ENCEPHALARTOS

JOURNAL OF THE
CYCAD SOCIETY OF
SOUTHERN AFRICA

TYDSKRIF VAN DIE
BROODBOOMVERENIGING
VAN SUIDELIKE AFRIKA

NO. 25

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EDITOR/REDAKTEUR

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VOORBLAD/COVER

Female Encephalartos transvenosus
Photographed by NEIL MUNRO at
Modjadji Nature Reserve

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FROM THE PRESIDENT

One of the aims of our Society, as circumscribed in our constitution, is to promote and support scientific research on cycads. This does not mean that we finance expensive research projects, but it does imply that everyone of us should be prepared to make available material from our collections for research purposes. Several cycad species have already been depleted in nature to such an extent that any research on these species is dependent on garden plants. Furthermore, our members are often in a very good position to make original observations which may well be of scientific value, and we would like to encourage you to publish such observations in ENCEPHALARTOS. So often one thinks that your observations are common knowledge to others, only to find that they have never been recorded.

Examples of research which may be of profound importance to our members, include investigations of germination requirements. There are indications that these are more complex than we have suspected up to now, and also that they vary between different species. Another aspect which should urgently be researched, is the storage of pollen. Already we have gained considerably from research on nitrogen fixation by the coralloid roots, which gave us a clearer understanding of the nutritional requirements; on pollination by insects which showed us for the first time how severe the problems of reproduction may be; and on growth patterns which indicated how fast we can expect our seedlings to grow.

The CYCAD '90 congress in Australia had a strong scientific basis, and we could expect that the same would be true for the 1993 congress in Pretoria. Let us support this matter fully!

The committee appointed by the State President to investigate the alleged illegal export of cycads, have tabled their report. I have not seen the report myself, but from radio reports I understand that one of the recommendations resulting from the investigation is that legislation in all four provinces should be uniform. We hope that all the provinces follow Transvaal's realistic attitude towards seedlings. We all know that a collector's seedlings vary continuously in respect of numbers and species composition, and when such seedlings are subject to possession permits it entails an enormous amount of administrative work. Another recommendation, which probably has bearing on the Cape Province, is that possession permits should be permanent instead of having to be renewed annually (most of us regularly forget to renew in time). We can only hope that something will come from this. It is ironic that similar recommendations were made some years ago to the Minister of Environmental Affairs by the influential South African Association of Botanist, without any success.

With best wishes,

Piet Vorster

PIET VORSTER
ACTING PRESIDENT

We wish our President Nat Grobbelaar great success during his research visit to the Republic of China and look forward to his return in May 1991.

VAN DIE PRESIDENT

Een van die doelstellings van die Vereniging, soos omskryf in ons grondwet, is om wetenskaplike navorsing op broodbome aan te moedig en te ondersteun. Dit beteken nie dat ons duur navorsingsprojekte finansier nie, maar wel dat elkeen van ons bereid behoort te wees om materiaal uit ons versamelings beskikbaar te stel vir navorsing. Verskeie broodboomsoorte is reeds tot so 'n mate uitgewis in die natuur dat enige navorsing op hierdie soorte aangewese is op tuinplante. Verder is ons lede dikwels in 'n baie goeie posisie om oorspronklike waarnemings te maak wat van wetenskaplike waarde mag wees, en ons wil u aanmoedig om sulke waarnemings bekend te stel in ENCEPHALARTOS. So dikwels dink mens dat jou waarnemings vanselfsprekend is, en vind dan uit dat dit nog nooit aangeteken is nie.

Voorbeelde van navorsing wat vir ons lede van groot belang mag wees, is bv. om ontkiemingsvereistes te ondersoek. Daar is aanduidings dat dit meer ingewikkeld is as wat ons tot dusver gedink het, en ook dat dit baie verskil by verskillende broodboomsoorte. 'n Ander aspek wat dringend nagevors behoort te word, is die stoor van stuifmeel. Reeds het ons aansienlike baat gevind by navorsing oor stikstofbinding deur die koralloïde wortels, wat vir ons meer duidelikheid gegee het oor voedingsvereistes; oor bestuiwing wat ons vir *die eerste keer* werklik laat verstaan het watter probleme hierdie plante kan hê met hulle voortplanting; en oor groeipatrone wat vir ons gewys het hoe vinnig ons kan verwag dat ons saailinge gaan groei.

