ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

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VOORBLAD/COVER

Encephalartos arenarius

EDITORIAL

It is very evident that cycad lovers are always looking for more information on cycads. Everyone wants to learn more about these fascinating plants. And the more one learns about them, the more one becomes aware that there is no end to the fascination of cycads. Our members should therefore find Roy Osborne's list of published sources elsewhere in this edition very interesting and useful.

It is also important that we express our appreciation to the researchers who are continuously trying to find out more about cycads and who share their results with all of us, inter alia through ENCEPHALARTOS. We are certain that all the members will agree that they have learnt a lot since joining the Society, and that their plants now mean even more to them.

REDAKSIONEEL

Dit is baie duidelik dat broodboomliefhebbers altyd op soek is na meer inligting oor broodbome. Almal wil graag meer leer van hierdie fassinerende plante. En hoe meer 'n mens van hulle leer, hoe meer kom jy agter dat daar nie 'n einde is aan die interessantheid van broodbome nie. Ons lede behoort dus Roy Osborne se lys van gepubliseerde bronne elders in hierdie uitgawe baie interessant en handig te vind.

Dit is ook belangrik dat ons ons waardering uitspreek teenoor die navorsers wat voortdurend probeer om meer oor broodbome te wete te kom en wat hulle resultate met almal van ons deel, onder andere deur middel van ENCEPHALARTOS. Ons is seker dat al die lede van die Vereniging sal saamstem dat hulle baie geleer het sedert hulle by die Vereniging aangesluit het, en dat hulle plante nou nog meer vir hulle beteken.

EDITORIAL
- CONTINUED -

It is not only researchers who contribute to our knowledge of cycads, however. All of us can make a contribution by sending information to ENCEPHALARTOS. We do not have to be academics to observe interesting things about cycads and to share these with other members. The very interesting information sent in by Marion Debruyne (see elsewhere in this edition) is an excellent example of the type of contribution we refer to. We once again appeal to our members to co-operate in a similar manner, in the interest of the Society and its members.

REDAKSIONEEL
- VERVOLG -

Dit is egter nie net navorsers wat bydra tot ons kennis van broodbome nie. Almal van ons kan 'n bydrae lewer deur inligting aan ENCEPHALARTOS te stuur. Ons hoef nie akademici te wees om interessante dinge oor broodbome waar te neem en met ander lede te deel nie. Die baie interessante inligting wat Marion Debruyne ingestuur het (sien elders in hierdie uitgawe) is 'n uitstekende voorbeeld van die soort bydrae waarna ons verwys. Ons doen weer eens 'n beroep op ons lede om op soortgelyke wyse saam te werk, in die belang van die Vereniging en al sy lede.

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.

Menings wat in die redaksionele artikel uitgespreek word, is dié van die Redakteur en verteenwoordig nie noodwendig die beleid van die Broodboomvereniging nie. Ingelyks 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.

SAADBANK

Die Saadbank doen 'n beroep op alle lede vir skenkings van enige saad. Enige skenkings sal baie waardeer word. Die Saadbank is ook nou in 'n posisie om saad aan te koop om in lede se behoeftes te voorsien. Moontlike verskaffers word versoek om met Danie Nel in verbinding te tree. Saad van Encephalartos natalensis is tans beskikbaar.

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

SEED BANK

The Seed Bank appeals to all members for donations of any seed. Any donations would be appreciated. The Seed Bank is also now in a position to purchase seed to meet the needs of members. Possible suppliers are requested to contact Danie Nel. Seed of Encephalartos natalensis is now available.

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

NUWE HOOFBESTUUR

Die dienstermyn van die huidige Hoofbestuur van ons Vereniging verstryk aan die einde van 1987. Volgens die grondwet moet 'n President en twee Hoofbestuurslede direk deur die lede verkies word. Die streektakke moet ook hulle ampsdraers verkies, asook 'n verteenwoordiger op die Hoofbestuur.

Die verkose Hoofbestuur is by magte om persone te koöpteer om spesifieke take te behartig, soos dié van Lidmaatskapbeampte, Saadbankbeampte, Stuifmeelbankbeampte, Redakteur van ENCEPHALARTOS, Sekretaris, Tesourier, ens. Die bykomstige Hoofbestuurslede wat deur die dienende Hoofbestuur gekoöpteer is, behou nie outomaties hulle posisies binne die nuwe Hoofbestuur nie, maar kan weer gekoöpteer word.

Die huidige direk-verkose Hoofbestuurslede is Roy Osborne (President), Marion Debruyne en Piet Vorster. Piet is bereid om vir 'n verdere termyn te dien; maar Roy het te kenne gegee dat hy sou verkies om as President uit te tree, en Marion kan weens omstandighede nie langer op die bestuur dien nie.

Ons vra dus nominasies vir die direkverkose lede van die volgende Hoofbestuur. Gebruik asseblief die ingeslote nominasievorm en maak seker dat dit volledig ingevul is. Let asseblief veral daarop dat genomineerde persone die vorm moet onderteken om aan te dui dat hulle die nominasie aanvaar. Voltooide nominasies moet Piet Vorster teen 31 Oktober 1987 bereik. Sy adres verskyn op die nominasievorm.

NEW EXECUTIVE

The term of office of the present Executive Committee of our Society expires at the end of 1987. According to the constitution, a President and two Executive Committee Members are to be elected directly by the members. The regional branches must also elect their office-bearers, as well as a representative on the Executive Committee.

Once elected, the Executive Committee is entitled to co-opt persons to perform specific tasks, such as those of Membership Officer, Seed Bank Officer, Pollen Bank Officer, Editor of ENCEPHALARTOS, Secretary, Treasurer, etc. The additional Executive Committee Members, co-opted by the current Executive Committee, do not automatically retain their positions on the new Executive Committee but may be co-opted again.

The present directly elected Executive Committee members are Roy Osborne (President), Marion Debruyne and Piet Vorster. Piet is willing to serve for another term; but Roy has indicated that he would prefer to retire from the position of President, and due to circumstances Marion does not see her way open to serve for another term on the Executive Committee.

We therefore call for nominations for the directly-elected members of the next Executive Committee. Please use the enclosed nomination form and make sure that it is filled in completely. Please note, particularly, that nominated persons must sign this form to indicate that they agree to their nomination. Completed nomination forms must reach Piet Vorster by 31 October 1987. His address appears on the nomination form.

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 ARENARIUS

by Maans Kemp

INTRODUCTION

Encephalartos arenarius is a particularly beautiful Eastern Cape cycad. Its numerous attractive green leaves make it a striking plant.

DISCOVERY AND NAME

When M.R. Henderson studied the cycad collection at Kirstenbosch Botanic Gardens in Cape Town for his revision of the South Africa species of Encephalartos which he published in 1945, he remarked on specimens which were "obviously closely related to the typical form of latifrons ..., but differing from it to a greater or lesser degree..." Some of these had apparently been collected in the Alexandria district.

In 1953 Dr E.E.A. Gledhill reported the discovery of a colony of unidentified Encephalartos on inland sand dunes near Alexandria. In 1954 Dr R.A. Dyer accompanied Dr Gledhill on an inspection visit to the locality where he came to the conclusion that a new species had been discovered. Dr Dyer announced the establishment of the new species at a meeting of the South African Association for the Advancement of Science in Grahamstown in July 1955 and published it in the Journal of South African Botany on 31 December 1955.

Dr Dyer appropriately named the new species "arenarius", which means "growing in sandy places".

DISTRIBUTION

E. arenarius occurs in a relatively limited area in the Alexandria district. It typically grows in shade on sand dunes in the coastal forests and scrub bush. The rainfall ranges from 725 to 875 mm per year and occurs throughout the year. No frost occurs. The summers may be hot and fairly dry.

DESCRIPTION OF PLANT

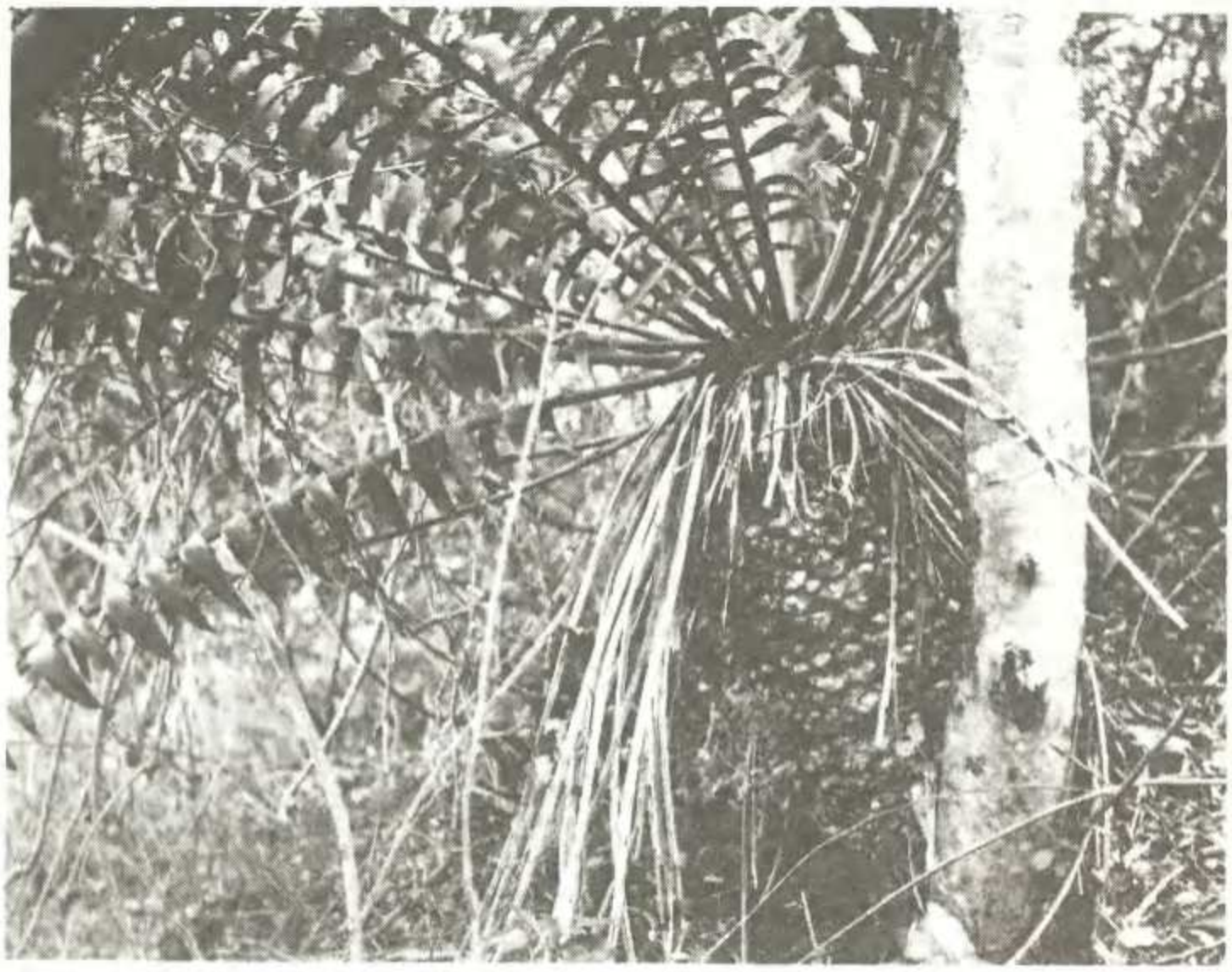
1. STEM

The stem of E. arenarius may be up to 1 m tall, but in its habitat the lower part of the stem is usually covered by sand and leafmold. Smaller plants often appear to have subterranean stems for this reason. The diameter of the stem is 20 to 30 cm but it may be wider at the base. The crown of the stem is covered with light-brown hair, especially before new leaves are formed.

