am pleased to report that the Society's finances are healthy: My wife Angela has kindly got the books in good order and has volunteered to take over the bookkeeping chores. I must end by acknowledging the kind donations by various members and our sponsor compa=nies - their financial contributions are much appreciated.

Broodboomgroete
Roy Osborne
CHAIRMAN

FOOD FOR THOUGHT

"I possess no cycads, because I am con=centrating only on those species that Fairchild Botanic Garden in Miami needs and does not have, and then I donate them to Fairchild. As an analogy, there are those individuals who work to save whales without needing to have a private collection of whales."

David Tuvel, Deerfield Beach, Florida, USA.

MODJADJI: BROODBOOMKONINGIN

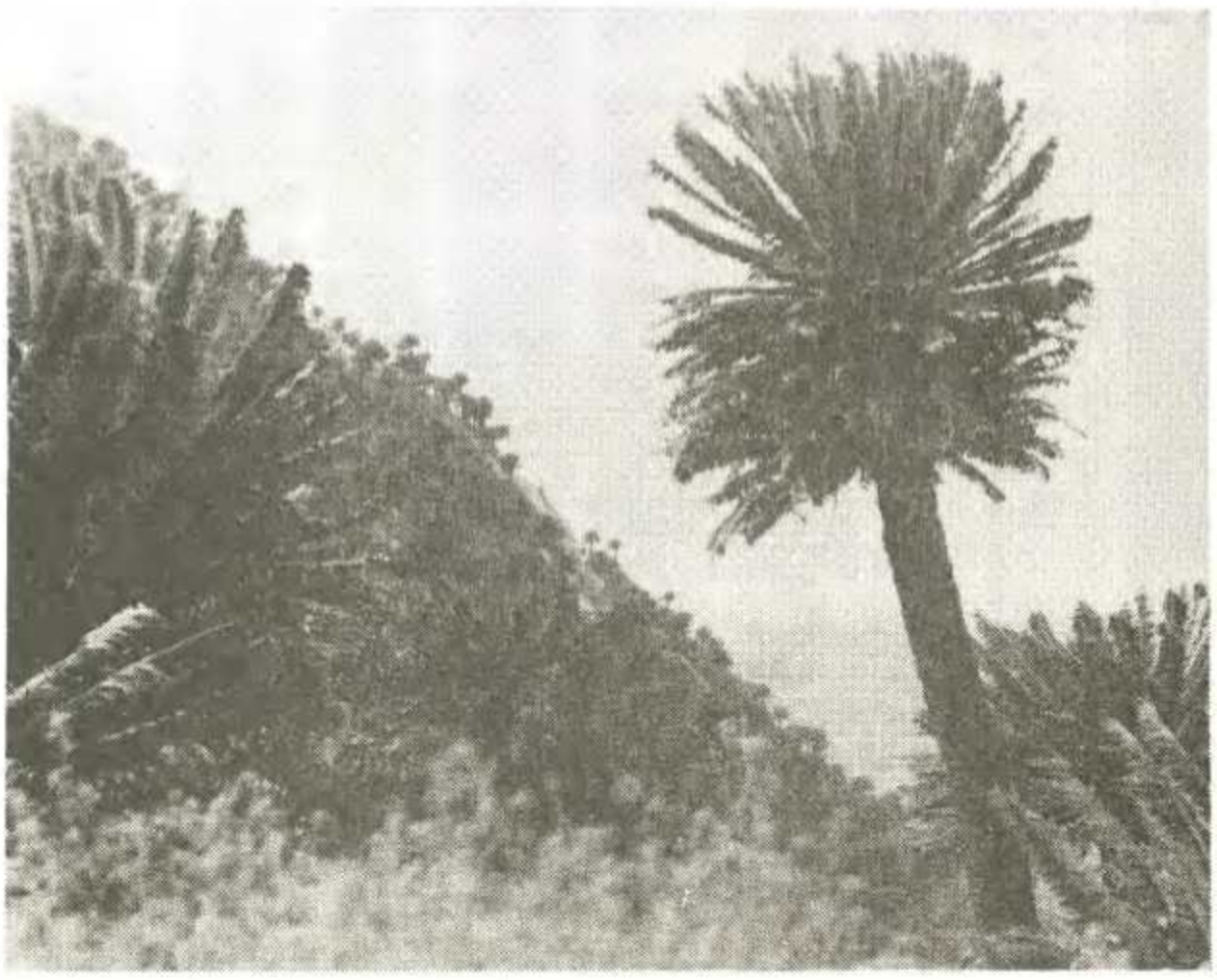
Naby Duiwelskloof in die Noord-Transvaal woon die Lovedu-stam. In die koninklike kraal, in haar bergvesting, woon die heerser van die Lovedu: die misteri= euse vorstin, die Reënkoningin, die Modjadji (die naam beteken "Koningin van die Dag").

Die huidige vorstin is die vyfde Mod= jadji: Die Modjadji-dinastie se oorsp= rong en mistiek is gewortel in die eeu- oue verlede van die Modjadji-stam waar= van die heersers volgens oorlewering die vermoë gehad het om "die wolke te melk" - om "reën te maak". Vroeg in die 19de eeu het koning Mokotha sy dogter as troonopvolger, as eerste Modjadji en as draer van die reënmaak= tradisie aangewys. Sy is alom daarvoor gerespekteer, ook deur Tjaka en sy Zoeloes. Wanneer sy oorlede is, weet niemand nie - in daardie tyd is die Modjadji deur haar onderdane as onsterf= lik beskou. Ook van Modjadji II is min bekend. Geen Blanke het haar ooit ge= sien nie. Dit word geglo dat die eerste twee Modjadji's gifbekers ge= drink het nadat hulle opvolgers aange= wys is.

Modjadji III het vir 57 jaar, van 1896 tot 1953, regeer en is opgevolg deur Modjadji IV wat in 1981 oorlede is. Albei is aan natuurlike oorsake oorlede, alhoewel die dood van Modjadji IV steeds tot die mistiek bydra: sy het aan be= roerte beswyk, na 'n donderslag, byna asof sy geroep is.

Die huidige Modjadji is in Oktober 1982 ingehuldig en word steeds met groot eer= bied deur haar onderdane behandel. Sy word deur hulle as 'n soort godheid be= skou en in haar kraal is die grond heilig en trek almal hulle skoene uit. Die idee van die Modjadji's se onsterf= likheid word steeds voortgedra deurdat hulle begrafplaas geheim is. Daar is gerugte dat dié geheimsinnige plek streng bewaak word. Die misterie van die Reënkoningin wat Rider Haggard geïnspireer het om sy boek "She" te skryf, duur dus voort.

Een van ons broodboomspesies, Encepha= lartos transvenosus, speel steeds, soos deur die eeue heen, 'n groot rol in die rituele gebruike en tradisies van die Reënkoningin en haar stam. Naby die



E. transvenosus:

Die broodboomwoud by die Modjadji se kraal

koninklike stat is 'n heuwel, oortrek met honderde groot broodbome, 'n "broodboom=woud" wat uniek in Suidelike Afrika is. Die duisend jaar-oue woud (wat ook die "Woud van Daja" genoem word) is tot 'n nasionale gedenkwaardigheid verklaar en is deur die eeue beskerm deur die mis=tiek rondom die Modjadji's. Tot baie onlangs het niemand dit gewaag om naby die heilige woud te gaan nie.

Daar is gerugte van 'n geheime grot naby die Modjadji se stat wat streng bewaak word en wat deur geen nie-Lovedu genader mag word nie en waar keëls van die brood=bome gereëld geplaas word om die voort=bestaan van die stam te verseker. Daar is van die broodbome voor die Modjadji se huis geplant en van die blare versier haar troon tydens seremoniële geleent=hede.

E. transvenosus is onlosmaaklik aan die Modjadji's gekoppel en daar word dikwels (verkeerdelik) na hulle verwys as "Modjadji-palms" of "Modjadji-reënpalms".

Die broodboomwoud by die Modjadji se stat is oop vir besoekers elke dag van die week vanaf 08h00 tot 17h00. Toegangspermitte is by die hek ver=krygbaar teen R1,00 per persoon en 50c per motor. Grasperke, braaige=riewe en toilette is beskikbaar. Indien u verdere besonderhede ver=lang, kan u in verbinding tree met:

Mev. M.R. Short
"Rolvark"
Posbus 43
MOOKETSI
0825

Tel.: 015239-761

(Ons hartlike dank aan mev. Short wat geskryf het om van die Modjadji en haar broodbome te vertel en ook die meegaande foto gestuur het. Bykomstige inligting is verkry uit "Suid-Afrikaanse Panorama", Maart 1983 - Redakteur.)

YOUNGEST MEMBER

Rein Schuch

In Cyril Manthe's last 1984 "Newsletter for the South African Cycad Collector", he featured fifteen-year old Robbie Swanepoel of Pietermaritzburg as 'our youngest member'. That honour has now passed to ten-year old Rein Schuch of Phalaborwa. Rein has a collection which includes Encephalartos altenstei=nii, E. lebomboensis, E. transvenosus, E. horridus, E. mannikensis, E. trispi=nosus, E. laevifolius, E. longifolius, E. lehmannii, Dioon edule, Cycas thouar=sii, C. revoluta, Zamia furfuracea, Z. pumila and Ceratozamia mexicana, with about 35 specimens in all. Pre=sently in Standard 3 at school, Rein does karate twice a week and collects coins, medals, guns and has a large and beautiful shell collection. 'But my main love is for the cycads', he says. Membership of the Society was a surprise Christmas present for Rein.

(ENCEPHALARTOS thanks Mrs Marion Debruyne of Phalaborwa for 'intervie=wing' Rein for us - Editor)

POLLEN EXCHANGE

The Society is very pleased to announce the introduction of a Pollen Exchange service for its members. Mrs Cynthia Giddy has kindly offered her services (and those of her computer!) in this connection and will be in charge of the Pollen Exchange. Thank you very much, Cynthia!

The Pollen Exchange will operate as follows:

- A list will be compiled of members who possess or have access to male cycad plants which produce cones and who are prepared to donate pollen to other members, as well as of members who possess or have access to female cycad plants which produce cones and who are prepared to have the female cones pollinated in exchange for a share of the fertile seed. Interested members are requested to complete and return the Pollen Exchange Check List which is enclosed with this edition of ENCEPHALARTOS as a loose insert. Please send the completed list directly to Cynthia. Her address appears on the form.
- The information obtained from the above-mentioned form will be stored in the computer.
- If a member has pollen available or has a female cone and wants pollen to pollinate it, he/she can contact Cynthia directly. From the information stored in the computer, Cynthia will then provide the names of possible sources in the same area. The member concerned can then contact these persons directly. The idea of the Pollen Exchange is therefore to put the "haves" and the "have-nots" in touch, to their mutual benefit.

Please complete the check list and send it to Cynthia without delay. Let us help one another in this way.

STUIFMEELRUIL

Dit is vir die Vereniging baie aangenaam om die instelling van 'n Stuifmeelruildiens vir sy lede aan te kondig. Mev. Cynthia Giddy het haar dienste (en dié van haar rekenaar!) goedgunstiglik in hierdie verband aangebied en sal in beheer van die Stuifmeelruil wees. Baie dankie, Cynthia!