Die CYCAD '90-kongres in Australië het 'n sterk wetenskaplike grondslag gehad, en ons kan verwag dat dieselfde sal geld vir die 1993-kongres in Pretoria. Laat ons hierdie saak ten volle ondersteun!

Die komitee wat deur die Staatspresident aangewys is om die beweerde onwettige uitvoer van broodbome te ondersoek, het hulle verslag ter tafel gelê. Ek het dit nie self gesien nie, maar uit radioberigte verstaan ek dat van die aanbevelings wat uit die ondersoek gespruit het, is dat wetgewing in al die provinsie eenvormig moet wees. Ons hoop dat al d provinsies Transvaal se realistiese benaderi teenoor saailinge sal navolg. Ons almal we dat 'n versamelaar se saailinge gedurig wiss sover dit betref aantal en soortsamestelling; e wanneer sulke saailinge aan besitpermit onderhewig is, beteken dit 'n enorm hoeveelheid administratiewe werk. 'n And aanbeveling, wat waarskynlik op d Kaapprovinsie betrekking het, is d besitpermitte permanent moet wees eerder dat dit jaarliks hernu moet word (meeste v ons vergeet gereëld om betyds te hernu). O kan maar net hoop dat daar iets van sal kor Dit is ironies dat soortgelyke voorstel verskeie jare gelede deur die invloedryke Sui Afrikaanse Genootskap van Plantkundig voorgelê is aan die Minister v Omgewingsake, sonder enige welslae.

Met vriendelike groete,

Piet Vorster

PIET VORSTER
WAARNEMENDE PRESIDENT

FOCUS ON...

In this edition of ENCEPHALARTOS, we do not focus on a Southern African species, as usual, but on a more distant species from Central Africa. The spotlight falls on:

FOKUS OP...

In hierdie uitgawe van ENCEPHALARTOS fokus ons nie, soos gewoonlik, op 'n Suidelike Afrikaanse broodboomspesie nie, maar op 'n spesie van Sentraal Afrika. Die kollig val op:

ENCEPHALARTOS GRATUS

by Roy Osborne

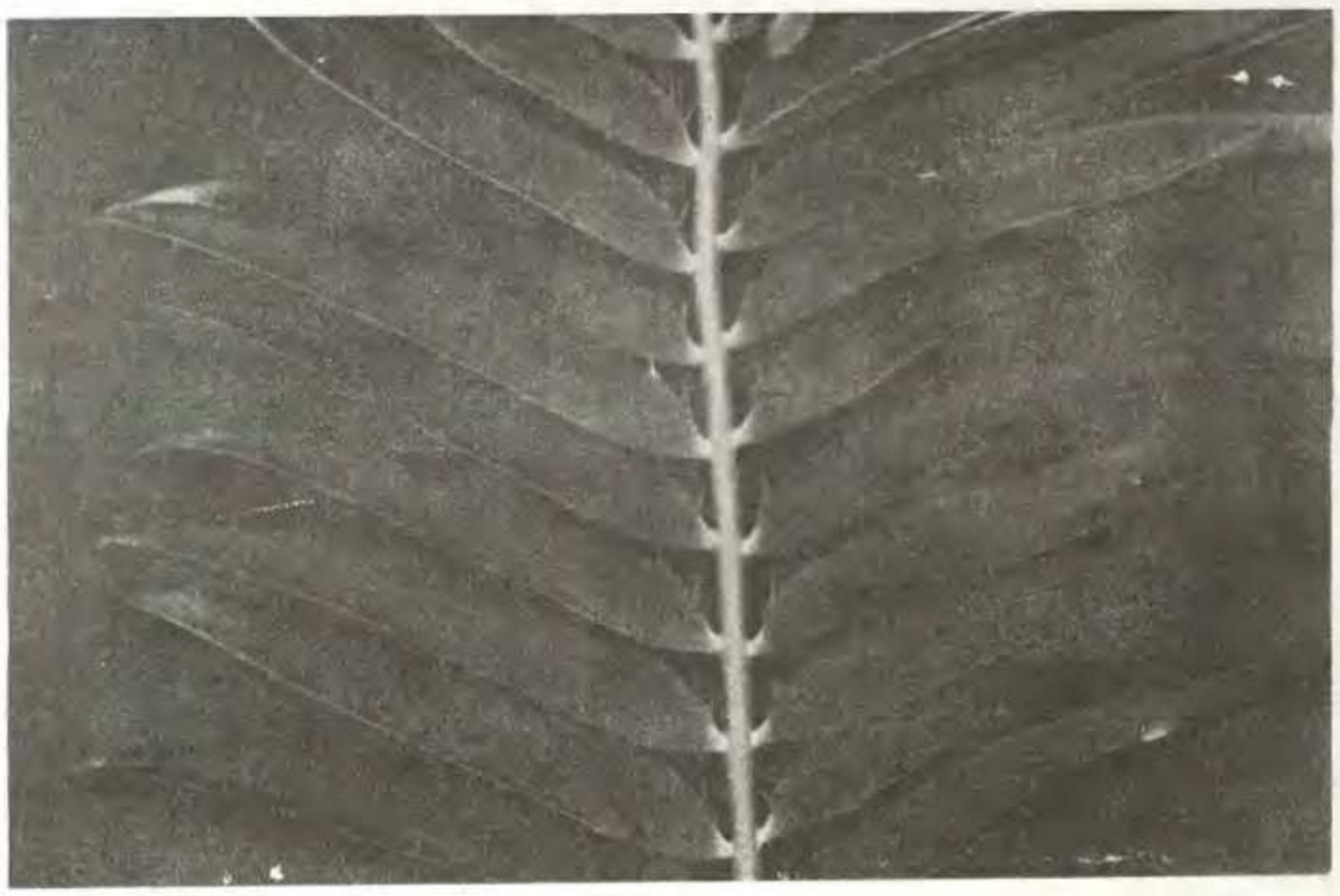
The imposing grandeur of Africa is typified by this view of part of Mt Mulanje, with the village of the same name in the foreground. (Photo: Graham Cox, November 1987).