Single stems occur, but plants are more usually branched from the base to form clumps with stems of varying height. Taller stems usually lean over to one side.

2. LEAVES

The attractive leaves of E. arenarius may be 1 to 1,5 long, including a leaf stalk of 15 to 20 cm long. The leaf stalk is recurved at the tip. The leaves are light green when they are young, with a slight bloom. When they get older they become darker green in colour and the bloom disappears. In a



E. arenarius in its coastal forest habitat

few (probably dryer) localities a bluish-green form occurs.

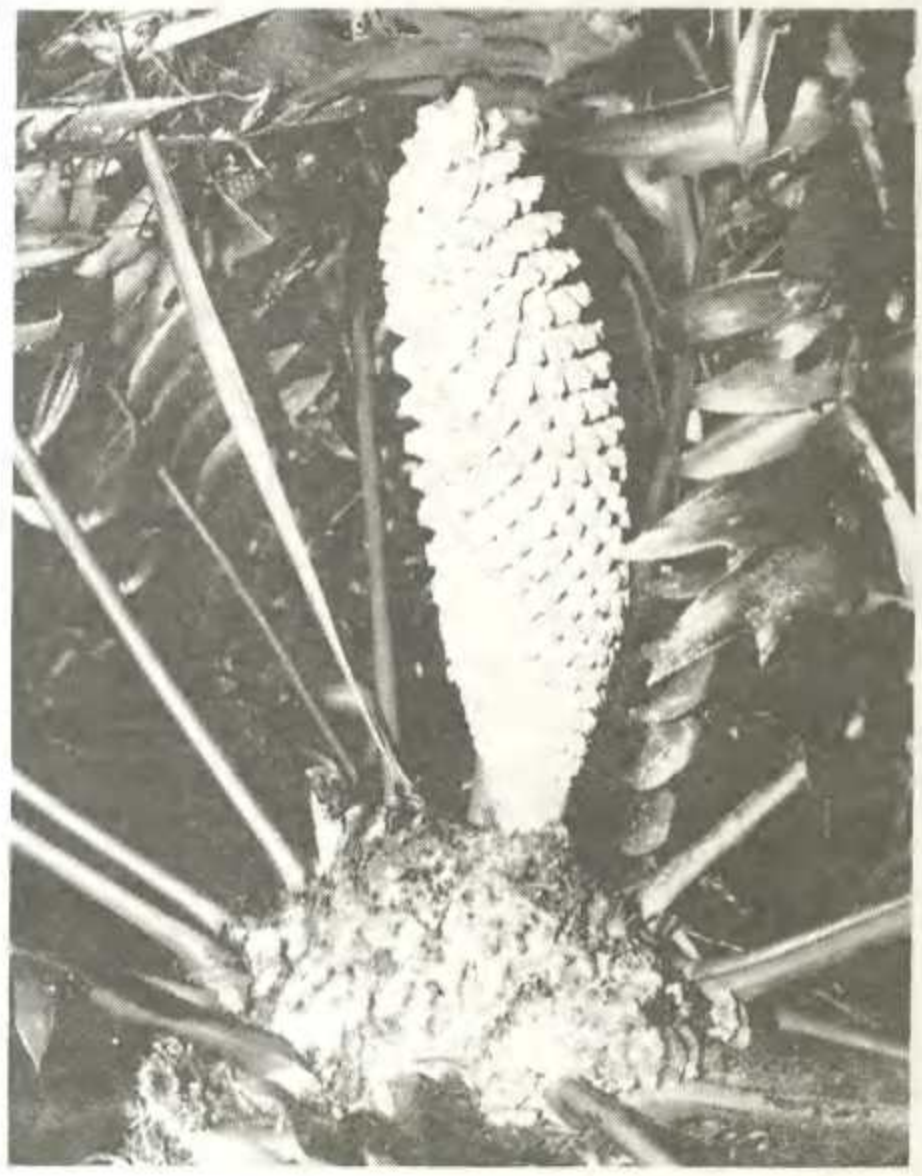
The leaflets at the middle of the leaf are 12 to 16 cm long and 2,5 to 4 cm broad. The leaflets have three or four lobes on the lower margin. The upper margin is usually smooth, but may occasionally have one tooth. The lobes are in the same plane as the leaflet or slightly twisted. The lower leaflets have only one or two lobes and are reduced in size to an occasional single prickle. Seedling leaves have three lobes at the tip, with or without a tooth on the upper margin and one or two teeth or lobes or the lower margin.

The leaflets overlap in the top part where they are attached to the leafstalk in the form of a V. Lower down they are more widely spaced and more spreading.

3. CONES

Single cones are formed. Mature cones are light green in colour and are borne on short thick stalks, 4 to 8 cm long.

The male cone is 30 to 50 cm long and 8 to 15 cm in diameter. The scales at the middle of the cone are approximately 3,5 cm long and 2,5 cm wide. The beak of the scale protrudes approximately 1 cm.



Male cone of E. arenarius with pollen on leaflets on the right

The female cone is barrel-shaped, 35 to 60 cm long and 20 to 30 cm in diameter. The scales at the middle of the cone are approximately 7 cm long, 5 cm broad and 4 cm high. The face of the scale is usually four-sided with a slightly wrinkled surface and a beak which protrudes approximately 2 cm. The female cone is often pushed down to an almost horizontal position by the formation of new leaves.

The seeds are red and shiny, approximately 5 cm long and 2,5 cm wide, with a fleshy beak.

AFFINITY

The only species with which E. arenarius may be confused, and to which it is obviously most closely related, is E. latifrons. The following guidelines may be used to distinguish between them:

1. E. arenarius only occurs in the coastal areas of the Alexandria district and its distribution area does not overlap with that of E. latifrons which occurs in the inland Albany and Bathurst districts.

2. The stems of E. arenarius are only up to 1 m tall, while E. latifrons may have stems up to 3 m tall.

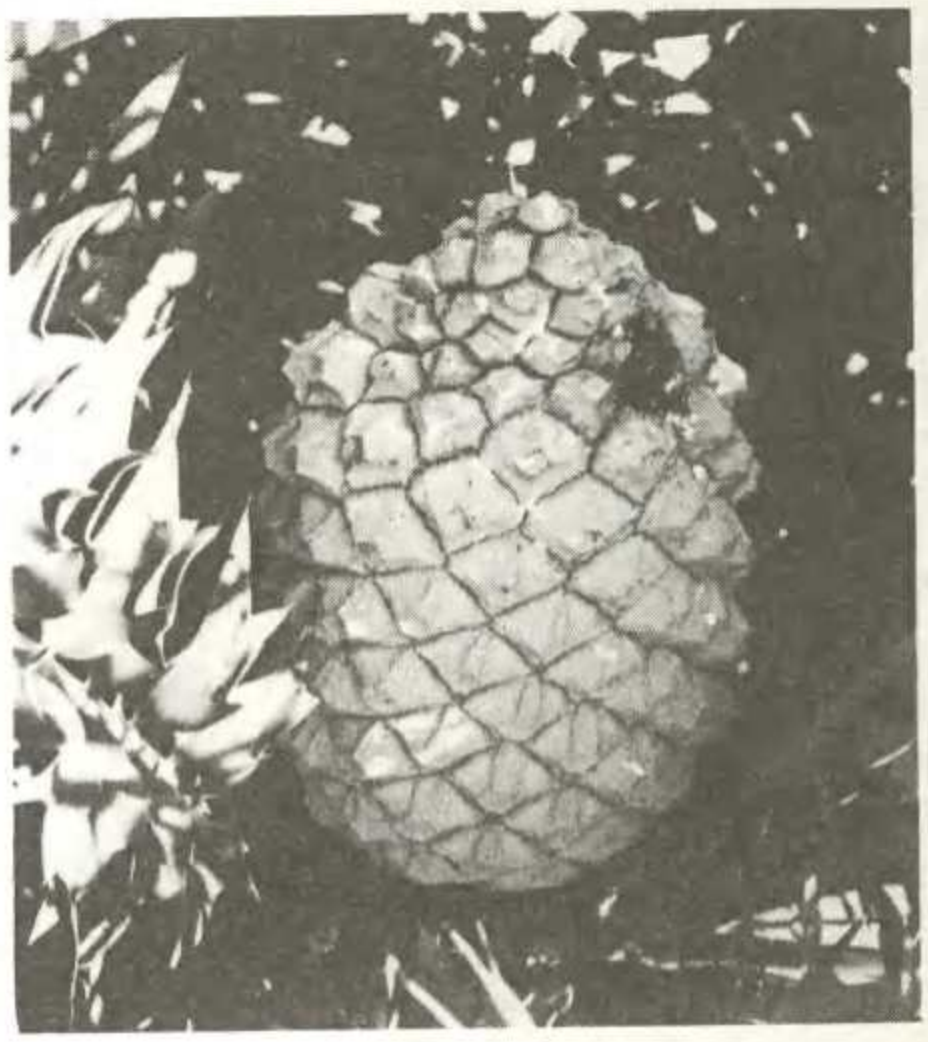
3. The leaves of E. arenarius are lighter-green than the shiny dark-green leaves of E. latifrons, and may sometimes be bluish-green.

4. The leaflets of E. arenarius are more widely spaced than the interlocking, densely-spaced leaflets of E. latifrons.

5. E. arenarius bears single cones while E. latifrons may have as many as four cones.

6. E. arenarius cones are light-green in colour while those of E. latifrons are olive-green or bluish-green.

7. The surfaces of the female cone scales of E. arenarius are relatively smooth compared to the deeply furrowed, wrinkled and pimply surfaces of E. latifrons.