Die stuifmeelruil sal as volg werk:

- 'n Lys sal saamgestel word van lede wat in besit is van, of toegang het, tot manlike broodbome wat keëls vorm en wat bereid is om stuifmeel te skenk aan ander lede, sowel as van lede wat in besit is van, of toegang het, tot vroulike broodbome wat keëls vorm en wat bereid is om die vroulike keëls te laat bestuif in ruil vir 'n deel van die bevrugte saad. Belangstellende lede word versoek om die Stuifmeelruil-vraelys wat by hierdie uitgawe van ENCEPHALARTOS ingesluit is, te voltooi en terug te stuur. Stuur asseblief die voltooide lys direk na Cynthia. Haar adres verskyn op die vorm.

- Die inligting wat uit bogemelde vorm verkry word, sal in die rekenaar gestoor word.

- As 'n lid stuifmeel beskikbaar het of 'n vroulike keël het en stuifmeel soek om dit te bestuif, kan hy/sy direk met Cynthia in verbinding tree. Uit die inligting wat in die rekenaar gestoor is, sal Cynthia dan die name van moontlike bronne in dieselfde omgewing verstrek. Die betrokke lid kan dan direk met hierdie persone in verbinding tree. Die idee van die Stuifmeelruil is dus om die "haves" en die "have-nots" met mekaar in verbinding te bring, tot hulle onderlinge voordeel.

Voltooi asseblief die vraelys en stuur dit so gou as moontlik aan Cynthia. Laat ons mekaar op hierdie manier help.

FOCUS ON... FOKUS OP...

In every edition of ENCEPHALARTOS the spotlight will fall on one South African Cycad species in the form of an indepth article in layman's language. In this edition we focus on the unique Southern African genus, with its single species:

STANGERIA ERIOPUS

by Piet and Elsa Vorster

Summary

ALONG the east coast of South Africa occurs a remarkable cycad which is seldom seen in cultivation, and when not in cone is often mistaken for a fern. This plant is *Stangeria eriopus*, and it is the purpose of this article to present some information about it.

Introduction

The unique nature and position of the cycads in the plant kingdom have already been discussed in *Excelsa* 3: 15 (1973). One of the three families of cycads (the others being Cycadaceae and Zamiaceae), the Stangeriaceae contains only one genus, *Stangeria*, and one variable species, *S. eriopus*. *Stangeria* differs from the other living cycads in the venation of the leaflets. While the leaflets (pinnae) in the Cycadaceae contain a single prominent midrib and in the Zamiaceae a number of equal parallel longitudinal veins, the pinnae in the Stangeriaceae contain a strong midrib from which faint lateral veins branch out at an angle of 10-45°, like a feather. Each lateral vein forks at least once near its point of origin and sometimes another two or three times. This type of venation is considered to be primitive, and resembles that of ferns. The stem of *Stangeria* is underground and tuberous, and like the Australian *Bowenia* sheds the old leaf bases which are such a characteristic feature of most other cycads. The reproductive structures, while differing in certain finer details, largely resemble those of the Zamiaceae. Chamberlain (1919) pointed out that while in certain genera of cycads the cones are formed laterally, in *Stangeria*, *Dioon* and *Ceratozamia* the process is different. When the first cone is formed, it is indeed terminal, but in the process all the embryonic tissue at the apex of the plant is used up. A new region of embryonic tissue develops below the peduncle of the cone and continues growth of the stem until its life is also terminated by the formation of a cone. Once again a new region of embryonic tissue is formed. Therefore, although the stem has a linear appearance, it in fact consists of a series of branches each terminated by the formation of a cone. More than one new growing point may be formed at a time, giving rise to more than one new head. In this way extensive branched clumps may be formed.

Description

Stangeria is a perennial plant, probably living to a great age like other cycads. It has an elongated, swollen, carrot-shaped underground part which is up to 10 cm in diameter or even 25 cm according to Marloth (1913) (figure 7). This tuber is sometimes branched into several growing points which usually cone simultaneously. Some people regard the whole underground portion as a subterranean stem, but actually only the apical part is the stem, the basal part being a tuberous root. Dyer (1966) states that the transition between stem and root is not readily detectable. Branching takes place in the stem-portion, not in the root. The apex of the stem produces woolly scales which fall off early. As in other cycads, the roots of *Stangeria* form unusual growths, the so-called root-nodules or coralloid roots (figure 6). These seem to become more pronounced in badly aerated soil under which conditions they occur above the surface of the soil. Although they may play a part in the aeration of the root system, it has been demonstrated (Spratt, 1915) that they contain two species

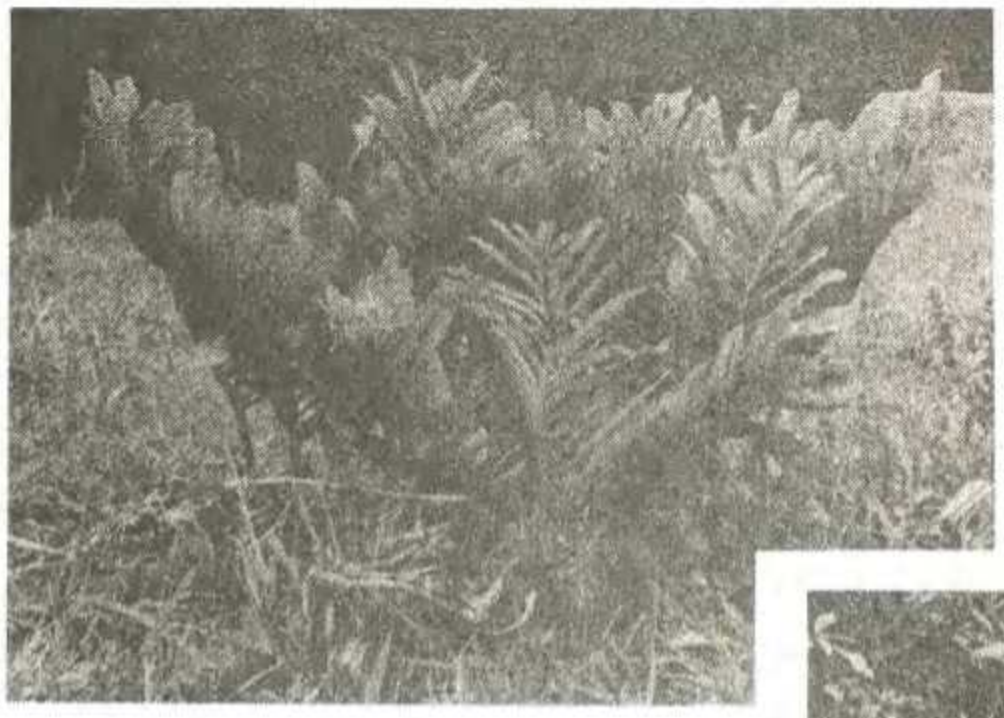


Figure 1: Stangeria eriopus *in grassland habitat in Zululand*

Figure 2: Stangeria eriopus *in forest habitat in Zululand*

of Bacteria, namely, *Bacillus radicola* and *Azotobacter* sp., and an alga which is a species of *Anabaena* according to Spratt (1915) but is called *Nostoc* by Pearson (1906). These organisms fix atmospheric nitrogen in the root nodules. Each growing point of the stem forms one leaf at a time, which is circinate (rolled up at the tip) when young. When a new leaf first appears, it is covered with short, grey velvet, but this soon disappears except sometimes at the base of the petiole. The leaves are fern-like, pinnate and vary in length from 25-200 cm depending on environmental conditions. About half of this length is petiole. The pinnae (leaflets) are soft to slightly leathery, varying considerably in texture and size, arranged in 5-20 opposite or nearly opposite pairs (figure 8). The venation (figure 8a) has already been described. The lower pinnae are stalked but the upper pairs are fused at their bases and decurrent on the rhachis below. The reproductive structures are stalked cones, male and female cones being borne on separate plants.

It appears as if only a single cone at a time is borne on each growing point. According to Batten & Bokelman (1966) the cones are produced from May to September, but the coning specimens in the National Herbarium in Pretoria were collected evenly throughout the year. The male cone (figure 3) is cylindric, tapering to the apex. The young cone is covered with short, silvery velvet, but this falls off towards maturity when the cone displays a yellow-brown colour. Cones are 3-4 cm in diameter and 10-25 cm long. The male scales or microsporophylls (figure 9a-b) are spirally arranged round the axis of the cone (figure 9a).
They are triangular or rhomboid as seen from above, about 12 mm wide and long, with the outer face about 12 mm wide and 4-6 mm high. About 150 microsporangia (Chamberlain, 1919) are borne on the lower surface of the microsporophylls (figure 9b) in groups of 3-6 (figure 9d). The microsporangia are about 1 mm long by 0,5 mm in diameter and open with a longitudinal slit to release the pollen. The female cone (figure 4) is elliptic or egg-shaped with a rounded tip. It is covered with silvery velvet when young but loses most of this to become dark green at maturity. It is up to 18 cm long and 8 cm in diameter. The female scales (macrosporophylls) are, like the male scales, spirally arranged around the central axis of the cone in such a way that their outer faces appear to be arranged in about six vertical columns. They are up to 6 cm wide and long, with the outer scale face

up to 4 cm high. The outer surface is slightly convex and overlaps the scales above, probably assisting the retention of wind-borne pollen. At the base two ovules are borne (figure 9e-f). The ovules are up to 3,5 cm long by 2,5 cm in diameter, although usually somewhat smaller. They consist of a dark red fleshy outer layer which envelopes a hard kernel which is about 2 cm long by 1,4 cm in diameter. Initially the kernel is stained pinkish by the outer layer, but soon changes colour to brown on exposure to the atmosphere.

Variation

The long list of synonyms bears testimony to the astonishing degree of variation exhibited by *Stangeria eriopus*. Careful study of plants in the field has led to the conclusion that only one species is involved. This has been confirmed by cultivating different-looking plants from different habitats under identical environmental conditions, under which they assumed similar appearances (Chamberlain, 1919).