A young specimen of *Encephalartos gratus* in habitat on the slopes of Mount Mulanje, November 1987, with Graham Cox.

The crown of a specimen of *E. gratus* on Mount Mulanje showing numerous male cones, a newly-emergent leaf flush and the remnants of the previously season's cones. (Photo: Douglas Goode, November 1987).

An impressive mature specimen of *E. gratus* on the lower slopes on Mt Mulanje, with Douglas Goode. (Photo: Graham Cox, November 1987).

A young specimen of *E. gratus* in the grounds of Kings Park, Perth, Australia, with the son of local Palm & Cycad Society member Jack Teh.



Portion of a leaf of *E. gratus* showing the typical shape and arrangement of the leaflets. Note the distinctive teeth on the upper leaflet margins concentrated near the leaflet bases.

1. INTRODUCTION

Somewhat akin to, but much larger than, Ayers Rock in Central Australia, the imposing granite structure known as Mount Mulanje rises 2400 meters above the surrounding African plains at the southern end of the central African Republic of Malawi. The mountain forms part of the precambrian basement complex of the region and is described geologically as "a massive, alkaline syeno-granitic pluton intruded into semi-pelitic biotite and hornblende gneiss country rocks". It is on the slopes of this mountain that Malawi's only indigenous cycad, *Encephalartos gratus*, is found.

2. DISCOVERY

The first evidence to reach the western world of a cycad in the area to the south of Lake Nyasa (now Lake Malawi) was a specimen of material sent in 1899 to Kew Herbarium by John Mahon, Government Forester stationed at Zomba, having been gathered from plants located in an area between the Puchila and Ruo Rivers in the south-western Mulanje district at an altitude of 850 meters. In 1903, John McClounie, also a Government Forester, sent one or more small plants to Kew, these having been taken from material in cultivation at Zomba, an earlier capital of the then-called British Protectorate of Nyasaland. In 1914, E.W. Davy, of the Department of Agriculture in Zomba, sent both herbarium and plant specimens to Kew, these having been found on the lower slopes of Mount Mulanje at altitudes from 650 - 900 meters. It was on the basis of this material, and further photographs, notes and plant specimens from Davy in 1916, that Prain published the description of the species *Encephalartos gratus* in the *Kew Bulletin* of 1916, with a further description being printed in the *Flora of Tropical Africa* of 1917. The epithet *gratus* arises from the Latin word for "pleasing" or "welcome".