Female cone of E. arenarius

HYBRIDIZATION

There have been reports of plants which appear to be hybrids between E. arenarius and E. altensteinii. The author has seen seedlings which are said to be artificial hybrids between E. arenarius and E. latifrons.

CULTIVATION

E. arenarius grows well in cultivation if planted in the right conditions. They should be grown in sandy soil with sufficient leafmold or compost and should be kept moist. Although they grow in shade in their natural habitat, they tolerate direct sunlight. Growing them in half-shade will prevent the leaves from burning on hot, dry days. Plants must be protected against frost.

Established plants form leaves each year. Two sets of leaves per year are common and three sets not unusual. Seedlings are commercially available and grow well.

E. arenarius with other cycads in a garden

CONSERVATION

E. arenarius was once fairly numerous in its habitat area. It was threatened even before it was described as a species, however. When Dr Dyer visited the area in 1954, he was told by local farmers that "a large number had been removed for cultivation within recent times". (Dyer, R.A.; "A new cycad from the Cape Province".) Numerous plants were removed to make way for farming activities, especially the establishment of pastures for dairy herds.

The accessibility of the habitat and the relative ease with which plants can be removed from the sandy soil have made E. arenarius an easy target for destructive collectors. Truckloads of plants were illegally removed. The result of the destruction is that E. arenarius has now become fairly rare in nature.

Plants in cultivation cone regularly and it is essential that artificial pollination is done and seedlings cultivated on a large scale to ensure the survival of this beautiful cycad.

BIBLIOGRAPHY

- Henderson, M.R. "Materials for a revision of the South African species of Encephalartos". Journal of South African Botany. Vol 11, 1945
- Dyer, R.A. "A new cycad from the Cape Province". Journal of South African Botany. Vol 22, 1955.
- Dyer, R.A. "The cycads of Southern Africa". Bothalia. Vol 8, Part 4, 1965.
- Dyer, R.A. and I.C. Verdoorn. "Zamiaceae". Flora of Southern Africa. Vol 1, 1966.
- Giddy, C. Cycads of South Africa. 1974.

(All photographs by the author)

SOUTH AFRICAN CYCADS - A BIBLIOGRAPHY

by Roy Osborne

One of the stated aims of the Society is to encourage scientific research on cycads. Since all research is essentially an extension to the existing body of knowledge, it is logical that access to the existing information is a fundamental pre-requisite in any sound research programme. In the case of the cycad work, this literature is fairly thinly spread in a large number of books and journals - many of which may seem obscure and difficult to obtain. In line with the Society's objective to encourage research, we have prepared a more-or-less comprehensive list of all cycad work published by South African workers or visitors to the area. Apart from the envisaged use to scientific workers, this list may be of interest to many of our members, some of whom (judging by the correspondence received) seem to have an insatiable appetite for any information about cycads! I am grateful to Prof. Nat Grobbelaar, Dr R.A. Dyer and Dr Piet Vorster for checking and making certain additions to the bibliography. If readers can advise me of any omissions, I would be pleased to hear of them.

AITKEN, R.D. & GALE, G.W. 1921. Botanical survey of Natal & Zululand.(Encephalartos kosiensis) Bot. Surv. Mem. No. 2.

ALTENKIRK, B. 1974. Occurrence of macrozamin in the seeds of Encephalartos transvenosus and E. lanatus . LLoydia 37: 636-637.

BARKHUISEN, B.P. 1975. The cycad garden of Unisa / Die broodboomtuin van Unisa. Univ. of South Africa, Pretoria. 80 pp.

BRANDT, W.F. & VON HOLT, C. 1975. Isolation and characterisation of the histones from cycad pollen. (Encephalartos caffer). Febs Letters 51: 84-87.

BRANDT, W.F. & VON HOLT, C. 1986. The primary structure of histone H3 from cycad pollen.(Encephalartos altensteinii). Febs Letters 194: 278-281.

BAIJNATH, H., NAIDOO, S. & RAMCHARUN, S. 1980. Leaf surface characters in selected genera of Cycadales. Proc. E.M. Soc. S.A. 10: 35-36.

BOND, C. 1978. Wild plant racketeers. African Wildlife 32: 29-32.

BURTT-DAVY, J. 1926. A manual of the flowering plants and ferns of the Transvaal with Swaziland. (Encephalartos lanatus, E. laevifolius, E. transvenosus, E. paucidentatus, E. striatus = E. villosus). Longmans,Green & Co., London. Part 1: 39-40, 97-99.

COATES-PALGRAVE, K. 1983. Cycadaceae/Zamiaceae In : Trees of Southern Africa. C. Struik, Capetown, 2nd Edtn: 43-55.

COLLINS, B. 1985. Cycads as bonsai ? Encephalartos 3, Sep 1985: 24-25.

COMPTON, R.H. 1933. Encephalartos kosiensis Hutch. In Hooker's Icones Plantarum Tabula 3220.

COMPTON, R.H. 1976. Cycadaceae. In: The Flora of Swaziland. Journ. S.A. Bot. Supp. Vol. 11: 10-12.

DYER, R.A. 1947-1949. (Cycadaceae) Fl.Pl.Africa 26-27: pts. 101-108.

DYER, R.A. 1951. Encephalartos umbeluziensis. Fl.Pl.Africa 28: pl. 1100.

DYER, R.A. 1956. A new cycad from the Cape Province (E. arenarius). Jour. S.A. Bot. 22: 1-4 with plates 1-3.

DYER, R.A. 1964a. Information please, aberrant cycad cone.(Encephalartos longifolius). S.A. Jour. Sci. 60: 25.

DYER, R.A. 1964b. Notes and new records of African plants. (Encephalartos inopinus). Bothalia 8: 169.

DYER, R.A. 1965a. The cycads of southern Africa. Bothalia 8: 405-515 figs.1-97.

DYER, R.A. 1965b. The type specimen of Encephalartos paucidentatus Stapf and Burtt Davy. S.A. Jour. Sci. 61: 50.

DYER, R.A. 1965c. New species and notes on type specimens of South African Encephalartos .(E. princeps and E. trispinosus). Jour. S.A. Bot. 31: 111-121.

DYER, R.A. 1966. Stangeriaceae. In L.E. Codd, B. de Winter & H.B. Rycroft (eds) Flora of Southern Africa 1: 1-3, fig 1.

DYER, R.A. 1971a. Zamiaceae. The cones of Encephalartos inopinus. Bothalia 10: 363-371.

DYER, R.A. 1971b. A further new species of cycad from the Transvaal, Encephalartos cupidus. Bothalia 10: 379-383.

DYER, R.A. 1972a. A new species of Encephalartos from Swaziland.(E. heenanii & E. paucidentatus) Bothalia 10: 539-546.

DYER, R.A. 1972b. Cycads. Encephalartos. Cact. & Succ. Jour. Great Britain 44: 209-216.

DYER, R.A. & VERDOORN, I.C. 1951. Encephalartos natalensis. Bothalia 6: 205-211, pl. 1-3.

DYER, R.A. & VERDOORN, I.C. 1966. Zamiaceae. In L.E. Codd, B. de Winter & H.B. Rycroft (eds) Flora of Southern Africa 1: 3-34, figs 2-9.

DYER, R.A. & VERDOORN, I.C. 1969. Encephalartos manikensis and its near allies. Kirkia 7: 147-158.

FORSYTH, C. & VAN STADEN, J. 1983. Germination of cycad seed. (Encephalartos natalensis). S.A. Jour. Sci. 79: 8-9.

PRIEDE, H.M. 1963. The Drakensberg cycad, Encephalartos ghellinckii Lem. Trees in South Africa 9: 26-30.

GIDDY, C. 1974. Cycads of South Africa. 1st Edtn. Purnell, Capetown, 122pp. 1984. 2nd Edtn. Struik, Capetown. 112pp.

GROBBELAAR,N. 1985. Koraalvormige wortels. Encephalartos 4, Dec 1985: 4-9.

GROBBELAAR, N., HATTINGH, W. & MARSHALL, J. 1986. The occurrence of coralloid roots on the South African species of the Cycadales and their ability to fix nitrogen symbiotically. S.A. Jour. Bot. 52(5): 467-471.

GROBBELAAR, N., SCOTT, W.E., HATTINGH, W. & MARSHALL, J. 1987. The identification of the coralloid root endophytes of the southern African cycads and the ability of the isolates to fix nitrogen. S.A. Jour. Bot. 53(2): 111-118.

GROBBELAAR, N., STRAUSS, J.M. & GROENEWALD, E.G. 1971. Non-leguminous seed plants in southern Africa which fix nitrogen symbiotically. Plant & Soil (special vol.): 325-335.

HEENAN, D. 1977a. Encephalartos heenanii - how it happened. Aloe 15: 3-7.

HEENAN, D. 1977b. Some observation on the cycads of central Africa. Bot. Jour. Linn. Soc. 74: 279-288.

HENDERSON, M.R. 1945. Materials for a revision of the South African species of Encephalartos. Jour. S.A. Bot 11.

HUTCHINSON, J. 1932. Notes on the flora of South Africa. Encephalartos kosiensis. Kew Bulletin : 512.

HUTCHINSON, J. 1933. Note in Hooker's Icones Plantarum (Encephalartos kosiensis). Tabula 3220.

HUTCHINSON, J. & RATTRAY, G. 1933. Cycadaceae. Flora Capensis 5 Sect 2, supplement.

JACOT-GUILLARMOD, A. 1958. Temperature variations in male cones of Encephalartos.(E. altensteinii). Nature 182: 474.

JACOT-GUILLARMOD, A. 1959. Variations of temperature in male cones of Encephalartos altensteinii Lehm. Jour. S.A. Bot. 25: 93-99.

JACOT-GUILLARMOD, A. & CROSS, R.H.M. 1972. The problem of wax on cycad leaves; a scanning electron microscope investigation. Proc. S.A. E.M. Soc. 2: 35-36.

JEPPE, C.B. 1965. Operation Wildflower. African Wildlife 19: 117-122.

KEMP, H.J. 1984. Cycads of the Eastern Cape province. Newsl. S.A. Cycad Collector 1, Nov 1984: 5-6.

KEMP, H.J. 1985a. Encephalartos longifolius. Encephalartos 1, Mar 1985: 6-13.

KEMP, H.J. 1985b. Sex change in specimen of Cycas revoluta. Veld & Flora : 63.

KEMP, H.J. 1985c. Encephalartos caffer. Encephalartos 3, Sep 1985: 6-11.

KEMP, H.J. 1985d. Encephalartos lehmannii. Encephalartos 4, Dec 1985: 12-17.

KEMP, H.J. 1986a. Encephalartos horridus. Encephalartos 7, Sep 1986: 8-13.