Leaf size varies from about 30 cm long in grassland to 240 cm in dense forest. The authors had access to a specimen which was originally uprooted in grassland and

Figure 3: Male cone of Stangeria eriopus *cultivated in Durban. Length 25 cm excepting peduncle.*

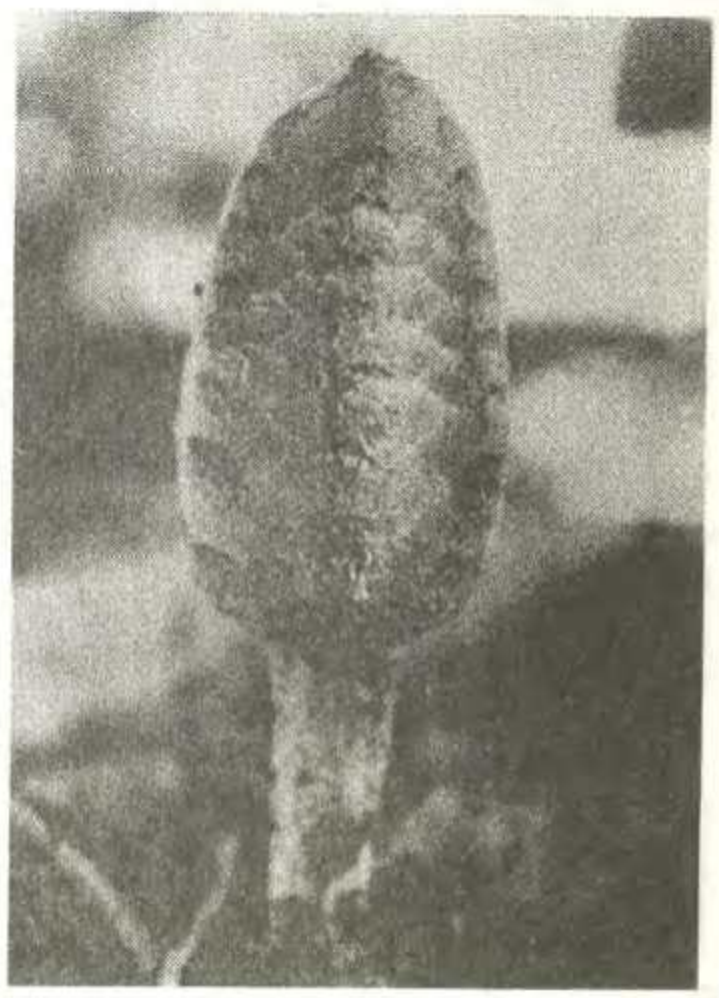


Figure 4: Female cone of Stangeria eriopus *from the Transkei. Length 15 cm not including peduncle*

replanted in shade. After seven years this plant, which originally had a single leaf about 30 cm long, has five magnificent leaves each about 80 cm long. Grassland plants usually have much more compact leaves (figure 1) compared with the more lax, fern-like leaves of forest plants (figure 2). Pinnae of grassland plants may be as short as 7 cm and 1,5 cm wide, while in forest localities they may attain a length of more than 50 cm and a width of 6 cm.

Plants in grassland seldom have more than one leaf per stem branch because leaves are produced only once a year and are destroyed in the annual grass fires. In moist forests, where fires rarely occur, the leaves of 2-3 seasons may accumulate. In cultivation up to five or six leaves accumulate after which the oldest leaf dies before a new one is formed. The short grassland in which the plant in figure 1 occurs, is being grazed quite heavily and therefore has not been burnt for a few years, which explains the unusual number of leaves.

Grassland plants usually have pinnae with margins entire or at least less toothed than forest plants (figure 8 d-e, a, f).

The pinnae are rarely strongly lobed, almost pinnatifid (figure 8c).

Observations on cultivated plants indicate that the toothed character of the pinna margins is to some extent controlled by the environment. Pearson (1906) recorded an observation by Medley Wood to the effect that forest plants usually have entire pinna margins and that toothed margins are to be found in grassland plants.

Grassland plants frequently have pinnae with rounded or indented tips (figure 8e, d) compared to an acute tip in forest plants (figure 8f).
Our observations indicate that the shape of the apex of the pinna is mainly acute. As the growth centre of the pinna is situated in its tip, it is readily damaged by being blown against other structures in exposed sites, resulting in rounded or indented tips. Within forests, conditions are much less windy and pinnae are much less prone to be damaged. The same phenomenon was observed in *Asplenium nidus*, the bird-nest fern.

Grassland plants usually have hard, leathery pinnae while forest plants have soft, herbaceous pinnae. The cause is probably that the atmosphere outside forests is much drier than inside, so that plants growing in the open develop protection against desiccation.

Grassland plants often branch into dense clumps a few metres across, while forest plants usually occur singly.

Figure 5: *Seed of* Stangeria eriopus

Figure 6: *Bacterial nodules of* Stangeria eriopus *from a plant cultivated in Durban*

Possibly the branching is the result of grass fires damaging the growing points of the stems and so induce branching. The branching habit may also be correlated with the frequency of coning, as it appears as if grassland plants cone much more often than forest plants. As has been explained, the growing point is exhausted every time a new cone is formed, so that the effect of coning would be the same as that of fire in the sense that it induces the formation of one or more new growing points.

While the cones of both grassland and forest plants are usually borne on peduncles about 5 cm long, occasionally specimens are found with peduncles up to 25 cm in length. Pearson (1906) concluded, probably correctly, that the length of the peduncle is influenced by the height of the surrounding vegetation. In a wind-pollinated plant it is essential that the reproductive structures must be exposed to the wind.

Life History

When the male cone is ripe, the central axis of the cone elongates to such an extent that the microsporophylls are separated from one another. Figure 3
is of such a cone. The pollen is released by the microsporangia via the longitudinal slits,

and is blown by the wind from the gaps between the microsporophylls. According to Batten & Bokelman (1966) pollination is affected by both wind and weevils. While several species of weevils (family Curculionidae) have been collected from cycad cones, there is as yet no proof that they play any part in pollination. These insects eat the pollen and breed in the female cones where they do great damage at times. The structure of the reproductive parts of *Stangeria* is typical of wind-pollinated gymnosperms. When the female cone is ripe, the macrosporophylls also separate. Because each scale overlaps the ones above it, any pollen falling into the slits between the scales is automatically retained. It is recorded that the micropyle of each ovule secretes a drop of sticky fluid on which the pollen falls and is retained. As the fluid evaporates, the pollen is drawn into the ovule where fertilization takes place. Eventually the female cone disintegrates, allowing the seeds to fall on the ground. The conspicuous red fleshy outer layer attracts the attention of rodents, baboons and possibly also birds, which eat the flesh and discard the kernel, thereby spreading the seed. If no mishaps occur, germination takes place in about one year. A radicle appears through the micropyle and bores into the ground to form a long, stout taproot. When the root is established, the first leaf appears through a slit in the radicle at the bend where it bored into the ground. The first leaf is digitate with 3-4 pinnae (figure 8b).

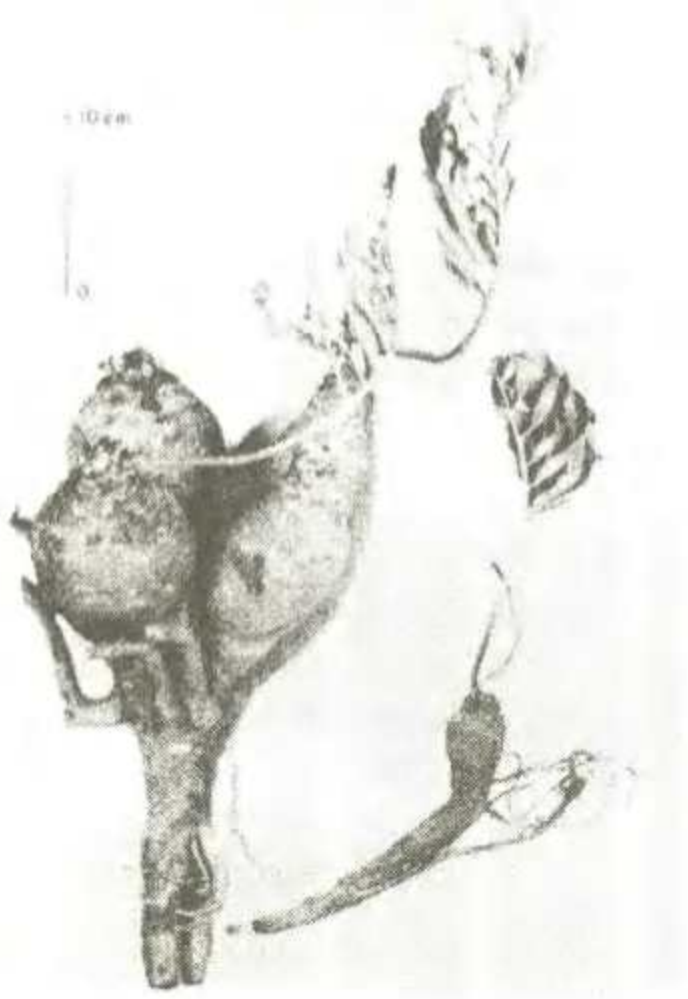


Figure 7: Uprooted plant of Stangeria eriopus, *showing tuberous underground parts*

Its Name

The correct name for the plant is *Stangeria eriopus* (Kunze) Baillard (1892), which antedates *S. eriopus* (Kunze) Nash (1909). It was first described by Kunze in 1836 from a sterile specimen collected by Drège in the eastern Cape, and misidentified with the fern *Lomaria coriacea* Schrader. In 1839 Kunze realised his mistake and extended the description, giving the plant a new name, *Lomaria eriopus*. At this stage the reproductive structures were still unknown. In 1851 Dr. Max Stanger, surveyor-general of Natal, sent a living specimen to a Mr. Ward in England who in turn forwarded it to the Botanic Garden in Chelsea, England. When this plant coned it enabled Moore to identify it as a cycad which he described and named *Stangeria paradoxa* in 1853. The generic name honours Dr. Stanger, while the specific epithet *paradoxa* refers to the paradoxal nature of the plant: Moore thought the plant to "be either a fern-like *Zamia*, or a zamia-like Fern . . . Its affinity appears to be however rather with Cycads than with Ferns . . ."

Synonyms of *S. eriopus* include:

Lomaria coriacea in the sense of Kunze, not of Schrader;

L. eriopus Kunze;

Stangeria paradoxa Moore;

S. schizodon Bull.;

S. katzeri Regel;

S. paradoxa Moore var. *katzeri* (Regel) Marloth;

S. paradoxa Moore var. *schizodon* (Bull.) Marloth;

S. zeyheri Stoneman *nom. subnud.;*

S. paradoxa Moore forma *schizodon* (Bull.) Schuster;

S. sanderiana in synonymy.

"eriopus" means "woolly", probably referring to the velvety hair in which the stipe of the leaf is covered just when it first appears, and which persists somewhat longer at the very base of the petiole. When Kunze proposed that name, the velvety cones were still unknown.

Vernacular names include "Bobbejaankos" (=baboon food), not a very apt name as it is used for several unrelated species regarded as inferior food for humans. In southern Natal it is also known as Finguane or Juma. The Zulu call it Imfingo while the Xhosa call the whole plant Umfingwani and the cone only, Umncuma.