3. DISTRIBUTION

Subsequent to the original reports, it has been shown that *E. gratus* is found in scattered areas on the plains below Mount Mulanje and on the northern, western and eastern slopes of the mountain itself. The plants, estimated to be at least several hundred in number, are generally found in rocky ravines or near rocky river courses, often associated with savannah bush vegetation, but not in densely-wooded sites. The area enjoys a high annual rainfall of 1000 - 1750 mm which is supplemented with copious flow from the granite massif itself. Indeed, plants on the plains below the mountain are often subjected to summer floodings but appear none the worse for their occassional immersions. The mean annual temperature is in the range 35 - 38 deg C and the minimum varies from 7 - 10 deg C. Plants in the savannah vegetation also appear to be adapted to a periodic burn cycle.

Field excursions by Mr R. C. Munch, well-known naturalist from the then-called Rhodesia, lead in 1950 to the discovery of another population of *E. gratus*. Munch found the plants in Mocambique's Namuli mountains, north-east of Vila Junqueiro (now Guruve) and *south*-west of Nampula, and he collected material for the herbarium in Salisbury (now Harare). This second population in thus about one-third of the distance between the population at Mount Mulanje and the *E. turneri* plants near Nampula in Mocambique. The map showing the distribution of Central African cycads (ENCEPHALARTOS 20: 22-23) indicates the relative positions of these three populations.

The possibility of further isolated populations of *E. gratus*, or other related species, occurring in Mocambique cannot be ruled out. Denis Heenan, for instance, believes that a population of "gratus-like" cycads at a site near Mavita, 75 km southwest of Vila Pery (now Chimoio) in Mocambique.

Since its discovery nearly a hundred years ago, the species plant has become fairly widely-distributed in botanic gardens and private collections. Specimens are present at Kew Botanic Gardens, Copenhagen University Gardens, Les Cedres Gardens and Naples Botanical Gardens in Europe; at Foster Gardens in Honolulu, at Huntington, Lotusland, the University of California, at the Marie Selby Botanical Gardens in Sarasota and at Fairchild Tropical Gardens in the USA, at King's Park in Perth, Australia, at Ewanrigg Gardens in Harare, at the Botanic Research Institute gardens in Pretoria and at the Durban Botanical Gardens and the nearby Old Fort Garden in Natal. It is also used ornamentally in gardens in Blantyre, the commercial centre in southern Malawi (e.g. the Old Mutual Buildings and the grounds of the Mount Soche Hotel). Similarly a fine planting of large specimens adds grace to the main street of Guruve in Mozamibique.

4. DESCRIPTION

4.1 STEMS

In Prain's original publication, *E. gratus* is described incorrectly as having very short stems, "mainly underground". In fact, mature plants often reach 2.5 m in height and sometimes 3.5 m. The trunk diameter is about 60 cm although plants higher up on Mt Mulanje have thinner stems at 30 - 40 cm. They are usually single stemmed, but basal suckers can eventually lead to a multi-stemmed appearance; Douglas Goode, for instance, reports one clump of 8 stems from a specimen on Mt Mulanje.

4.2 LEAVES AND LEAFLETS

The leaves of this species are variable in length, 90 - 180 cm being typical. Leaves are somewhat recurved towards the apex when mature. Each leaf bears 30 - 70 non-overlapping pairs of leaflets in a flat plane and the leaflets are inserted more-or-less at right angles to the leaf rachis. Leaflets reduce in size towards the leaf base ending in a series of prickles and spines with a bare petiole of about 10 - 12 cm below the last spine. Leaves are bright green in the juvenile stage but become a duller green and assume a more leathery texture when mature. Newly emergent leaves are covered with fine white silky hairs which are soon lost, but a brownish wool persists are the leaf bases.

Individual leaflets measure typically 18 - 26 cm in length by 2.3 - 3.5 cm in width. They are often sickle-shaped and terminate in a sharp point at the leaflet apex. The leaflet tips may be slight recurved downwards giving a slightly drooping effect. There are 2 - 7 prickles on the leaflet's upper margin, concentrated mainly near the point of insertion to the rachis, while the lower margin has fewer (2 - 4) and smaller teeth.

4.3 CONES

Male plants of *E. gratus* bear 5 or more cones (often up to 15 or even 20) per crown; these ripen in a staggered sequence - which ensures a prolonged period of pollen availability. Each male cone is about 40 cm long by 9 cm in diameter and is supported on a 15 - 19 cm peduncle. The greenish-yellow cone scale colour is almost completely masked by a thick covering of short reddish-brown hairs which is a diagnostic character for the species. The cones become quite warm and release a strong odour at maturity. Spent male cones remain on the plant for many month so that one often finds two seasons' cones and an interim leaf flush on the same crown.