KEMP, H.J. 1986b. Encephalartos latifrons. Encephalartos 8, Dec 1986: 8-15.

KIMBERLEY, M.J. 1975. Plant protection legislation in Rhodesia. Excelsa 5: 3-16.

KIMBERELEY, M.J. 1979a. Cycads in Zimbabwe. Excelsa 9: 11-17.

KIMBERLEY, M.J. 1979b. Specially protected plants in Zimbabwe. Excelsa 9: 53-54.

KOELEMAN, A. 1978. 'n Morfologies-taksonomiese studie van die blare van die genus Encephalartos Lehm. in Suid-Afrika. M.Sc. thesis, Univ. of Pretoria.

KOELEMAN, A., ROBBERTSE, P.J. & EICKER, A. 1981. Die anatomie van die pinnas van die Suid-afrikaanse species van Encephalartos Lehm. Jour. S.A. Bot. 47: 247-271.

KOELEMAN, A. & SMALL, J.G.C. 1982. A note on callus formation by stem and root tissue of some Encephalartos species. S.A. Jour. Bot. 1: 165-166.

LONG, F.R. 1962. Cycads of South Africa. New Zealand Pl. Gard. 4: 368-370.

MARLOTH, R. 1913. Cycadaceae. In : Flora of South Africa (Stangeria paradoxa = S. eriopus, Encephalartos altensteinii, E. horridus, E. lehmannii, E.friderici-guilielmi, E. villosus, E. caffer . 1: 89-100, Plates 14,15.

MARLOTH, R. 1914. Note on the entomophilous nature of Encephalartos. Trans. Roy. Soc. S.A. 4:69-71.

MILNER, F. 1944. The magic of the cycad forest. (E. transvenosus). Jour. Bot. Soc. S.A. 30: 14-16.

MOLL, E.L. & MORRIS, J.W. 1968. Notes on a cycad community and associated vegetation in Natal.(Encephalartos natalensis). Jour. S.A. Bot. 34: 331-343, map.

OGILVIE, B.M. 1930. Some observations on Encephalartos kosiensis Hutch. Kew Bulletin : 655-657.

OSBORNE, R. 1984. Maths figures in your cycad collection. Newsl. S.A. Cycad Collector 3, Nov 1984: 7.

OSBORNE, R. 1985a. One man's poison. Encephalartos 1, Mar 1985: 16-18.

OSBORNE, R. 1985b. Sex change in cycads - hope for woodii ? Encephalartos 2, Jun 1985: 20-22.

OSBORNE, R. 1985c. The R 50 story.(Encephalartos ghellinckii). Encephalartos 2, Jun 1985: 26.

OSBORNE, R. 1985d. Botanical historical monuments. (Encephalartos natalensis, E. transvenosus). Encephalartos 3, Sep 1985: 20-22.

OSBORNE, R. 1985e. Philatelic cycads. Encephalartos 4, Dec 1985: 3.

OSBORNE, R. 1985f. Cycads and the law. Encephalartos 4, Dec 1985: 18.

OSBORNE, R. 1986a. Encephalartos woodii. Encephalartos 5, Mar 1986: 4-10.

OSBORNE, R. 1986b. Grow, man, grow.(Encephalartos natalensis). Encephalartos 5, Mar 1986: 28-29.

OSBORNE, R. 1986c. Cycad research in the 80's. Encephalartos 6, Jun 1986: 26-34.

OSBORNE, R. 1986d. On the evolution of cycads. Excelsa 12: 9-13.

OSBORNE, R. 1986e. Cycad hit parade. Encephalartos 7, Sep 1986: 7.

OSBORNE, R. 1986f. U.S.A. Research roundup. Encephalartos 8, Dec 1986: 4-7.

OSBORNE, R. 1986g. Sex life of cycads. Encephalartos 8, Dec 1986: 26-31.

OSBORNE, R. 1987a. Encephalartos ferox Encephalartos 9, Mar 1987: 14-21.

OSBORNE, R. 1987b. Cycad 87 - a report on the First International Congress on Cycad Biology, Beaulieu-sur-Mer, France, April 1987. Encephalartos 10, Jun 1987: 4-8.

OSBORNE, R. 1987c. Encephalartos villosus . Encephalartos 10, Jun 1987: 16-23.

OSBORNE, R. 1987d. Current cycad research - African cycads. Fairchild Tropical Garden Bulletin 42(3): 14-16.

OSBORNE, R. & HENDRICKS, J. 1985. A world list of cycads. Encephalartos 3, Sep 1985: 13-17.

OSBORNE, R. & HENDRICKS, J. 1986. A world list of cycads - first supplement. Encephalartos 5, Mar 1986: 27.

OSBORNE, R., HENDRICKS, J. & STEVENSON, D. 1987. The World List of Cycads. Memoirs of the New York Botanic Garden (in preparation).

OSBORNE, R. & VAN STADEN J. 1987. In vitro regeneration of Stangeria eriopus HortScience (in print).

OSBORNE, R. & WEBB, D.T. 1987. Regeneration in cycads. In Y.P.S. Bajaj (ed) In print . Springer-Verlag.

PALMER, E. & PITMAN, N. 1972. Zamiaceae. In : Trees of Southern Africa, Vol 1. A.A. Balkema, Capetown : 304-323.

PEARSON, H.H.W. 1906. Notes of South African cycads. Trans. S.A. Phil.Soc. 16: 341-353, pl. 6-8.

PEARSON, H.H.W. 1916. The Kirstenbosch cycads. Jour. Bot. Soc. , part 2.

PIENAAR, B.A. 1971. A list of some of the cycads of the world. Excelsa 1: 65-67.

PRAIN, D. 1916. Encephalartos ferox. Kew Bulletin : 180-181.

PRAIN, D. 1917. Cycadaceae, In D. Oliver (ed) Flora of Tropical Africa Vol 6 Sect 2 : 344-354.

PRETORIUS, J. 1970. 'n Morfologiese studie van Encephalartos lanatus Stapf et Burtt Davy. M.Sc. thesis. Univ. of Pretoria.

RATTRAY, G. 1913. Notes on the pollination of some South African cycads. Trans. Roy. Soc. S.A. 3: 259-270.

ROBBERTSE, P.J. 1972. Die saad en ontkieming van Encephalartos altensteinii. Aloe 10: 8-11.

ROBBERTSE, P.J., VAN DER WESTHUIZEN, S. & THERON, G.K. 1978. The vascular anatomy of the seedling of Encephalartos eugene-maraisii Verdoorn. Jour. S.A. Bot. 44: 317-328.

SCHELPE, E.A. 1950. Maturation period in Encephalartos kosiensis. S.A. Jour. Sci. 47: 16.

STEPHEN, A.M. & DE BRUYN, D.C. 1967. The gum exudate from Encephalartos longifolius Lehm. (female)(family Cycadaceae). Carbohydr. Res. 5: 256-265.

STEYN, D.G., VAN DER WALT, S.J. & VERDOORN, I.C. 1948. The seeds of some species of cycads (Encephalartos); a report on their toxicity. S.A. Med. Jour. 22: 758-760.

TUNNINGTON, D. 1969. Observations on the growth-rate of cones of Encephalartos natalensis. S.A. Jour. Sci. 65:147-148.

TUSTIN, R.C. 1974. Toxicity and carcinogenicity of some South African cycad (Encephalartos) species. S.A. Med. Journ. 48: 2369-2373.

TUSTIN, R.C. 1983. Notes on the toxicity and carcinogenicity of some South African cycad species with special reference to that of Encephalartos lanatus . Journ. S.A. Vet. Assoc. 54: 33-42.

VAN BILJON, M.J. 1977. Unique plant discovered and saved from extinction. Fauna & Flora (Transvaal) 29: 16-17.

VAN DER WESTHUIZEN, S. 1976. 'n Morfologiese studie van Encephalartos eugene-maraisii Verdoorn. M.Sc. thesis, Univ. of Pretoria.

VAN PLETZEN, R.R. 1974. Cycads. E. Cape Naturalist No. 51.

VAN STADEN, J. 1978. A Comparison of the endogenous cytokinins in the leaves of four gymnosperms. (Encephalartos natalensis). Bot. Gazette 139: 32-35.

VAN WYK, A.E. & CLAASSEN, M.I. 1981. Sex reversal in Encephalartos umbeluziensis. Veld & Flora 67: 120-122.

VERDOORN, I.C. 1945. A new species of Encephalartos from the Waterberg.(E. eugene-maraisii). Jour. S.A. Bot. 11: 1-3.

VERDOORN, I.C. 1949. (Cycadaceae)./ Fl.Pl. Africa 27: 1053-1054, 1078-1079.

VERDOORN, I.C. 1951a. Encephalartos natalensis , the cycad of the Valley of a Thousand Hills. S.A. Jour. Sci. 48: 162.

VERDOORN, I.C. 1951b. A cycad tour of the Eastern Cape. African Wildlife 5: 153-159.

VERDOORN, I.C. 1951c. Newly-described species (Encephalartos humilis). Bothalia 6(1): 220-221.

VERDOORN, I.C. 1954. Newly-described species (Encephalartos eximius = E. cycadifolius). Bothalia 6(2): 426-428.

VERDOORN, I.C. 1962. Encephalartos species in Natal. Trees in South Africa 14: 50-55.

VERDOORN, I.C. 1970. Living fossils, the cycads. Summaries of talks - 1970 - Opsommings van praatjies. Proc. S.A. : 19-20.

VON BREITENBACH, P. 1965. Cycadaceae. In : The Indigenous Trees of South Africa. Dept. of Forestry, Govt. Printer, Pretoria. Vol 2 Part 1: 3-13.

VORSTER, P. 1985. Why plant names change. Encephalartos 1, Mar 1985: 15.

VORSTER, P. 1986. Hybridisation in Encephalartos. Excelsa 12: 101-106.

VORSTER, P. & VORSTER, E. 1973. The African Cycas. (Cycas thouarsii). Excelsa 3: 14-22,26.

VORSTER, P. & VORSTER, E. 1974. Stangeria eriopus. Excelsa 4: 79-89.

VORSTER, P. & WATMOUGH, R. 1974. Wanton destruction of an old cycad.(Encephalartos chimanimaniensis). Excelsa 4: 47-49.

WATT, J.M. & BREYER-BRANDWIJK, M.G. 1962. Cycadaceae. In : The medical and poisonous plants of southern and eastern Africa. 2nd Edtn, Livingstone: 369-373.

WOOD, J. MEDLEY. 1907. (Encephalartos woodii). Annual reports of the Natal Botanic Gardens and Colonial Herbarium 1906-1907 : 8-9.

WOOD, J. MEDLEY. 1908. Encephalartos woodii. Gard. Chron. 43: 44.