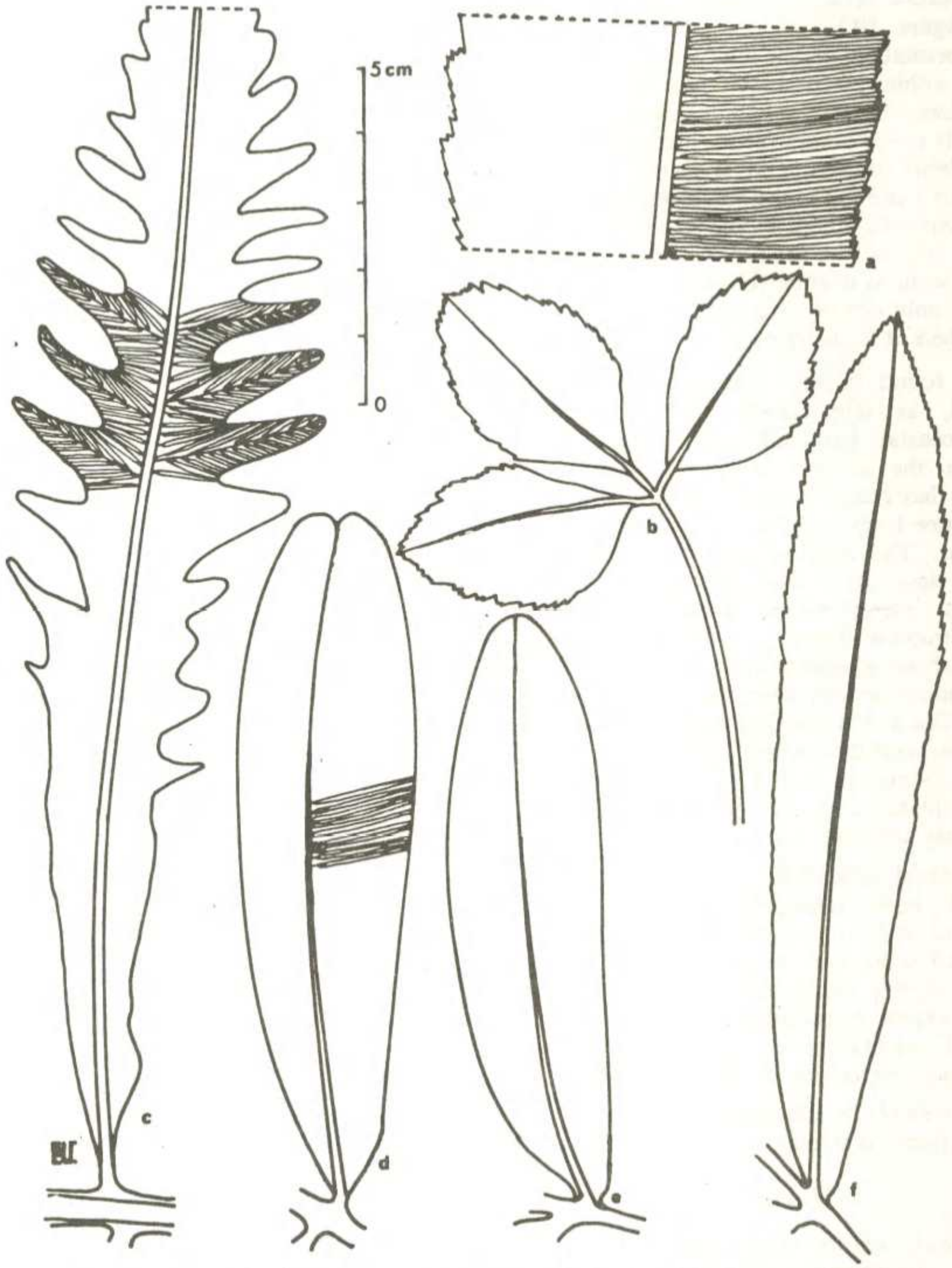


Figure 8: Variation in shape of the pinnae of Stangeria eriopus: *a, portion of a giant pinna 51 cm long from a forest plant; b, first leaf of a seedling plant; c, abnormal lobed pinna; d, pinna with indented tip from a grassland plant; e, pinna with rounded tip from a grassland plant; f, pinna from a forest plant.*

Distribution and Ecology

S. eriopus is restricted to a relatively narrow strip of land along the east coast of South Africa, from about latitude 33°30′ S in the Bathurst district to 27° S, just south of the border between Mocambique and Natal (figure 10). Dyer's (1965) speculation that it may well be discovered within Mocambique has not yet been realized, but the possibility cannot be ignored. It never occurs further than about 50 km from the sea, and is usually not closer than 2 or 3 km to the beach. Although it is occasionally found in the short grassland just beyond the first coastal dunes, it does not seem to tolerate the salt spray and therefore only occurs very near the sea in places where it is sheltered from the spray.

It is found in full sunlight in short grassland, in light shade under trees in the coastal parkland, and in dense shade in the coastal forest. It should be noted that coastal forest is distinct from coastal dune forest in which *Stangeria* does not occur. The distribution of *Stangeria* shows a close correlation with the vegetation type "evergreen and deciduous bush and subtropical forest" of Pole Evans (1936), whose classification of vegetation types is much simpler than that of Acocks (1953). The soil is mostly sandy, often derived from sandstone, although in the north *Stangeria* occurs on granite soil, and in the Transkei plants were seen on heavy black clay. These soils are slightly acid.

The annual rainfall is more than 1 000 mm in the north, falling to just below 750 mm in the southern part of the distribution range, and about two thirds of this is precipitated during the summer months. The mean minimum temperature at East London is 14,3° C, at Durban it is 17,3° C and at the northern extremity of the distribution area it probably is still higher. Frost is of rare occurrence in this area.

Cultivation

Stangeria is easy to grow. Because conditions of cultivation usually eliminate competition from other plants, cultivated specimens are often more luxuriant than many plants under natural conditions.

While most tuberous-rooted plants should be allowed to dry out for some time after uprooting and before replanting, especially when wounded, this is not necessary and perhaps not advisable in the case of *Stangeria*. Because of the extensive branching of the underground parts it is usually not possible to uproot a plant without damaging it to some extent. Wounds should, as soon as possible, be dusted with sulphur or some commercial fungicide, and the underground parts may be enclosed in a plastic bag to prevent desiccation until the plant can be replanted. Free water should, however, not be allowed inside the plastic bag. Unlike other cycads, the leaves must not be removed unless they start to die after transplanting. Although not essential, it does no harm to cover the leaves with plastic until the plant can be replanted. The authors have seen a specimen with a stem about 10 cm in diameter being broken off about 20 cm below ground level. This plant, which had one leaf plus a second leaf just emerging, was treated in the manner related above and replanted. The plant survived and the emerging leaf grew out to nearly full size.

Even when cultivating plants of *Stangeria* in a coastal district, it is preferable to keep plants in shade, because under such conditions they produce more luxuriant foliage. They also do well in pots at least 30 cm deep and 30 cm in diameter. There should be ample soil for root development to take place. The soil should be sandy, slightly acid, very rich in humus and a layer of dead leaves about 5 cm deep should cover the soil to prevent desiccation and to maintain the humus level. The soil should be kept slightly moist but not permanently wet. Occasional dry spells do not harm the plants but are unnecessary as *Stangeria* has no inherent seasonal periodicity. Protection against frost is necessary.

Sometimes one sees illustrations of cultivated plants with exposed tubers. In nature, however, the tuber is usually below ground level.

Like other cycads, growth from seed seems to be on the slow side, but nevertheless this method of propagation is worth the trouble. At the Botanical Research Institute in Pretoria a specimen was raised from seed under glass. At the age of five years it has a tuber 4 cm in diameter and six leaves varying from 16 cm in length with three pairs of pinnae to 48 cm in length with five pairs of pinnae. Another specimen with a tuber 4,5 cm in diameter doubled its tuber diameter in seven years. Unlike other cycads, *Stangeria* usually produces only one leaf at a time, but these can accumulate to five or six. As the stem is always underground and thus invisible, the only apparent difference between young and old plants is leaf size.