Female plants of the species usually bear 2 -5, but sometimes up to 10, cylindrical cones per crown. They are typically about 62 - 65 cm long by 15 - 20 cm in diameter and are borne on 10 - 14 cm peduncles. The cone scales extend outwards and end in a slightly concave terminal facet. Like the male cone, their greenish-yellow colour is obscured by the dense layer of reddish brown hairs which is characteristic for the species.

David Heenan reports that the females cones commonly have a terminal set of leaflets replacing the upper sterile cone scales, and that this phenomenon was particularly evident in cultivated plants originating from the Namuli population. Bryan Chadwick similarly tells that in 1990 he observed well-developed apical leaves on every cone on each of six female plants growing in gardens in Blantyre. The presence of apical leaves on cones may be widespread but is not absolutely diagnostic for the species.

Seeds of *E. gratus* are 30 - 40 mm long by 14 - 20 mm in diameter and have the reddish colour to the outer fleshy layer typical of so many *Encephalartos* species. The seed kernels are distinctly elongated, measuring typically 30 - 35 mm by 15 - 18 mm, and showing only a faint ribbing pattern on the sclerotesta surface.

5. AFFINITIES AND HYBRIDS

Although *E. gratus* is geographically closest to *E. turneri* to the east and *E. manikensis* to the south west, it is not as closely related botanically as the geographic distribution might lead one to expect. Recent work by Osborne, Grobbelaar and Vincent, involving a multivariate statistical analysis of 86 different characters in the genus, shows that *E. gratus* has more features in common with plants to the north. Indeed, the four species *E. gratus, E. hildebrandtii, E. kisambo* and *E. septentrionalis* seem to comprise a closely-related set of taxa rather distant botanically from *E. turneri* and *E. manikensis*.

As far as is known to the author, there are no recorded cases of natural hybrids of *E. gratus* and any other cycad. However, Piet Vorster reports an artificial *E. gratus* (F) x *E. hildebrandtii* (M) hybrid (ENCEPHALARTOS 22: 6-12) and Douglas Atwater tells of an intriguing hybrid between *E. gratus* (F) and *E. woodii* (M) in the Lotusland collection in California (ENCEPHALARTOS 18: 12-18).

Mention has already been made that the Mulanje population of *E. gratus* probably does not exceed more than a few hundred mature plants. Many of these are located on the lower slopes where the local inhabitants carry out subsistence farming. The farmers, however, are careful not to disturb the established cycad specimens in their operations, a situation analogous to that describec

for *E. hildebrandtii* in East Africa (see ENCEPHALARTOS 22: 6-12). A possible threat to this species in habitat may arise from a pine afforestation programme being carried out on the Mulanje slopes by the Malawi Forestry Department. At present however it appears that the existing habitat plants are not generally within the areas being cleared. On a more positive note, the present plants are showing healthy seedling regeneration and one hopes that the cycads outside the afforestation area will continue to exist as a genetic reservoir for the species.

A more severe problem arose with respect to the Namuli population; here the area was widely cleared by the Portuguese for tea plantations and it seems that only a few specimens were relocated in this development.

Fortunately, *E. gratus* is readily propagated from seed and, by cycad standards, is relatively fast growing. Members of the Cycad Society in the Durban area have been active over the past coning season to ensure that all local female cones of this species have been pollinated with pollen kindly made available by the Durban Botanic Gardens. It is anticipatated that this season's "Durban" crop may exceed 1000 viable *E. gratus* seeds; these will be distributed to members of the Society for cultivation.

E. gratus is a frost-tender, fast-growing, species which needs good drainage and responds to occassional supplementary feeding. The presence of a very healthy female plant (one of those pollinated by the Society) within meters of the beach on Durban's Bluff, indicates that this species is tolerant to salt spray, a character which may be consistent with its relationship to *E. hildebrandtii*.