WYMAN, K. 1986. Living fossils in cultivation. Encephalartos 5, Mar 1986: 18-19 and Encephalartos 6, Jun 1986: 35-36.

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,

With respect to your enquiry about the cycad in the film "Crocodile Dundee" (ENCEPHALARTOS No. 10, page 29), I have the following comments to offer: Most of the filming was done on location at Kakadu National Park. In this area Cycas calcicola is quite common. Lepidozamia occurs on the eastern coastal strip but none is known in the Northern Territory. Cycas armstrongii does occur with C. calcicola in some areas. Incidentally, the film crew is back at the site - filming "Crocodile Dundee II" !

LEN BUTT
QUEENSLAND
AUSTRALIA

BITS AND PIECES STUKKIES EN BROKKIES

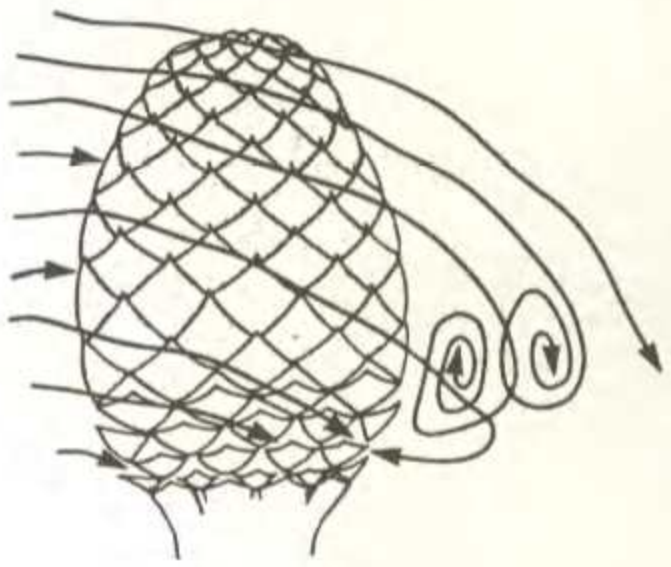
INSECT POLLINATION

Knut Norstog, member of our Society, Research Associate of the Fairchild Tropical Garden, and leading cycad biologist, is the author of a ten-page article in the May/June 1987 issue, (Vol 25) of the prestigious publication, "American Scientist". Entitled "Cycads and the Origin of Insect Pollination", Knut's article tells, in layman's language, the story of cycad evolution from the seed ferns with the emphasis on the swimming male sex cells and relates this to the present research on cycad pollination. One of the many fascinating areas of experimentation quoted, is the work of Karl J. Niklas of Cornell University, New York. Using elaborate wind tunnel equipment, Niklas has looked at the aerodynamics of pollen transport to cycad cones of different types.

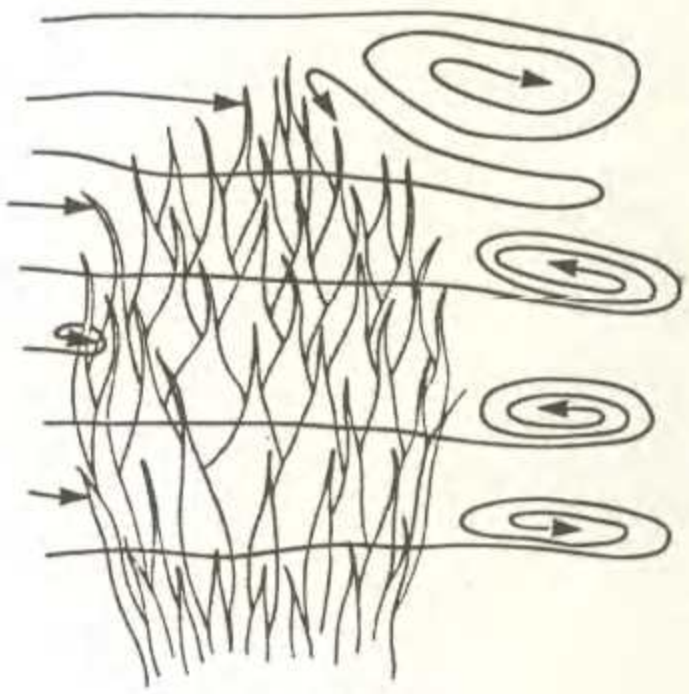
One of the diagrams illustrating this work is reproduced herewith. Knut proposes that there is room to accept that both wind and insects can play a role in pollination of some cycads, the wind transporting the pollen to the female cone base and the insects then taking it into the heart of the cone. This seems to be the case for instance in Dioon edule. The article ends with some interesting speculation on co-evolution of plants and insects and the reason why the modern flowering plants have become more widespread than the cycads.

CORALLOID ROOTS AND CYANOBACTERIA

Pretoria member, Prof. Nat Grobbelaar, together with research associates W.E. Scott, W. Hattingh and J. Marshall, has just published a paper entitled " The identification of the coralloid root endophytes of the Southern African cycads and the ability of the isolates to fix dinitrogen". The paper appears in the South African Journal of Botany, Vol. 53, nr. 2 of April 1987, on pages 111 to 118. The culmination of many months of research, the report provides new information on the nature of the



Dioon edule



Cycas circinalis

Experiments in a wind tunnel reveal that a surprising complex of aerodynamic and functional properties are combined in the female cone of *D. edule*. The cone's morphology has the effect of directing wind-borne pollen down toward the open sporophylls at the base of the cone. These sporophylls are sterile, but unlike the tightly packed ovule-bearing sporophylls above, they are the only access to the cone's interior. Apparently, insects enter the cone through the base, picking up pollen deposited there by the wind, and thus pollinate the ovules inside the cone. In contrast, the sporophylls of *C. circinalis* are all open to the air; consistent with this, the wind-tunnel tests show that the aerodynamic effect of the cone-shaped grouping of these sporophylls is to direct wind-blown pollen evenly to all the ovule-bearing sporophylls.

Cyanobacteria which inhabit cycad coralloid roots (see also ENCEPHALARTOS No. 4, pages 4 to 9). Their current research has shown that the organisms concerned are various species of the genus Nostoc, although in the case of Encephalartos hildebrandtii the organism was identified as a Calothrix. All cultures had the ability to reduce acetylene and to fix nitrogen. The research also challenges the belief that each cycad has only a single species of cyanobiont and further provides evidence that other bacteria may also be present in these associations.

A full reprint of this paper is kindly available from Prof. Nat Grobbelaar, Department of Botany, University of Pretoria, Pretoria, 0002

CYCAD THEFTS CONTINUE

The unfortunate spate of cycad thefts in the Durban area continues, with no apparent clues as to who the culprits might be. George Walters, keen supporter of the Society and member of the Natal Committee, reports that two of his prize specimens were taken from his garden during the night of 24 June this year. These were a five-year old E. lehmannii and a ten-year old Dioon edule.

A few weeks prior to this a large Parks Department street specimen of E. natalensis was removed from a site near George's home. This plant was estimated to weigh about 1,5 tons and had been anchored with several heavy boulders. It had defied two previous attempts to remove it.

AUSTRALIAN PALM BOOK

John L. Dowe, Secretary of the Palm and Cycad Society of Australia, has written to tell us that their Society is printing a book on local palms by Robert Tucker. Entitled "Palms of Sub-equatorial Queensland", it covers the area which extends northwards from Cooktown to the tip of Cape York. This territory is mostly uninhabited, except for the occasional Aboriginal settlement or mining town. Most of the palms are an extension of the New Guinea and South East Asia floras, with single species from the larger genera. The book also attempts to sort out the taxonomic problems in some of the indigenous palms, especially Archontophoenix and Livistona.

Members interested in obtaining a copy of this book should write to the Palm and Cycad Society of Australia, PO Box 1134, Milton, Queensland 4064, Australia.

TRY THIS FOR SIZE

It is known that the female cones of Encephalartos longifolius can be very large. The accompanying photograph shows what can be done! This E. longifolius female, her stem only 60 cm high, produced a massive cone, 72 cm high and with a diameter of 32 cm and a circumference of 113 cm.

Female cone of E. longifolius (photograph: Maans Kemp)

ZAMIA SURPRIZE

by Marion Debruyne

The accompanying photograph is of a perfectly normal Zamia furfuracea grown in my garden from a small seedling purchased in 1984. It is a female, and when its cone first appeared, it was just an ordinary female cone. However, as time went on and it began to swell, a small opening appeared at the top of the cone. After a week or so, a small green leaf appeared, and slowly but surely two more leaves emerged. During all this time the cone continued to grow; a little smaller than some of the other cones on other plants, but in all other respects perfectly normal.

I did not attempt to pollinate this cone, and when it seemed to be getting dry at the stem, I cut it off cleanly, treated the cut end with fungicide and tree sealer and planted it. I am happy to report that it is growing nicely, just as any other Z. furfuracea in my garden.

I am aware of Encephalartos longifolius having done this 'trick' and would like other members to send in a photograph or news of any other foreign species which can emulate the Z. furfuracea.

NURSERY NEWS

This time we have news of two nurseries which sell cycads:

Western Cape members, in particular, will be happy to learn that the GAZANIA NURSERY of member Alan Sonnenberg (1 Windsor Road, Rondebosch East, Cape Town, 7700) sells about eight species of cycad. Mainly seedlings are sold, but a few slightly older plants are available. The nursery also sells a wide variety of other indigenous plants, ranging from proteas and ericas to large specimens of Aloe dichotoma and other succulents. A price list is available on request.

Keen King William's Town member, Don Giese, has registered the GIESE CYCAD NURSERY (8 Nico Malan Drive, King William's Town, 5600; tel.no. 0433-22628). He sells cycad seed and seedlings, as well as larger plants from golf ball to football size. All necessary permits and other documents are provided, in compliance with Nature Conservation regulations.

CYCADS IN KOREA

by Douglas Bowring

Cycas revoluta, sometimes called the Sago Palm, is a native of the Southern Japanese Islands and is more commonly grown in Japan and Korea than in New Zealand.

While I was working in Korea for four months, I lived in an old part of Seoul (not much of it is left since the Korean War), with many very specialized shops. Opposite my hotel was a snake restaurant with live snakes in the front window. After choosing a snake, it was then cooked (the price depending on the size and the species - some rare ones with special properties for potency sold for more than US$1000). Also down the road was a shop selling C. revoluta.

The cycad shop, although fairly small, was packed with plants ranging from large old ones in large tubs to bonsai ones in pots only 5 cm high and with small leaves. The shopkeepers spoke no English and even when I brought a Korean friend who spoke English well, finding out information about them was hard going. However, I managed to glean the following from the shopkeeper and my friend's general knowledge.