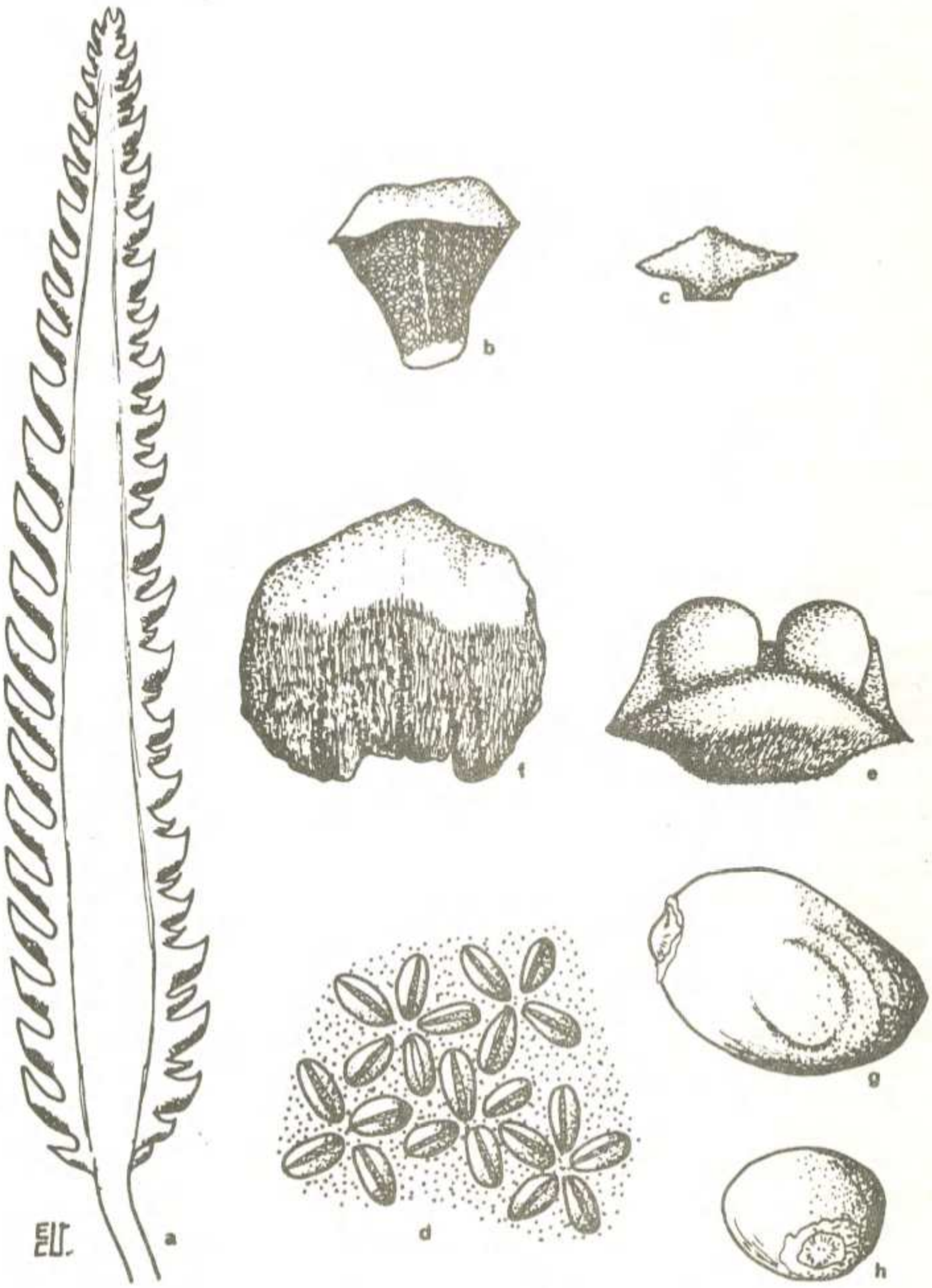


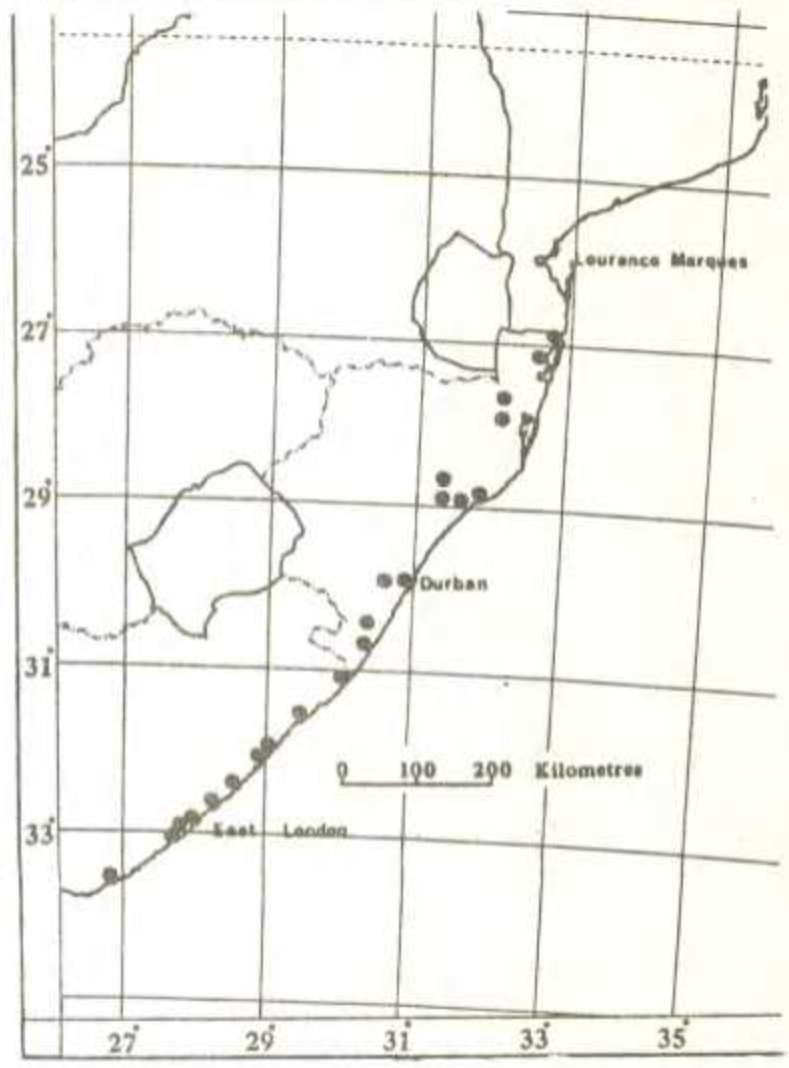
Figure 9: Reproductive structures of Stangeria eriopus: *a, longitudinal section of male cone; b, microsporophyll seen from below and showing microsporangia; c, microsporophyll seen from the front showing outer scale face; d, microsporangia; e, macrosporophyll seen from the front and showing outer scale face and ovules protruding below; f, macrosporophyll seen from above with ovules protruding from below; g, fruit in lateral view; h, fruit to show point of attachment to cone (hilum).*

The fleshy cover of the fruits may be removed before the seeds are planted, because it appears to inhibit germination, probably chemically. The soil should be light and rich in humus as described for mature plants. The seed should be pressed about halfway into this soil so that the long axis between the micropyle (germination pore) and the scar indicating where the seed was attached to the cone scale, is parallel to the soil surface. The seed must never be covered with soil, but a light covering of leaf-mould may be applied. The soil should be kept moist, and for best results the seed bed should be covered with a sheet of glass to keep the air moist. The seed bed should be in shade. Germination commences somewhat faster than in the case of many other cycads, being usually within a year after planting. As soon as the radicle appears, the plants can be potted individually. If transplanting is postponed until the leaves have appeared, the well-developed taproot may be damaged in transplanting operations.

Economic Importance

It is said (Watt & Breyer-Brandwijk, 1962; Batten & Bokelman, 1966) that the Zulu and the Xhosa make extensive use of *Stangeria* for medicinal purposes, especially the root. The root as well as the seeds are purgatives and are used to induce vomiting in children who have eaten something poisonous. These authors do not say whether the kernel or the fleshy part of the fruit is used. Schuster (1932) related how the natives apply the "nut" to the integument of the penis, the object not being known. Xhosa women with infants wear a necklace of *Stangeria* root pieces. It is said that some parts of the plant are edible. Most cycads contain a dangerous poison in the kernel, but no reference to poison in *Stangeria* could be found in literature.

Figure 10: Distribution of Stangeria eriopus



Epilogue

Stangeria is much in demand with scientific and educational institutions as well as with private collectors throughout the world, and many plants have been uprooted to meet this demand. In addition countless thousands of plants have been destroyed during preparation of their habitat for growing pineapples and sugar cane. Today *Stangeria* is protected by law throughout its distribution range and may not be uprooted, transported or exported without a permit. Unfortunately no one seems to grow them from seed on a commercial scale, and plants are hardly ever available in the trade.

It is hoped that this article will encourage a livelier appreciation of *Stangeria eriopus*.

(This article has been reprinted from 'Excelsa', no. 4, December 1974, by kind permission of the authors and the editor, Mr Michael J. Kimberley of Harare. 'Excelsa' is published by the Aloe, Cactus and Succulent Society of Zimbabwe.)

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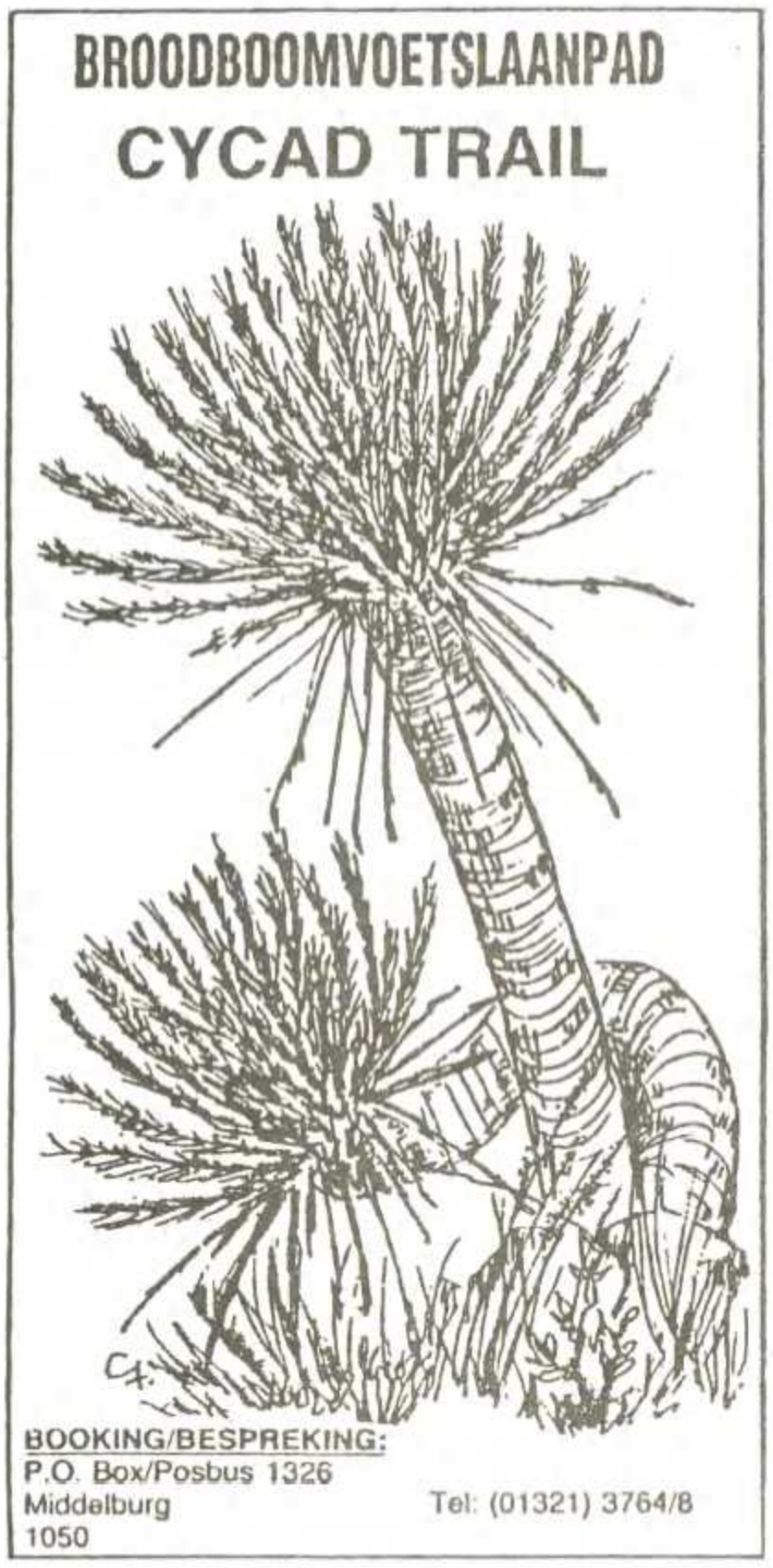
(The photographs are by P. Vorster and by R. G. Strey (figures 6 and 7) with permission of the Director, Botanical Research Institute),



CYCAD TRAIL

The National Hikingway Board, an organisation with representatives from the major conservation, educational, tourist and recreational bodies in the country, functions under the auspices of the Department of Environmental Affairs. Of the many trails presently being publicised by the Board, the one of most interest to Society members is obviously the 'Cycad Trail' through the Little Olifants River, about 25 km from Middelburg, Transvaal. This 14 km trail takes one through large groups of Encephalartos eugene-maraisii and E. lanatus, apart from the general splendid scenery of the area. Overnight camping facilities are available at a nominal charge. Full details are available from:

Mrs G.A.O. O'Grady
PO Box 1326, Middelburg, 1050.
Telephone 01321-3764/8

A VIEW ON KEW

by Maxine Phillips

Kew Gardens has been in existence for hundreds of years; it began life as a royal garden, but was taken over by the state in 1838. Although it is now known popularly as Kew Gardens, the regal flavour is still retained in its official title: The Royal Botanic Gardens, Kew.

The gardens cover a vast area, and however frequently you visit them, you can never see everything. It is almost impossible to believe that such a large, beautiful garden exists so close to the hustle and bustle of London. Kew is in the county of Surrey; however, it is not obvious to the visitor where London ends and Kew begins. For many years I lived under die misapprehension that Kew was in London, and the area is served by the London Underground and several London bus routes. This, of course, makes the gardens easily accessible to Londoners and visitors alike who do not have their own trans= port. In fact, Kew is a very popular place with tourists and Londoners who flock to enjoy its beauty and tran= quillity. There is an entrance fee, but this is very small indeed (15 pence when I last visited).

All Kew's cycads are to be found in the Palm House, which was built between the years 1844 and 1848. This is a huge and very imposing glasshouse, situated beside a small lake. As you enter the Palm House, you are immediately hit by the atmosphere, which is extremely hot and humid. This is particularly noticeable during winter visits when the difference in temperature between inside and out is at its greatest. The cycads occupy one whole wing of the Palm House. This area is rectangular in shape and bordered by a walkway. The larger plants are in the centre, whereas the smaller ones stand on a waist-high shelf which runs along the walls of the glasshouse.

By far the most impressive plants in the collection, in my opinion, are the Encephalartos species, many of which are mature trees. Amongst the most noteworthy of these is a specimen of Encephalartos longifolius, sent from South Africa by Kew's collector, Francis Masson, in 1775. This is probably the oldest glasshouse plant at Kew, being much older than the Palm House itself. It is now over 4m tall, the full size of the species in the wild. However, the plant that probably receives the most admiration from cycad enthusiasts is Encephalartos woodii. This is perhaps Kew's rarest plant, having been grown from a branch taken from the long lost original, which was discovered in 1895.