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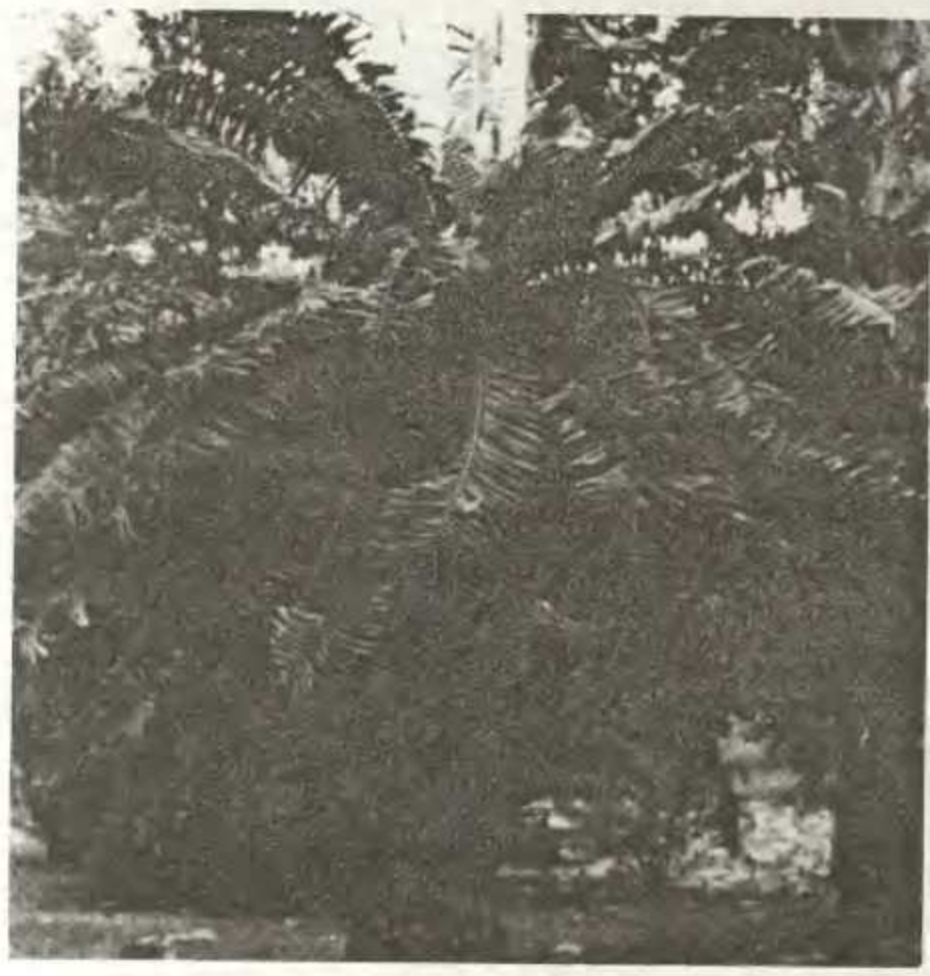
Excised male cones of *E. gratus* being prepared for pollen collection.

One of several female cones on a local Durban specimen of *E. gratus* just prior to pollination.

8. ACKNOWLEDGEMENTS

I would like to record my appreciation to Bryan Chadwick, Graham Cox, Douglas Goode, Ashley Nicholas, Ron Tavener-Smith, Ian Turner and Rose Williams who helped in various ways in the preparation of this text.



One of the best-known specimens of *E. gratus* is this large female in the Durban Botanical Gardens.

Natal Section Cycad Society members Danie Nel, Harry Gerber and George Walters pollinating female cones of *E. gratus* in a private garden in Durban.

Reprinted ex "The Cycad Newsletter" 12(1) of April 1989.