Although Seoul is on a latitude similar to Auckland, the climate is more extreme, with summer days typically 30°C and up to 38°C, and winters down to -20°C, so no plants are grown outside.

The ultimate size of the plant (trunk diameter and leaf length) is mainly determined by the size of the pot and the amount of root trimming. Large pots with no root trimming produce trunks about 15 cm in diameter and the smallest bonsais down to about 1 cm. The cost of the plant depended on age and, as a general rule, the large trunk specimens were less expensive than the bonsai. The very small trunk old bonsais commanded the highest prices and were considered a status symbol of the rich and affluent.

Large plants were used as house plants in windows and shifted out onto the balcony or garden (if you were lucky enough to have one) in spring to add some growth before the frosts in late autumn. Bonsai plants were placed to get morning or afternoon sun. All plants were shaded from the midday summer sun. Bonsai plants were root-trimmed annually. This is carried out as follows: Firstly, once new leaves are opening, no more water is given so that the leaves set in miniature form. In late autumn, with the mix still dry, the plant is removed and the bottom third of the roots trimmed off. The bottom third of the pot is filled with dry sand and the plant is replaced. Bonsai plants are grown in pure sand and no fertilizer is used. In spring the plants are regularly watered to get a new set of leaves, with the old leaves trimmed off to force the growth of the new ones.

Good luck to those who want to try the Korean bonsai method! It is of course very slow compared to ordinary horticulture, yet in 200 years a plant over 1 m high and less than 2 cm in diameter, with a crown of leaves, each only 10 cm long, can be obtained!

(Reprinted from the Magazine of the Palm and Cycad Society of New Zealand, no. 17, September/October 1985, with the kind permission of the author and the editor).

FROM THE PRESIDENT

Membership of the Society now stands at a record 516, one hundred more than at the time of my last report. I extend a warm welcome to our new members, both the many local cycad enthusiasts and our supporters from overseas. Whilst no one member is any more important than any other, it gives me especial pleasure to welcome the Royal Botanic Gardens, Kew, England, as a member and similarly to greet our first member from Japan, Mr T. Inoue of Kanagawa.

Our finances remain sound, but I must point out that costs of production of ENCEPHALARTOS have risen alarmingly. It seems that we may have to subsidise the printing of our final 1987 issue from the Society's reserve funds which have fortunately been set aside for such contingencies. I thus give advance notice that a moderate increase in membership dues for 1988 will be unavoidable. The amount will be determined by your Committee in the near future.

Also with respect to 1988, your attention is drawn to the request for nominations of office-bearers for the next Executive Committee, which appears in this issue.

Members will note the increasing frequency of cycad research reports appearing in ENCEPHALARTOS. Our feedback so far indicates that these are pitched at the correct, rather delicate, level between being technically incomprehensible and being bogged down in explanatory detail. I am delighted to see something of a resurgence of interest in cycad research by local botanists and I believe that the efforts of the Society have contributed at least in part to this happy state of affairs. Indeed, it is opportune to point out that one of the Society's aims, laid down in our constitution, is to encourage scientific research on cycads. We hope this trend continues.

VAN DIE PRESIDENT

Lidmaatskap van die Vereniging staan nou op 'n rekord 516, 'n honderd meer as ten tye van my vorige verslag. Ek rig graag 'n hartlike woord van verwelkoming aan ons nuwe lede, beide die baie plaaslike broodboom-entoesiaste en ons ondersteuners van oorsee. Terwyl dit so is dat geen lid meer belangrik as enige ander is nie, is dit vir my spesiaal aangenaam om die Koninklike Botaniese Tuine te Kew, Engeland as lid te verwelkom, sowel as ons eerste lid uit Japan, mnr. Y. Inoue van Kanagawa.

Ons finansies bly gesond, maar ek moet daarop wys dat die produksiekoste van ENCEPHALARTOS onstellend toegeneem het. Dit lyk asof ons die druk van ons finale 1987-uitgawe uit die Vereniging se reserwefonds sal moet subsideer, wat gelukkig opsygesit is vir hierdie soort noodgevalle. Ek gee dus vooraf kennis dat 'n matige verhoging in ledegeld vir 1988 onvermydelik sal wees. Die bedrag sal in die nabye toekoms deur u Komitee bepaal word.

Ook met betrekking tot 1988, word u aandag gevestig op die versoek elders in hierdie uitgawe om nominasies vir ampsdraers vir die volgende Hoofkomitee.

Lede sal opmerk dat daar al hoe meer gereeld verslae oor navorsing in ENCEPHALARTOS verskyn. Ons terugvoering so ver dui daarop dat hierdie artikels korrek gemik word op daardie taamlik delikate vlak tussen tegnies-onverstaanbaar aan die een kant en oorlaai met verduidelikende detail aan die ander. Ek is baie bly om iets van 'n opwelling van belangstelling in broodboomnavorsing onder ons plaaslike plantkundiges te sien, en ek is seker dat die pogings van die Vereniging minstens gedeeltelik tot hierdie gelukkige stand van sake bygedra het. Dit is inderdaad 'n gepaste geleentheid om daarop te wys dat een van die Vereniging se doelstellings, soos neergelê in ons grondwet, is om wetenskaplike navorsing oor broodbome te bevorder. Ons hoop hierdie neiging duur voort.

Finally, on behalf of all our readers, may I thank the contributors, editor and producer of this volume of ENCEPHALARTOS for their continued excellent work. Enjoy reading it!

ROY OSBORNE

Laastens, namens al ons lesers, bedank ek graag die bydraers, redakteur en produseerder van hierdie uitgawe van ENCEPHALARTOS vir hulle volgehoue uitstekende werk. Geniet die lees daarvan!

ROY OSBORNE

CYCADS OF AUSTRALIA

by Len Butt

Macrozamia lucida

Apart from Lepidozamia, the best known local cycad in south east Queensland is without doubt Macrozamia lucida. It is grouped in the Section Parazamia as it is a low-growing "spiralis" form of plant. However, M. lucida has very little twist in the mature frond rachis. It is known by local farmers as "pineapple zamia".

M. lucida has a subterranean caudex with fronds loosely arranged in a circle from the crown. The pinnae are narrow and shiny dark green in colour, and the bases of the petioles are clearly marked by prominent whitish markings. The length of the fronds I observed would be 90 cm long on the average at maturity. The general width of plants from frond tip to frond tip would be 1,5 to 2 m. The height of plants would be up to 1,2 m. As many as five to eight cones have been seen on male plants, and two cones generally on the female. This plant adapts well to cultivation and soon blends into the harmony of a garden, whether kept as a pot plant on a patio or as part of a native plant rockery, for which it is well suited. The female cones are very attractive, and are comparable to other Macrozamia, being roughly about the diameter of a closed male fist and about 13 cm long. Seeds are generally about 3 cm in length, and a marked dark orange in colour when ripe.

Sightings of M. lucida have occured from Hervey Bay, west to Carnarvon, then south in the low range areas into New South Wales. Around Brisbane it occurs on the slopes of Mount Coottha, Toowong and the Indooroopilly hilly areas. It is widely spread from Enoggera up through the D'Aguilar Range country, the Glasshouse Mountains vicinity, and Beerwah, Peachester to Maleny. Seedlings are easily available if collected fresh. Mature plants for cultivation as ornamentals are generally easier to obtain in Brisbane than most other species.

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

IN SEARCH OF ZAMIA WALLISI

by Ian Turner

For a long time I had been hearing about Zamia wallisi and, fascinated by the thought of being able to find this plant with the the largest leaflets of all cycads, which had not been seen since Kalbreyer discovered it in 1880, I decided to go to Colombia, the country in South America where this plant grows, and to make a search there.

I arrived in Colombia in August 1983 and thought I would stay for about two weeks, but I ended up staying for over a month. I found the people in Colombia very helpful indeed and, in fact, had it not been for the help I received from my good friends Rodrigo Bernal Gonzales and Gloria Golliandro Garces, I would never have found Z. wallisi.

Dr Arango, Director of the Botanic Gardens in Medellin, very kindly lent me a four-wheel drive truck. He told me that the area I intended to visit was very dangerous because of guerilla activity and I should not go there, but after travelling all the way to Colombia from Zimbabwe, I could not be put off. Since Rodrigo and Gloria were also willing to go with me, we set off from Medellin and travelled over some very rough and dangerous roads. There had been a lot of rain and along the road there had been many landslides. At times we had to wait while a bulldozer came to clear the road so vehicles could pass. We had to cross three mountain chains to get to the area where Z. wallisi grows. Some of the mountain passes were quite spectacular. To look over the side of the road was like looking out of an aeroplane - the valley below was very far down! Sometimes two lorries would meet at a particularly bad place and neither driver would move his truck to the outside of the road to let the other pass, for fear the road might give way. So, after a long argument, one driver would have to reverse his truck to a place where it was more safe to pass.

When we eventually arrived in the area where Z. wallisi is said to grow, Rodrigo made enquiries at a farm to ask if anyone knew the plant we were looking for. Although no-one was sure, one man thought he might have seen the plant, so we arranged to meet him the next morning and go on to a nearby mountain. We then carried on a bit further to another farm where we stayed the night.

Our guide was waiting for us at six the next morning and we started up the mountain. There were some fast-flowing rivers to cross and my boots were soon filled with water. Even Rodrigo and Gloria, who wore Wellington boots, frequently had to empty the water from them. With the hope of finding Z. wallisi, the problem of walking with waters squelching in my boots all day, did not seem to matter, however. It took all morning to reach the top of the mountain. We made numerous stops to look at and collect some of the beautiful bromeliads and anthuriums seen on the way. Anthurium veitchii and A. warocquianum were particularly spectacular. Still with no sign of the Zamia, we carried on our search along the top of the mountain where there was an old mule trail. This was the route Kalbreyer took over 180 years ago when he found Z. wallisi. We followed the trail for the rest of the day, making stops to look around, but still could not see any Zamia. Our guide said it was time to head back, otherwise it would be dark and we would not find our way back to the farm. So, very reluctantly, we agreed. Starting down the mountain, the guide was quite far ahead of us, cutting a path through the undergrowth, when he shouted to come and see what he had cut off. When I got to where he was, I could hardly believe my eyes - he was holding up a big leaf, and asked if that was what we were looking for. Could a cycad really have such a big leaf, with one leaflet measuring 60 cm x 17,5 cm? The answer is "Yes", of course, because there in front of me was Zamia wallisi.

We spent some time looking around, because we felt sure there had to be more plants, but we could not find another.

The next day we had planned to go to look for Zamia medida, so we asked the guide if he would try to find some more plants of Z. wallisi and we would return in two days to see what he was able to find. After a very rough but successful trip to collect some Z. medida plants, we returned to find that in the two days we had been away, he had only found six more plants. It seems as if Z. wallisi is a very rare plant indeed and, if it is scattered over a wide area, there is little hope of fertile seed being produced.