Of course, although Kew excells in its collection of Encephalartos, it is home to many other cycads. In fact, the total number of cycad plants at Kew is about 190, representing about 73 species and varieties. These include 23 species and varieties of Encephalartos. When= ever I write to cycad enthusiasts abroad, the single factor they find most strange is that cycads can be grown at all in England! It is true that our climate is not very suitable and that we have to keep our plants either indoors or in heated greenhouses. Kew does not have any serious problems stemming from the weather (apart from the high cost of heating!), but there can be trouble when cold water droplets fall into the crowns of plants.

Kew's cycad collection has been increa= sing for 200 years and is still growing gradually. However, very little is done to propagate the cycads by artificial pollination. Attempts have been made at this, using methods developed by the Fairchild Tropical Garden in Miami, but so far no great success has resulted. Kew's involvement with research into the cycads has been largely concerned with taxonomic work; various descriptions have been contributed to parts of the flora of African countries.

For me, the greatest thing about Kew is that I can go there and find inspiration through being able to view a large gathe=ring of cycads, all at varying stages of their development. This is my only opportunity to see more mature plants. Of course, it can be a bit frustrating too as I try to expand my own small col=lection and think of how many marvellous specimens Kew has! Still, they started their collection a few years before me!!!

(My grateful thanks are due to Mr J.L.S. Keesing of the Royal Botanic Gardens, Kew. I would very much welcome corre=spondence from cycad enthusiasts. They can write to me at 97 Pemberton Road, London N4 IAY, ENGLAND)

DANKIE
THANK YOU

Baie dankie aan almal wat mondelings en skriftelik hulle gelukwense met die eerste uitgawe van ENCEPHALARTOS oorgedra het. Dit word opreg waardeer. Die onderstaande is enkele aanhalings uit briewe.

Thanks very much to all those who conveyed their congratulations, orally and in writing, on the first edition of ENCEPHA=LARTOS. It is sincerely appreciated. The following are a few extracts from letters.

- "Veels geluk met die eerste uitgawe van ENCEPHALARTOS. Dit lyk regtig goed!" - Dr. Piet Vorster, Universiteit Stellen=bosch.
- "The first number of ENCEPHALARTOS is a big success and probably caters admira=bly for the needs of all the members. I am also pleased to see that the inten=tion is not to develop it into a scien=tific research-type journal. We simply don't have the resources to develop it successfully into such a journal. On the other hand, I am convinced that there is a big need for something of the kind you are now producing." - Prof. Nathanaël Grobbelaar, Universi=ty of Pretoria.
- "Geluk met die eerste uitgawe van ENCEPHALARTOS. Dit is 'n baie knap stuk werk, interessant en leersaam..." - Mev. Cynthia Giddy, Umlaasweg.
- "Thank you for the March journal re=ceived. 'Have you hugged your cycad today?' was food for thought - I often talk to my eugene-maraisii, however I find the horridus a bit unapproachable. The other articles are most learned and interesting." - Mrs Jo Marais, Empangeni.

SWOP SHOP
RUILHOEKIE

Members are advised that the ex=change of plant material between persons (except when both parties are registered nurserymen) is illegal in terms of the Plant Improvement Act (Act No. 53 of 1976) and amendments thereto. We regret that the Society will no longer be able to accept such requests for publication, and the 'Swop-Shop' column is now discon=tinued. (See the new 'Give and Take' feature elsewhere in this issue.)

Lede word in kennis gestel dat die uitruil van plantmateriaal tussen persone (behalwe as albei partye geregistreerde kwekers is) onwettig is volgens die bepalings van die Plantverbeteringswet (Wet no. 53 van 1976) en wysigings daarvan. Dit spyt ons dat die Vereniging nie verder sodanige versoeke vir publikasie kan aan=vaar nie en die 'Ruilhoekie'-kolom word hiermee gestaak. (Sien die nuwe 'Gee en Neem'-kolom elders in hierdie uitgawe.)

SEX CHANGE IN CYCADS – HOPE FOR WOODII ?

by Roy Osborne

Because of both its extreme rarity and its splendid appearance, Encephalartos woodii is one of the most sought-after plants in the world. Only one specimen was ever discovered in habitat, the male multi-stemmed clump found by Medley Wood in the Ngoye Forest, Zulu= land, in 1895, although unsubstantiated rumours of a second male plant have been heard. Why there were not more plants is not clear; one theory is that the species was depleted through its use in Zulu ceremonial rites, while some authorities suggest that the plant might be a natural hybrid and perhaps no other specimen of its kind did ever exist. Nevertheless, E. woodii is now regarded as extinct in nature.

The Durban Botanical Gardens hosts several portions of the original plant, salvaged apparently shortly before being carted off for firewood by the indige= nous population; these have now deve= loped into magnificent prize specimens. Fortunately E. woodii produces offsets quite readily and careful vegetative propagation has resulted in a fair number (500?) of plants being established in major botanical gardens and private collections throughout the world. Since all these plants are male it is impos= sible to propagate the species from seed. But two new approaches hold hope for the future.

Encephalartos woodii:

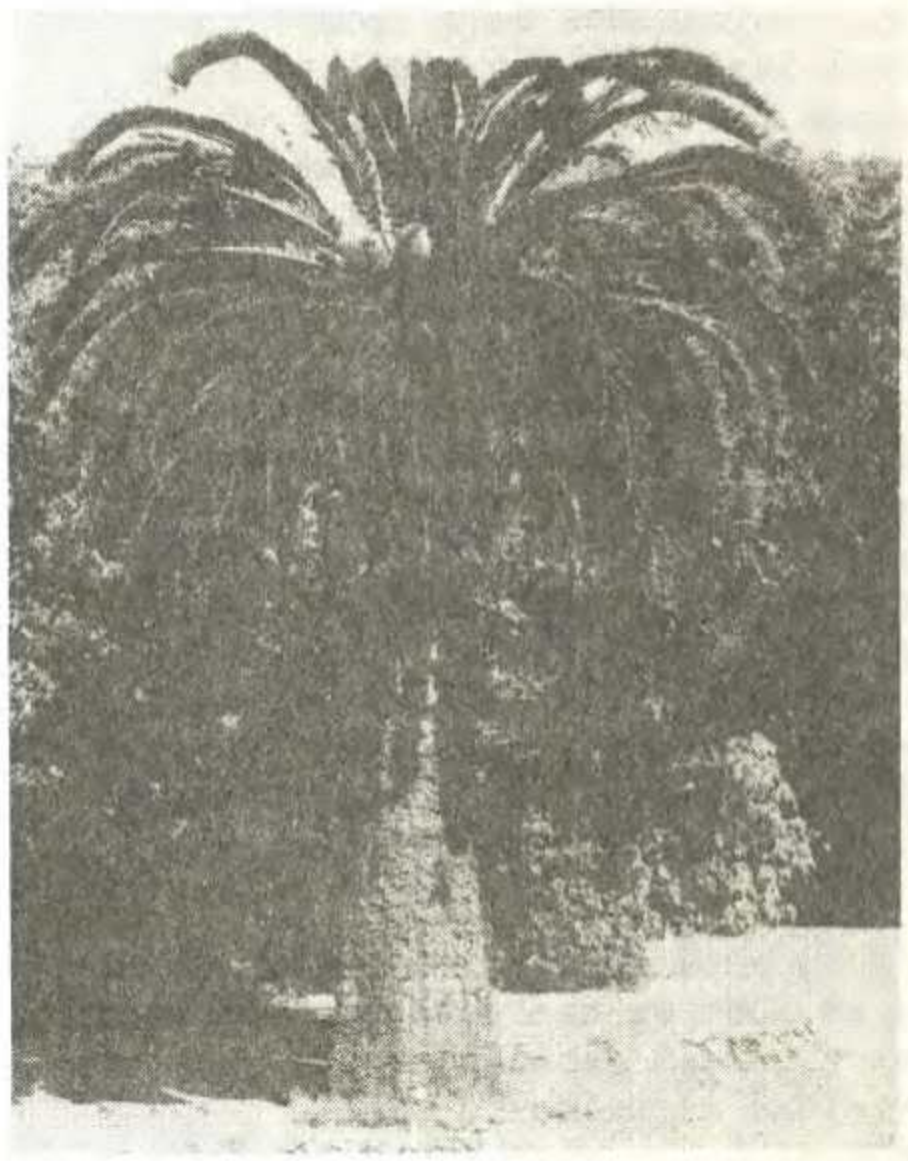
the original male plant found near Ngoye, Zululand; from a photo= graph in the Natal Herbarium, Durban, taken on the expedition by Wylie in 1907. (Reproduced from Bothalia Vol.VIII, Part 4, 1965, with kind permission from the editor and the Botanical Research Institute.)

The first approach is being adopted by Cynthia Giddy at her Umlaas Road nursery and has been described by D.C. Speirs. Pollen from male cones of the existing E.woodii plants is used to fertilize E. natalensis, the species which seems to be most closely related. Females from this hybrid generation (F_1,50% E.woodii) are back-crossed with more E.woodii pollen to give another generation a little closer to pure E.woodii (F_2, 75% E.woodii). The process is repeated until an almost pure population is established - e.g. the F_5 generation would be 97% E.woodii. The disadvantage of course lies in the length of time from one generation to another; assuming 12 years for each batch to come to maturity, the 5-generation process takes 60 years.

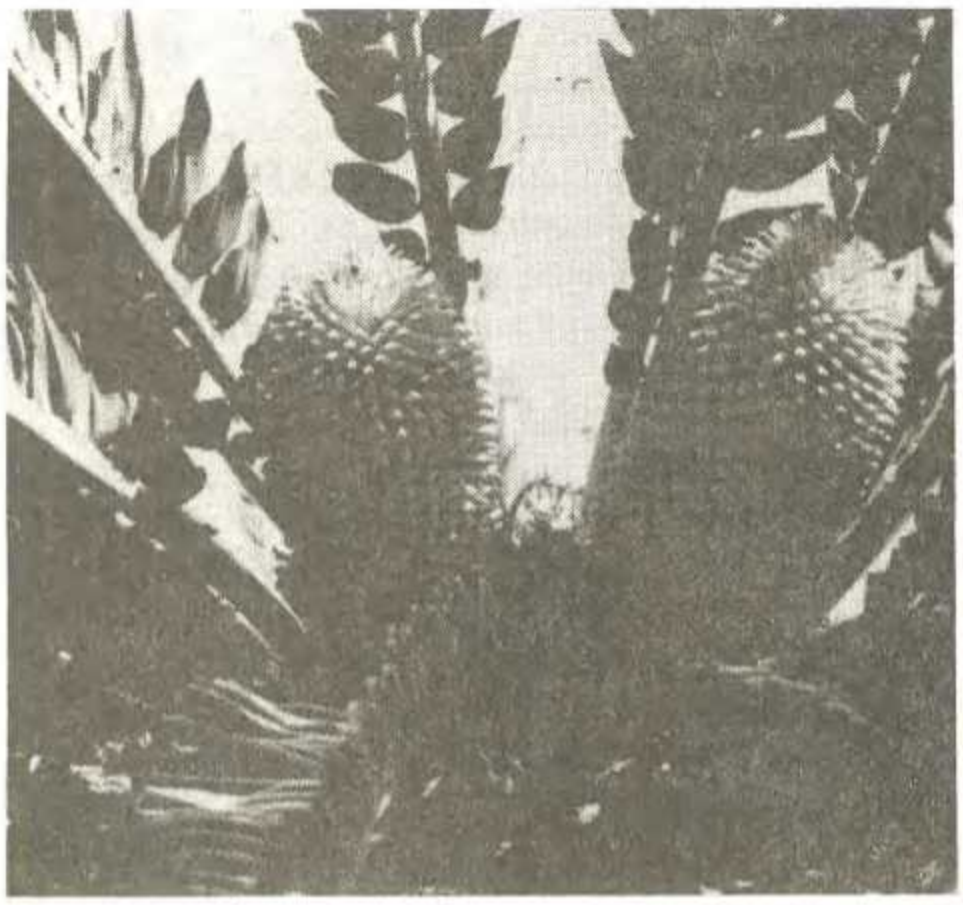
A second plan of action follows from the rather unusual, but now well-documented evidence that sex changes can and do occur in cycads. In 1967 Menninger decribed two instances of sex reversal in Cycas circinalis; one plant changed from female to male after severe physical damage, while the opposite change occurred when another plant was badly frost damaged. The most authoritative report of sex change was presented by Van Wyk and Claassen from the Department of Botany, University of Pretoria, in 1981. Dr Claassen obtained several specimens of E.umbeluziensis which were transplanted into her Pretoria garden in December 1967; one of these plants produced a male cone in 1970 but a female cone several years later. The reversal might be associated with either the trauma of being transplanted or a sudden cold spell in August 1972. (See also the article "Sex change in specimen of Cycas revoluta" elsewhere in this edition.) Other, less well-documented instances of sex-reversal in mature cycad plants are not uncommon. Mr Koeleman of Magaliesberg Research Nursery for instance knows of a female Zamia (?) which produced an offshoot with a male cone. Nearly all these cases have one thing in common and that is some traumatic incident like physical damage or severe cold weather prior to the sex reversal.