AUSTRALIAN CYCADS IN HABITAT

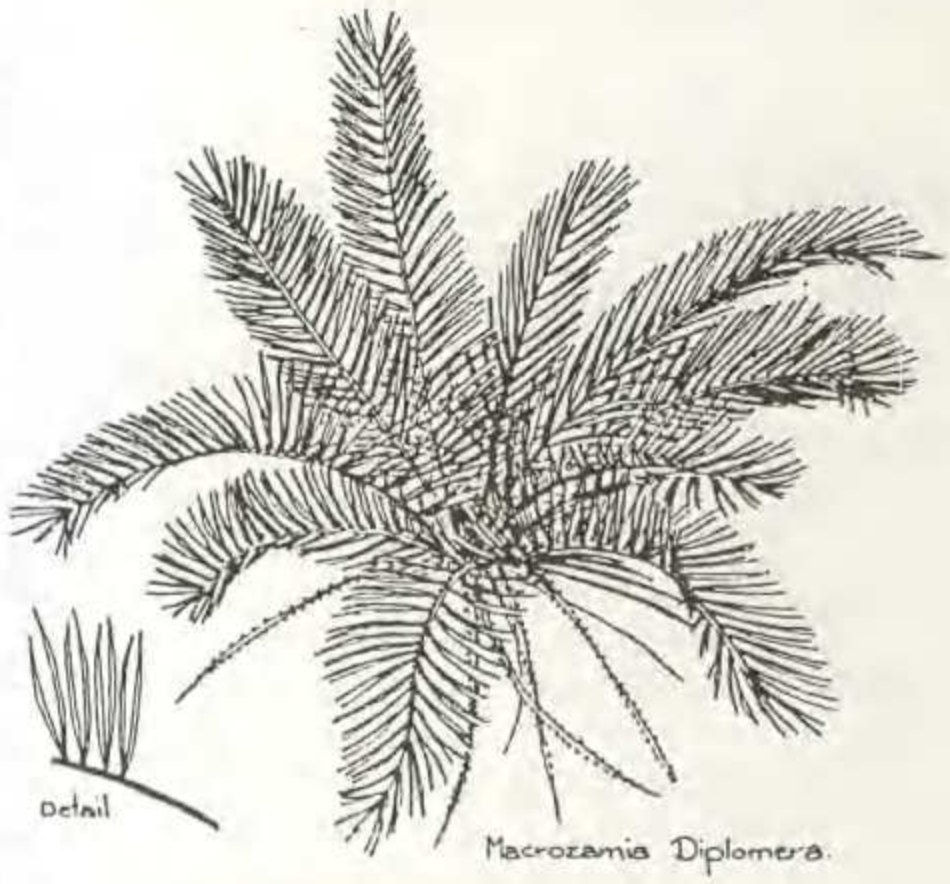
Bryan Laughland *

This year like many New Zealanders I chose to spend my annual vacation in Australia.However for me the lure was not the Sydney night life,the beaches of Surfers Paradise,or even Expo '88 in Brisbane.It was the chance to see cycads in habitat for the first time.I was able to see 18 species spanning 4 genera during my 25 day visit.

After much preparation which involved discussions with fellow members of the NZ Palm & Cycad Society (membership 130) who had seen Australian cycads,correspondence with Australians who could direct me to the colonies,and many hours spent route-plotting so I could cover as many miles as possilble in the time I had available,I flew from Auckland to Brisbane to begin my expedition.

Travelling by rental car I first drove south into central New South Wales where I had planned to see 5 Macrozamia species in my first 2 days.I located colonies of Macrozamia heteromera and Macrozamia diplomera near the town of Coonabarabran.Both colonies were very restricted in extent and accurate directions were needed to find them. Macrozamia heteromera are small cycads with few fronds and a recurved rachis.The pinnae are sometimes twice divided.Macrozamia diplomera is larger with many more fronds and a straighter rachis.The pinnae are also often divided.Both colonies grew on flat terrain in pure sand.

From here it was north to the national park at Mt Kaputar,home of the distinctive Macrozamia stenomera with its attractive multiply-divided narrow pinnae..After having to take a detour through a wide but fortunately shallow creek I drove up the mountain and found a colony of M.stenomera near the roadside.This species coned earlier this year which is a very rare event,and I managed to find 43 seeds by complete accident while stumbling about in the dark.I had no experience of how quickly darkness descends at more northerly latitudes than New Zealand and so I often found myself arriving at cycad colonies in the middle of nowhere as the light was fast fading.



Macrozamia Diplomera.

Next stop was near Dalmorton where the NSW form of Macrozamia moorei grows.Its thick trunk which reached up to around 5 feet in height carried a dense crown of glossy green fronds.The plants grew on the slopes of a river valley on ground strewn with rocks.Large kangaroos could occasionally be seen bounding along in the distance.I had seen a group of emus the previous day.

From here I drove east to the coast and down towards Coffs Harbour where I found a colony of the very attractive Macrozamia fawcettii.This is another dwarf type with few fronds.The rachis spirals through a full circle and the pinnae radiate outwards.A characteristic red coloration is seen where the glossy green pinnae join the rachis.Coning had ocurred this season.

After spending a few days in Brisbane I flew north to Cairns (1500km) to attend the International Palm Society biennial meeting.Here I met some American cycad enthusiasts including By and Libby Besse from Florida.They had been spotting colonies of blue cycads by helicopter!

Bowenia spectabils was widespread in the tropical rainforests north of Cairns where the IPS ventured on various excursions.New cones could be seen emerging on some plants at ground level.