I left one of the Z. wallisi specimens with Dr Arango in Medellin and I am pleased to say that I have the others growing here in Zimbabwe. My trip to Colombia was very successful because I found ten different species of Zamia growing there. The collecting of Z. obliqua was the most hazardous because it meant a long journey on the open sea in a very small boat. At Cape Corriente (Cape of the Current) the sea was so rough that the owners of the boat would go no further for fear of capsizing it. I did eventually get some Z. obliqua, but that is another story.

(Ian Turner's address is:
Springs Farm, P.O. Box 2162,
Harare, Zimbabwe)

REGIONAL NEWS STREEKNUUS

Oos-Kaap / Eastern Cape

'n Vergadering van die Oos-Kaapse tak is op Donderdag, 6 Augustus 1987 in Port Elizabeth gehou. Die lede is toegespreek oor die Setlaarspark-Natuurreservaat in Port Elizabeth en die broodbome in die Reservaat, deur die Kurator, mnr. Adrian Odgers. In 'n baie interessante praatjie het hy onder andere vertel van die geskiedenis en opvoedkundige rol van die Reservaat.

The members were especially happy to welcome Mrs Wil O'Brien, a visitor from Australia, at the meeting. She was in Port Elizabeth on holiday and had been encouraged by Australian friends and members of the Society, Dr and Mrs Carter, to make contact with cycad enthusiasts in South Africa. She found out about the local branch and contacted the Secretary, Pieter Stroebel, in time to be invited to the meeting.

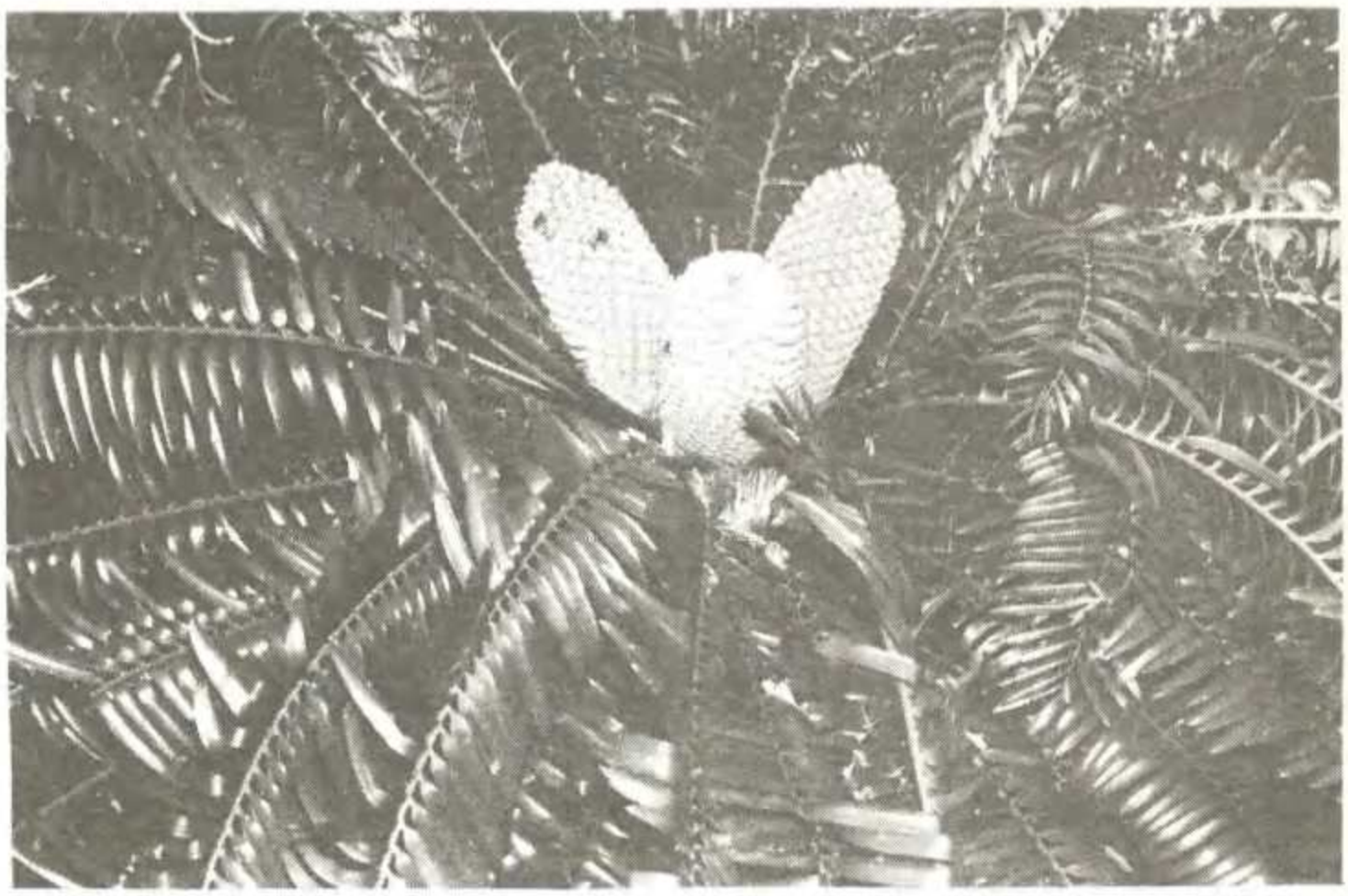
Natal

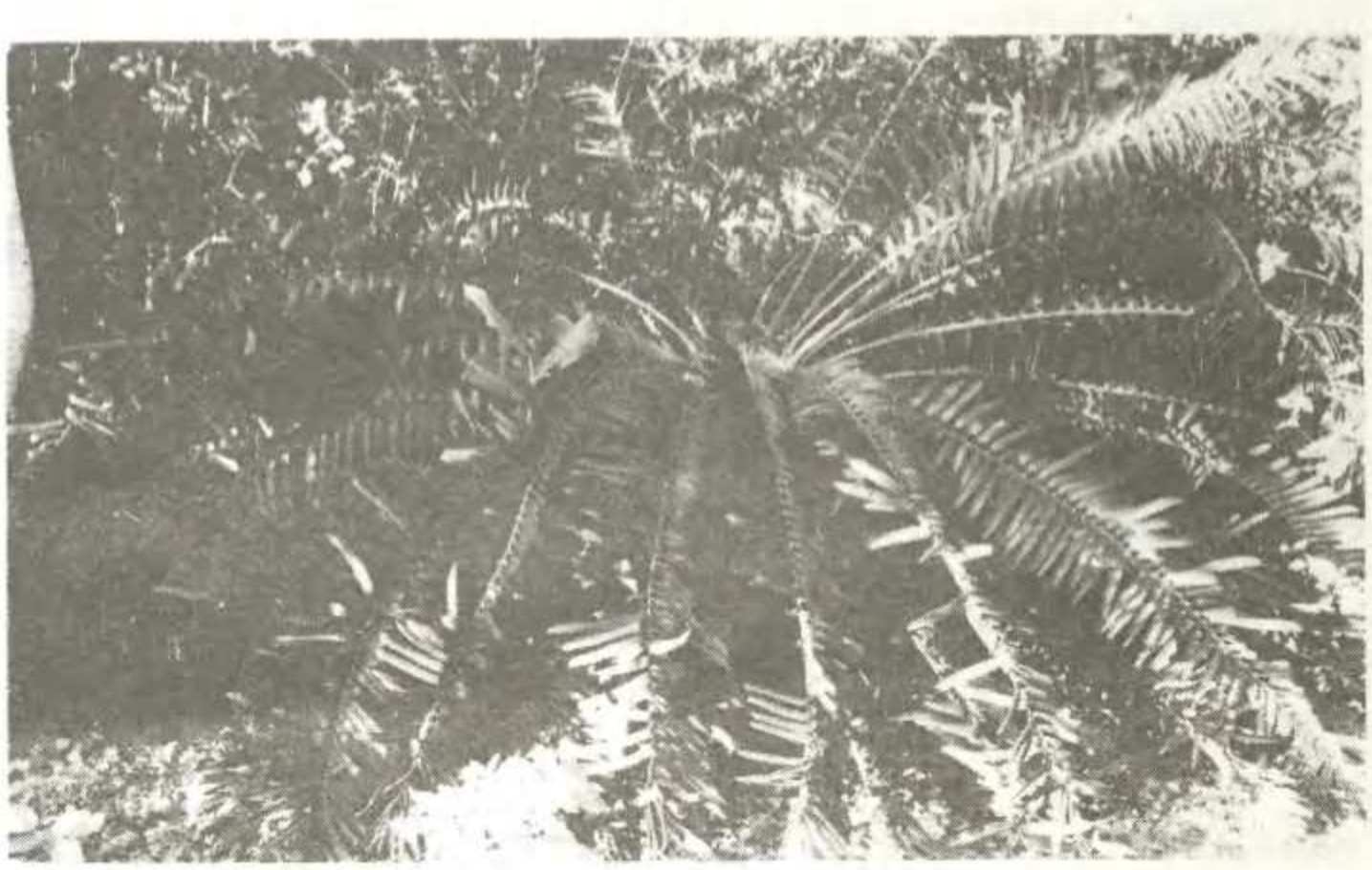
Danie Nel reports:
On Friday 29 May 1987, twenty members and six guests attended a slide show. It was a very pleasant and interesting evening. The show consisted of slides taken by our President, Roy Osborne, during the first International Conference on Cycad Biology (1987) on the French Riviera. We were delighted to see our own Encephalartos species flourishing in French soil! After an interval, during which refreshments were served, Harry Gerber showed us slides of local cycads and succulents. I want to appeal to the Natal members to attend these slide shows and other meetings to meet fellow-members and to improve their knowledge about cycads or to share their knowledge with others.

Natal members will be advised in due course of the next planned outing.

CYCADS FROM SEED

The accompanying photographs are of two specimens of Encephalartos natalensis which were bought as seedlings in Natal thirty years ago and planted in a Port Elizabeth garden. They now have a stem height of approximately 1m. Both are females and both cone regularly.





(Photographs: Maans Kemp)

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 like to make contact with anyone who has a few seeds of Encephalartos hildebrandtii and/or E. laurentianus to spare.

- Danie Nel (120 Bowker Road, Escombe, 4093; tel.no. 031-442505) would be grateful for any printed material on cycads - articles, newspaper cuttings, books, etc. This is needed for a scrap-book on the subject of cycads.