The sex expression of plants appears to be a function of hormonal control; there seems to be evidence that dioecious plants (male and female reproductive organs on separate plants) are potentially bisexual and that a delicate internal hormonal balance results in one sex "over-riding" the other. A traumatic incident might therefore act by temporarily upsetting this balance which is later restored in a way which leads to the opposite sexual character being manifested. Another pointer in this direction is the fact that a variety of artificially applied chemical substances has been shown to affect the sexual expression of a significant number of different plants. Jan Geuns, working in Belgium, believes that the class of chemicals known as the steroid hormones might be a major key to the sex expression lock. All this indicates that it might be possible to "create" a female E.woodii by either a physical shock or a controlled chemical process.

However, no-one would suggest that we start putting our precious woodii plants in the deep freeze or spray them with random chemical cocktails! What is needed is a large uniform population of small plants to experiment with and I believe the clue here lies in tissue culture techniques.



E. woodii, Durban Botanical Gardens
(Photograph : Mr Harry Gerber)



E. woodii, male cones

(Photograph: Mr Harry Gerber)

Various scientists have looked into the feasibility of taking small tissue portions from different parts of cycad plants and "cloning" these in test-tube culture media to give large numbers of identical progeny. Professor Paola de Luca and his team in Naples, the research unit of Fairchild Tropical Garden in Florida and Mr Koeleman at Hartbeeshoek have all been working along these lines. Producing a mass of callus material in culture seems to be quite easy; the difficult bit is in "persuading" the callus to form roots and shoots and develop into a plantlet which can later be moved into a normal soil environment. Time and patience will undoubtedly perfect this technique.

It is my hope to work on these techniques so that we can mass-produce sufficient E.woodii material for a properly-controlled experiment. The experiment itself will comprise a series of physical and chemical regimes, one of which I believe should lead to the creation of a 100% pure, female E.woodii. The success of this Adam and Eve story would be fantastic news to growers and conservationists alike.

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GIVE AND TAKE

As mentioned elsewhere in this edition, 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 offers 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.

GEE EN NEEM

Soos elders in hierdie uitgawe genoem, is die ruil van plante 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 phyto-sanitêre 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 (Durban, tel. no. 031-866953) has a few surplus seedlings of Encephalartos natalensis and E. villosus and is willing to donate these to 'beginners' in the Durban area.

-Vince Jefferys (P.O Port Douglas, Queensland, 4871, Australia) is a collector and dealer in cycad seeds and wants to purchase or exchange South African species for Australian and other species (e.g. Zamia). He tells us they do not need import permits or phytosanitary certificates for seed arriving in Australia.

-Mr and Mrs David Guerra of 'Aztekakti' (PO Box 26126, El Paso, Texas 79926, USA) have seed of Dioon edule available at $10,00 per 100 or $65,00 per 1000. Ask for a pro-forma invoice including shipping charges as preferred.

-Maans Kemp (Port Elizabeth, tel.no. 041-323344 het 'n beperkte hoeveelheid saad van E. longifolius om te skenk aan 'beginners', verkieslik in die Port Elizabeth-omgewing.

-Would any person wishing to exchange/sell African Cycad seed please contact S. and J. Walkley, Buckley Road, Burpengary, Queensland 4505, Australia. Most Autstralian species are available from time to time.

-Mnr. Leon Scholtz (Posbus 139, Umtentweni, 4235, tel. no. 0391-50576) het saad van E. natalensis en E. villosus beskikbaar. Hy soek saad van enige ander spesies.

SEX CHANGE IN CYCAS REVOLUTA

by Maans Kemp

A sex reversal was recently observed in a Cycas revoluta specimen belonging to Mr and Mrs E.A. Brunsdon of Uitenhage.

The plant, which had been growing in a garden in Uitenhage for many years, changed hands in 1971 and was taken out and re-planted. In 1974 the then owner gave the plant to the present owners, who transplanted it into their garden. It grew well and formed leaves and a cluster of male cones every year, i.e. four times.

In February 1984, the plant was moved to another spot in the garden to make way for a swimming pool. This was very nearly a fatal move. The plant lost all its leaves and after more than two years, its stem became quite limp.

The owners were on the point of giving up hope when, in November 1980, the plant formed a few small leaves. This was followed by a crown of full-sized leaves the next year. Their joy turned into amazement in March 1982 when a huge female "cone" (mass of female sporophylls) appeared. After a new set of leaves in November 1982, a second female "cone" was formed in March 1983. The plant has obviously settled down to its new gender.

The sex change in this case should probably be linked to the shock experienced by the plant because of the last transplanting. This seems to confirm observations by A.E. van Wyk and M. Isabella Claassen ("Sex Reversal in Encephalartos umbeluziensis", Veld and Flora, December 1981).

Another result of the plant's ordeal was the formation of scores of small pointed "buds" all over its stem, probably as a result of damage while the stem was so limp that it could be moved from side to side at any point. These "buds", which were first noticed by the owners in March 1984, occur from the base of the stem almost to the top. If they should develop and produce leaves, a number of "branches" could be formed from the main stem.

The Cycas revoluta plant with its second set of female sporophylls

BITS AND PIECES STUKKIES EN BROKKIES

MEMBERSHIP LIST

Copies of the Society's full membership list (excluding the names of members who have specifically asked that their names are not made available) are available to members on request. Write to the Chairman (R. Osborne, 20 Maryvale Road, Westville, 3630) if you would like to receive this. A donation to cover the costs of photocopying (about 15 pages) would be appreciated.

LEDELYS

Afdrukke van die Vereniging se volledige ledelys (uitgeslote die name van lede wat spesifiek gevra het dat hulle name nie beskikbaar gestel word nie), is beskikbaar aan lede op aanvraag. Skryf asseblief aan die Voorsitter (R. Osborne, Maryvaleweg 20, Westville, 3630) as u 'n afdruk verlang. 'n Donasie om die koste van fotokopiëring (ongeveer 15 bladsye) te dek, sal waardeer word.

DONATIONS ACKNOWLEDGED

The Society wishes to record sincere appreciation to the following members who have enclosed a donation in addition to their normal annual membership fee:

- Paul & Marion Debruyne, Phalaborwa(R10)
- Mr S. Wentzel, Pretoria (R10)
- Mnr. A.S.J. v.d. Walt, Randburg (R2)
- Mev. Ita v.d. Walt, Pretoria (R40)
- Mrs Jo Marais, Empangeni (R5)

Baie dankie, dit word baie waardeer.

AUDITOR NEEDED

The Society requires the services of an auditor who will attend to the preparation of our fairly simple statement of income and expenditure in January of each year. Although we would be delighted to accept an 'honorary' offer, a small fee could be made available for this purpose. Kindly contact the Chairman if you are able to assist in this respect.

THANKS TO OUR SPONSOR

The Society acknowledges the kind financial assistance by WOLF GARDEN MACHINERY MANUFACTURERS (PTY) LTD towards the production costs of this edition of ENCEPHALARTOS. Your attention is drawn to the enclosed brochure of our sponsor's products.

ENCEPHALARTOS DOES IT

Mr George Walters, a keen Durban member of the Society, had been trying for some time to get hold of a copy of the out-of-print publication, Chamberlain's "The Living Cycads". Without expecting much, George placed a request in ENCEPHALARTOS No.1. We are delighted to report that a Free State member, Mr Sullivan Rawlinson of Bainsvlei, called up to offer George a spare copy that he had in his possession!

AANDAG, KWEKERS

Die Vereniging wil graag alle broodboomkwekers wat by die Departement van Landbou geregistreer is en wat deur hulle provinsiale owerhede gelisensieer is, aanmoedig om gereelde advertensies in ENCEPHALARTOS te plaas. Geen fooi word gehef nie maar donasies aan die Vereniging sal verwelkom word.

INSECT-INFECTED CYCAD CONES

Mr I. Hertogs of the Department of Entomology at the University of Natal in Pietermaritzburg is conducting research into cycad-insect interrelationships. He would very much appreciate complete mature female cones (which need not be fertile) of any cycad species in which there is evidence of insect infestation, especially by the curculionid (weevil) type of insects.

THE R 50 STORY

by Roy Osborne

Readers were invited in the last edi=tion of ENCEPHALARTOS to guess the identity of the cycad on the reverse side of the recently-issued R50 note. Well, here's the answer:
The artist who was commissioned to assist with the design of the R50 note was Kobus Esterhuysen of Johannesburg. Kobus tells us that, having decided on a Drakensberg scene, he thought plants of the area would fit in nicely. He selected two Aloes and a cycad because they had never been used on a note before, they were quite characteristic and above all they were decorative. He started out by drawing a typical female specimen of Encephalartos ghellinckii but took the liberty of opening the leaves a little more than usual to expose the four cones, and produced the artwork shown in the ac=companying figures. The final design (which the Reserve Bank won't allow us to reproduce) was identical to the second of these sketches.

Kobus then took the finished work to the hand engravers in London who appear to have made certain modifica=tions which he had not intended. "The leaves were fanned out like bushy palm sprouts .... the median leaflets irre=gularly elongated beyond recognition . ..... just for luck they added two more cones ..... we end up with some=thing that looks more like E.friderici-guilielmii from the Eastern Province, the six cones being the deciding factor and give-away".

So there you are: the plant isn't really any existing specimen unless there is an E. ghellinckii x E. fride=rici-guilielmii hybrid somewhere!

(ENCEPHALARTOS acknowledges the kind help of Mr G.P.C. de Kock, General Manager of the Reserve Bank, and espe=cially Mr Kobus Esterhuysen, in the preparation of the above news-item.)

First Draft

Second Draft

REGIONAL NEWS STREEKNUUS

NATAL

VISIT TO GIDDY'S NURSERY, UMLAAS ROAD: 21 APRIL 1985

This was a joint meeting with the Celtis Branch of the Dendrological Society and the first we hope of several such co-operative ventures. A total of 22 members and guests was treated to a field identification course on South African Encephalartos species. Cynthia Giddy very ably demonstrated the leaf and other characteristics which are used to distinguish one species from another. Within the same species the phenomenon of regional differences (ecotypes) was explained; in particular the differences in E. natalensis from central, southern (e.g. Harding) and further north (e.g. Vryheid) in Natal. Our thanks to Cynthia and Ted for an enjoyable and informative day.

VISIT TO THE MONTESEEL CYCADS: 7 JULY 1985

On Sunday, 7 July, Roy Osborne will lead members to see the group of E. natalensis which have been proclaimed a National Monument. Those who wish to go with must meet at the Hillcrest Flea Market site at 10 a.m. and bring a picnic lunch. N.B.: The terrain is not easy; persons who do not want to take the hike down to the plants can enjoy the magnificent view from the picnic site.

Details of future meetings and excursions will be given in the next edition of ENCEPHALARTOS.

OOS-KAAP

BESOEK AAN KWEKERY: 13 APRIL 1985

Op Saterdag 13 April het 18 lede Danie Slabbert se broodboomkwekery op Despatch besoek. Danie, wat 'n lid van die Oos-Kaapse komitee is, het vertel en gedemonstreer hoe 'n vroulike keël met die hand bestuif word. Daarna het hy ook verduidelik hoe die saad voor en na ontkieming behandel moet word. Al die teenwoordiges het die besoek baie aangenaam en leersaam gevind.

BROODBOME EN DIE WET: 13 JUNIE 1985

Die volgende byeenkoms vind op Donderdag 13 Junie by die Port Elizabethse Technikon plaas wanneer die lede toegespreek word deur mnr. Basson, die plaaslike Natuurbewaarder van die Kaaplandse Departement van Natuur- en Omgewingsbewaring. Hy sal praat oor hoe broodbome deur die Kaaplandse natuurbewaringordonnansie geraak word. Die onlangse veranderinge sal ook bespreek word (sien berig elders in hierdie uitgawe).

UITSTAPPIE NA RESERVAAT: 3 AUGUSTUS 1985

Op Saterdag 3 Augustus sal belangstellendes 'n besoek bring aan die Broodboomnatuurreservaat naby Grahamstad waar E. caffer beskerm word. 'n Beampte van die Kaaplandse Natuurbewaringsdepartement sal die uitstappie lei.

LETTERS BRIEWE LETTERS BRIEWE

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

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

Dear Sir

CYCAD IN RIO GARDENS

With reference to Denis Heenan's enquiry (ENCEPHALARTOS No. 1, March 1985) concerning the big cycad in the Botanical Gardens in Rio de Janeiro: It is difficult to guess which "magnificent specimen" he refers to, seeing that there are quite a number. There is however a particularly large, 2 m tall Encephalartos altensteinii which was in 1977 incorrectly indicated as E. ferox. I assisted the curator to identify the different South African species and the one mentioned above was definitely the largest South African plant in the gardens at that time.

There are also some magnificent Cycas species in the gardens, as well as a number of Zamias and Ceratozamias. A number of the latter had Tillandsias which grew as epiphytes on the leaf stalks.

CYNTHIA GIDDY
UMLAAS ROAD

Geagte Heer

STOMATA (HUIDMONDJIES) VAN ONS INHEEMSE BROODBOME

Uit gesprekke wat ek met verskeie broodboomkwekers en -liefhebbers gevoer het, het ek ontdek dat baie van hulle onder die waan verkeer dat die blare van broodbome nie oor stomata (huidmondjies) beskik nie. Een uitvloeisel hiervan is dat hulle dit nie eers sal oorweeg om spoorelementvoedingsoplossings deur blaarbespuiting aan broodbome toe te dien nie.

Eerstens wil ek beklemtoon dat al ons inheemse broodbome asook Stangeria eriopus oor stomas beskik.

Volgens A. Koeleman ("'n Morfologies-taksonomiese studie van die blare van die genus Encephalartos Lehm. in Suid-Afrika", M.Sc.-verhandeling, Univ. van Pretoria, 1978) kom stomas by al die spesies in die abaksiale (onderste) epidermis voor. By slegs Encephalartos eugene-maraisii en E. cupidus kom stomas in albei. blaaroppervlakke voor.

Indien 'n spoorelementoplossing op 'n plant se blare gespuit word, word feitlik al die spoorelemente wat wel opgeneem word, direk deur die kutikula deur epidermisselle opgeneem en amper niks word via die stomas opgeneem nie. 'n Plant hoef m.a.w. nie stomas (of oop stomas) te hê om blaartoegediende voedingstowwe op te neem nie.

Dit is egter belangrik dat die toegediende oplossing aan die blaaroppervlak moet bly kleef nadat dit daarop gespuit is want as dit dadelik afrol sal die blaar nie die stowwe wat dit bevat kan absorbeer nie. Veral in die geval van plante met wasagtige blaaroppervlakke is dit dus noodsaaklik om een of ander benattingsmiddel soos "Tween" in 'n lae konsentrasie by die spuitstof te voeg voordat die plante daarmee behandel word.

PROF. NATHANAËL GROBBELAAR
PRETORIA

MORE THEFTS

R1 000 for return of rare plants

Eleven extremely rare plants, cycads aged between 200 and 300 years, were stolen at the weekend from the Northcliff garden of collector Mr Dickie Rutzen.

A dismayed Mr Rutzen said it had taken him 15 years to collect the plants which were valuable and formed part of his 300-strong plant collection.

"I cannot set a price on these plants as I keep them for their beauty," he said.

"One of the stolen plants was a freak of nature, a cycad with two crowns — something absolutely unique."

Mr Rutzen said he was offering a R1 000 reward for the return of his plants.

Two or three thieves must have carried them because they are big, varying in size from one to two metres, Mr Rutzen added.

THE STAR
APRIL 1985

Plants disappear

NELSPRUIT: Cycads worth thousands of rands have been removed from the Lowveld Botanical Gardens here during the past six months.

In the latest incident, three well-established plants have disappeared.

DAILY NEWS
24 APRIL 1985

KAAPSE BROODBOME BEDREIG

Die Administrateur van Kaapland het aangekondig dat, met onmiddellike effek, alle broodboomspesies in Kaapland tot bedreigde plante verklaar word. Voor hierdie wysiging van die betrokke ordonnansie, was slegs Stangeria eriopus, Encephalartos caffer en E. latifrons as bedreigd verklaar. Al die ander spesies was as beskermde plante geklassifiseer.

Die jongste wysiging beteken dat 'n permit nou nodig is om enige broodboom uit sy natuurlike habitat te verwyder, te skenk, as 'n geskenk te ontvang, te verkoop, te koop, te vervoer of te besit.

Alle persone wat reeds broodbome in hulle besit het (dit sluit broodbome uit ander provinsies in) moet dus nou om 'n permit aansoek doen. Besitters van broodbome sal in staat moet wees om bewys te lewer dat hulle die plante wettiglik in hulle besit het. Aansoekvorms en volledige inligting is by enige kantoor van die Kaaplandse Departement van Natuurbewaring verkrygbaar.

'n Woordvoerder van die betrokke departement het gesê dat die wysiging aangebring is om die grootskaalse verwydering van broodbome uit hulle natuurlike habitat aan bande te lê en om sodoende die moontlike uitwissing van sommige spesies te voorkom. Om kontrole te vergemaklik, is besluit om alle soorte, ook van buite Kaapland, in te sluit. Die woordvoerder het dit beklemtoon dat die hoofdoel van die wysiging nie is om bestaande eienaars van broodbome te vervolg nie.

HAVE YOU CHANGED YOUR ADDRESS?

Please inform:
Roy Osborne
20 Maryvale Road
WESTVILLE
3630
Tel. no.: (H) 031-866953

HET U VAN ADRES VERANDER?

Laat weet asseblief:
Roy Osborne
Maryvaleweg 20
WESTVILLE
3630
Tel. no.: (H) 031-866953

FROM THE BOOKSHELF

'THE LIVING CYCADS' BY C.J. CHAMBERLAIN; 1919, REPRINTED IN 1965 BY HAFNER PUBLISHING COMPANY

The late Professor Charles Joseph Chamberlain's work, 'The Living Cycads', was the first full-length book on cycads. Published in 1919, it followed the two volumes on 'The Fossil Cycads' by Prof. Wieland of Yale University, and represents the author's work over 15 years with field trips to Mexico, Cuba, Australia and Africa.

Part I deals with the distribution and appearance of the cycads known at that time, Part II covers the life history of the cycads as a group, while Part III is devoted to evolutionary aspects.

This 172-page book with 91 illustrations is now a much sought-after collectors' piece. Fortunately the 1965 reprinted edition is less rare; a few enthusiasts have personal copies, one is available on inter-library loan from the Univer= sity of the Orange Free State and a copy may be consulted by arrangement with the Science Library of the Univer= sity of Natal (Durban).

I would like to quote numerous passages, but have selected two for reasons of space limitation. The first deals with Chamberlain's exploration in Zululand (1912) and his report on Encephalartos woodii, while the second relates to his observations on E. latifrons in the Eastern Cape.

"About twenty miles from Mtunzini, in the midst of the Stangeria and Encepha= lartos brachyphyllus, stands a single specimen of another species of Encepha= lartos more than ten feet in height. They say that it is the only cycad, with a trunk, within a distance of fifty miles. There had been three trunks, doubtless derived from buds at the base of an old plant which had fallen hundreds of years ago, but one of the trunks had been cut off and taken to Durban, where it is now one of the finest cycads in the botanical garden. The species has been called Encephalartos Altensteinii bispinosa, and has also been called Encephalartos Woodii, but to me it seemed to come within a reasonable range of variation which should be expected in E. Alten= steinii. My Zulu guide, the son of a Zulu chief, was thoroughly familiar with Zululand and had been well coached by Mr Wylie; otherwise there would have been little likelihood of finding such an isolated specimen in a hilly country, with numerous stretches of forest and bush."

"One of the most interesting species, Encephalartos latifrons, was found at Trapps Valley, between Grahamstown and the coast. It reaches a height of five or six feet and has a dense crown of rather short leaves with very broad and extremely jagged leaflets. Field stu= dies are laborious, since the plants are isolated, usually half a mile or even a mile apart. However, the ground is not very uneven, and with a good pair of binoculars one can make efficient use of his limited time. I was particularly gratified to find this species, since it is almost unknown to botanists.

Its growth is extremely slow. In Grahamstown I had heard of a row of "bread palms" in front of a house at Trapps Valley, and it was not difficult to find the place. There are five plants in the row, three of them Encephalartos Altensteinii and the other two E. latifrons. A pleasant, gray-haired lady told me that they had been set out when she came to that house as a bride forty-six years before. She said that the E. Altensteinii may have grown a foot in the forty-six years, but that the E. latifrons did not seem to have grown any, although they always had green leaves."

Roy Osborne