- Roy Osborne (20 Maryvale Road, Westville, 3630; tel.no. 031-866953) is anxious to obtain a copy of Prof. C.J. Chamberlain's 1935 book entitled "Gymnosperms - Structure and Evolution". The 1966 Dover Edition would be equally suitable. Can anyone help?

EX PRESS

THE NATAL MERCURY
23 July 1987

Three posters to help save cycads

Municipal Reporter

A CYCAD protection project is being undertaken by Durban's Natural History Museum in the form of three promotional posters.

Dr John Mendelsohn, director of the museum, said yesterday one of the museum's artists, Mr Doug Goode, was a top cycad artist presently compiling a book on cycads of Africa.

As cycads were so scarce in the wild and there was a need for concerted efforts to conserve them, the museum had decided to publish a series of three posters promoting their conservation, he said.

The first poster, depicting the seven species of cycad found in Natal, had already been printed and would be sold in the museum's shop as well as being put on display.

Some of the posters would also be given to schools, while others would be distributed by the Natal Parks Board which was also involved in the project, he said.

Dr Mendelsohn said the other two posters would depict cycads of the Cape and the Transvaal.

Sikadee-smokkelaars landwyd vasgevat

Deur
MARTIENS VAN BART

SMOKKELAARS van sikadee (broodbome) het in die laaste tyd landwyd só bedrywig begin sake doen dat dit die aandag van die wetstoepassingsbeamptes van die Departement van Natuur- en Omgewingsbewaring getrek het.

Minstens 45 mense is reeds gedagvaar om in die hof te verskyn.

In Transvaal is 'n smokkelsindikaat oopgevlek wat van Suid-, Oos- en Noord-Transvaal tot in die stadsgebiede aan die Witwatersrand en Pretoria gestrek het. Minstens 2 500 broodbome is by dié saak betrokke. Die vervalsing van permitte word ook ondersoek.

HOFSAKE

Volgens mej. Jill Holliday, skakelbeampte van die Departement van Natuur- en Omgewingsbewaring in Kaapstad, ondervind die departement ook groot probleme met smokkelaars wat in veral Oos-Kaapland bedrywig is. Twee hofsake in dié verband gaan binnekort op Port Alfred dien.

Mnr. P.J. Grobler, tuindirekteur van die botaniese tuin Kirstenbosch, het gesê dat die smokkelary lank reeds 'n ernstige probleem is. Die bome word uit die veld gesteel en verkoop. Van dié smokkelaars gaan so ver as om die bome uit te voer.

In Amerika veral word hoë pryse behaal vir broodbome. Die boetes wat aan oortreders opgelê word, verteenwoordig net 'n klein deel van die winste wat gemaak word. Hulle word gevolglik nie deur die strafbepalings afgeskrik nie.

STRAF

Volgens mej. Holliday bepaal die betrokke natuurbewaringsordonnansie van 1983 wat handel oor die beskerming van bedreigde flora, dat broodbome nie sonder 'n wettige permit besit, verkoop, gekoop, geskenk of as skenking ontvang, gepluk, ingevoer of uitgevoer of vervoer mag word nie.

By 'n eerste skuldigbevinding kan 'n boete van hoogstens R3 000 of 'n jaar gevangenisstraf opgelê word. By 'n tweede of verdere skuldigbevindings kan 'n boete van R6 000 of twee jaar gevangenisstraf of albei opgelê word. Beslag mag ook gelê word op voertuie waarin die plante vervoer is.

Al die verskillende broodboom-spesies is as bedreigde flora verklaar. Dit sluit ook gekweekte bome in. Dié maatreël is getref om breër magte toe te ken aan die Departement van Omgewingsake vir doeltreffender beheer oor dié bome.

● Kapenaars of besoekers aan Kaapstad wat in broodbome belang stel, kan benewens die mooi broodboomtuin in Kirstenbosch ook gerus na die versameling in die Kaapse stasietuin gaan kyk. Daar is sowat vyftig broodbome van verskillende spesies.

Die broodboomrotstuin langs die SA Lugdienstерminus lyk egter nie te waffers nie. Die publiek gooi hul vullis daarin. Dit is ook só in die pad van voetgangers dat niemand dit eintlik raaksien nie.

DIE BURGER
20 Junie 1987

The 'living glue' that holds down the earth

THINK of the Cape and you might picture the fynbos of erica and protea or Namaqualand's floral carpet of colour, while Natal's image could be one of luxuriant green growth and bright flowering splendour.

For the Transvaal there could be the bushveld scene of acacia thorn trees, the contrasting seasons of green and brown grassveld, the impala lily or the seemingly immortal baobab.

We often relate ourselves to plants — the living green glue that holds down the earth. We keep tame plants in the house, and we religiously tend our garden plants or window box. We give flowers on special occasions.

ALL SA'S 29 cycads species are in danger.

Plants are obviously important to us. More than that, they are vital — providing modern medicines, industrial commercial products such as paper.

They filter the air and absorb rainfall, preventing soil erosion and floods and release a steady flow of clean water. They provide our food and enable all other life to exist.

But our rich plantlife is in grave danger from steadily worsening human impact, resulting in 2 500 species being under threat.

The Transvaal's 250 threatened plants are mostly found in the lowveld and Drakensberg escarpment to the east.

All the 12 cycads found in this region are given maximum protection, and in a unique conservation scheme a special nursery was created at Hartbeeshoek to grow these fascinating and primitive plants in cultivation.

Former United Nations secretary-general U Thant once asked: "How much would we pay to preserve an animal species on the moon, had the astronauts found one?

"No species on earth is less precious".

Effective ways to save threatened species

THE MOST effective way to save a threatened wildflower species is to protect its natural habitat by including this in a nature reserve.

Conservationists agree it is impossible to protect all South Africa's 2 500 threatened plants in their individual habitats, but by carefully choosing key areas with high plant diversity, many species can be quickly protected.

A further option is action by a "search and rescue" team, suggested by Professor Tony Hall of the University of Cape Town.

This involves identifying critically endangered species in the wild and protecting them through a variety of methods including growing the species in cultivation in a botanic garden or storing the seed in a "seed bank".

The species can also be protected on site, through gaining the commitment of the landowner to be the plant's guardian, or by fencing off a small colony.

A search and rescue team could also transplant part of an endangered plant's population to a formally protected area with similar natural conditions, such as a nearby nature reserve, as has been effectively achieved with the beautiful golden gladiolus.

When the "captive" colony has increased sufficiently, plants can be reintroduced to strengthen the wild population.

Our Living World, June 7 1987

THE survival of more than 10 percent of South Africa's plant species is severely threatened, with at least 30 species already extinct and a further 130 in great danger.

Endangered species include the delicate Erica jasminiflora and the beautiful golden gladiolus.

A further 1 000 species are critically rare or vulnerable.

We invite you to help the urgent work to protect these plants from extinction, by supporting the SA Nature Foundation's campaign to "Save The Plants That Save Us".

Altogether almost 2 500 of South Africa's 21 000 flowering plant species are threatened — more than one in every 10 local species.

Threatened by invasive alien plants, insensitive development, fire, farming, illegal collecting and general lack of care, many of these plants can survive only with our help. And the need is urgent.

We invite you to read on these pages about the wealth and diversity of South Africa's plants, the threats they face, and some of the conservation projects where dedicated people are working to protect this unique floral heritage.

Please send a donation to help fund one or more of these projects. Your donation, large or small, will make a real difference. Thank you for caring.

Plea for SA forests

SOUTH Africa's forests are so important for mankind that every area should automatically be granted blanket conservation protection, states a Wildlife Society survey of indigenous forest.

Covering less than 0,3 percent of South Africa's land surface area, forests also provide essential habitat for more than 100 wildlife species already classed as endangered, vulnerable or rare

These threatened species include both the red and blue duiker, the suni, leopard, palm nut vulture and three cycads.

The survey, which covers Natal, Transvaal and the Orange Free State, was undertaken by Keith Cooper, director of Conservation for the Wildlife Society.

A total of just 127 000 hectares of indigenous forest was identified in the three provinces in areas larger than 50 ha. Patches of forest less than 50 ha are believed to be too small to survive in the long term.

Our Living World, June 7 1987

Posters, sketches for R20, R50 gifts

PLEASE! We need your help. Funds are needed urgently to protect South Africa's unique and beautiful wildflowers from extinction.

2 500 plant species are in danger and the threats to their survival are growing steadily.

We must act at once to save this magnificent heritage for future generations.

Do you feel strongly about the extinction of a living species? If you do, and you would like to help prevent this tragedy, please use this coupon and send your donation urgently.

Every contribution will help.

We shall keep you informed of the progress of this campaign so you will see your support has a positive and effective result. Remember:

- **Donations of R50 or more will receive an exclusive print of kudu drawn by famous artist Zakkie Eloff.**
- **Donations of R20 or more will receive a colourful poster featuring the Cape's beautiful wildflowers.**
- **All donations will be acknowledged with the thanks of the SA Nature Foundation, together with a report and special panda sticker.**

(Address for donations: Endangered Plants Campaign,
S.A. Nature Foundation,
P.O. Box 456, Stellenbosch, 7600)

Sago pud may have killed David Niven

London Bureau

THAT dullest of schoolboy fare, sago pudding or 'frogs' eggs', is exciting a degree of interest which belies its damp, soggy nature.

It is under investigation as a possible cause of Parkinson's disease and motor neurone disease, which killed actor David Niven.

Scientists have tumbled on the staple stand-by of school caterers as a possible poison that could cause a group of diseases that hits the elderly.

The population of the Pacific island of Guam was shown to have a 100-times-greater-than-normal incidence of motor neurone disease, while it was virtually unknown in the neighbouring island of Saipan.

That island in the Mariana chain in the 1920s had its cycad plantations removed to make room for sugar, while Guam stuck with cycad, a possible ingredient of sago pudding.

During the Japanese occupation of Guam, cycad was eaten in vast quantities. 'Motor neurone disease, Parkinsonism and Alzheimer's-type dementia — which are all regarded as interrelated diseases in Guam — were occuring there in people in their 20s and 30s,' said Prof Peter Spencer, a neurotoxicologist.

But just abstaining from sago pudding is not going to rid the planet of these diseases, said Prof Spencer, of the Albert Einstein College of Medicine, New York.

However, research into cycad foods, sponsored by the Third World Medical Research Foundation, might help understanding of diseases that destroy muscle activating cells, leading to paralysis.

Dr Peter Nunn, biochemist at King's College Hospital, London, said that if David Niven had had a passion for sago pudding it might have played some part in his decline. 'As we get older our nerve cells degenerate anyway and a large number of toxins may accelerate that process.'

THE NATAL MERCURY 31 July 1987 (See also ENCEPHALARTOS no. 1, pages 16-18)

The Cycad Society Of Southern Africa

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