After a week I began the southward journey back to Brisbane.Cycas media was commonly seen in colonies along the main highway,almost invariably on stony elevated ground.It was the sugar cane harvesting season in Queensland and many grass fires had been started by the burning of the canefields prior to harvest.I saw a stand of Cycas media which had been burned quite recently and beautiful crowns of soft emerald coloured fronds were emerging.

I went inland to a very arid area west of Cairns and found a large colony of Cycas cairnsiana.These were growing without any


Macrozamia Heteromera.

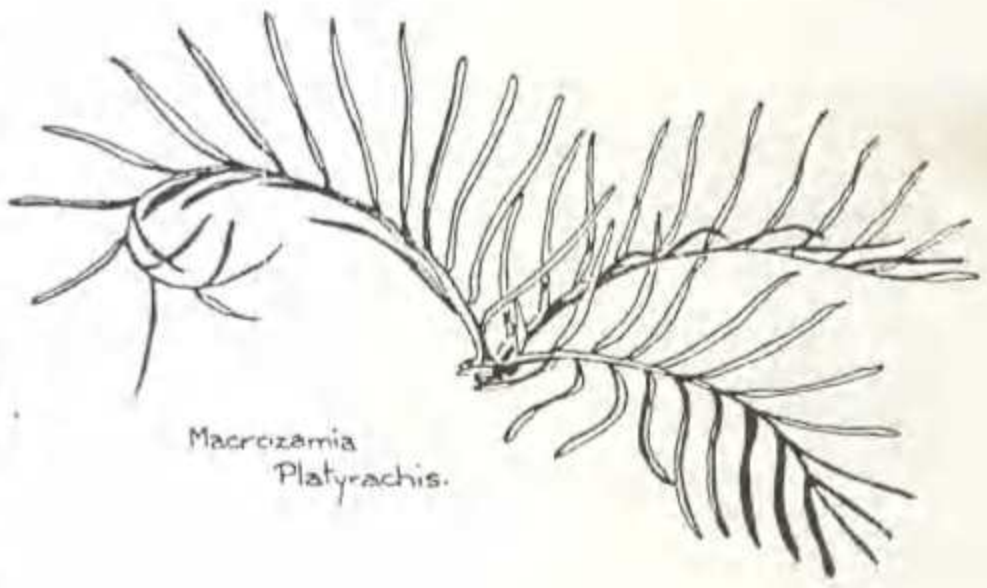
cover.Their fronds were attractively recurved with the pinnae held upright in a sharp 'V' configuration.Seed found in the crowns of some of the females was very attractive,being a powdery turquoise colour attached to rust-brown sporophylls.The colony was quite large,extending for perhaps a mile or so.

Between Cairns and Townsville I saw 2 species.The first,known as Bowenia sp."Tinaroo" is similar to Bowenia spectabilis but the pinnae margins have a few serrations rather than being entire.The second were massive (50 ft plus) specimens of Lepidozamia hopei growing at a coastal location near Mission beach in very moist tropical conditions.Carrying on southwards past Townsville and to another coastal locality I saw some large,robust Cycas normanbya.Seed was plentiful beneath the plants and I collected around 400 which is being distributed through the NZ Palm & Cycad Soc. seed bank,along with seed of other species I purchased from a seed collector in Townsville.

Proceeding towards Rockhampton I found a colony of the distinct Cycas sp "Marlborough Blue".This was one species I especially wanted to find because a previous group of cycad expeditioners from NZ had failed to find it and I had heard a rumour that somebody had removed all the plants from the colony.Fortunately this proved to be false.The cycads were growing under quite heavy cover in places.Those that were exposed to the sun were glaucous blue in colour.Macrozamia miquelii was growing socially with the species.

After staying the night in Rockhampton I made an early start to the Byfield state forest which was the habitat of Bowenia serrulata.These grew densely with each plant having many parasol shaped fronds in contrast to Bowenia spectabilis which usually had just 1 or 2.The pinnae were a glossy lime green with margins characteristically serrated.The plants had coned earlier in the year.

Inland from Rockhampton I found Cycas kennedyana growing on the dry slopes of Mt Morgan.It was from here that I began the long drive inland to see the next 2 species on my agenda,Macrozamia platyrachis and the gigantic Queensland Macrozamia moorei.M.platyrachis grows in a very restricted area on the Blackdown Tableland.It is typical of the parazamia section macrozamias having just a few fronds and being dwarf in stature.The fronds are recurved without any twisting and the pinnae are quite broad,up to half an inch wide.I found the plants to be in excellent condition growing in sand

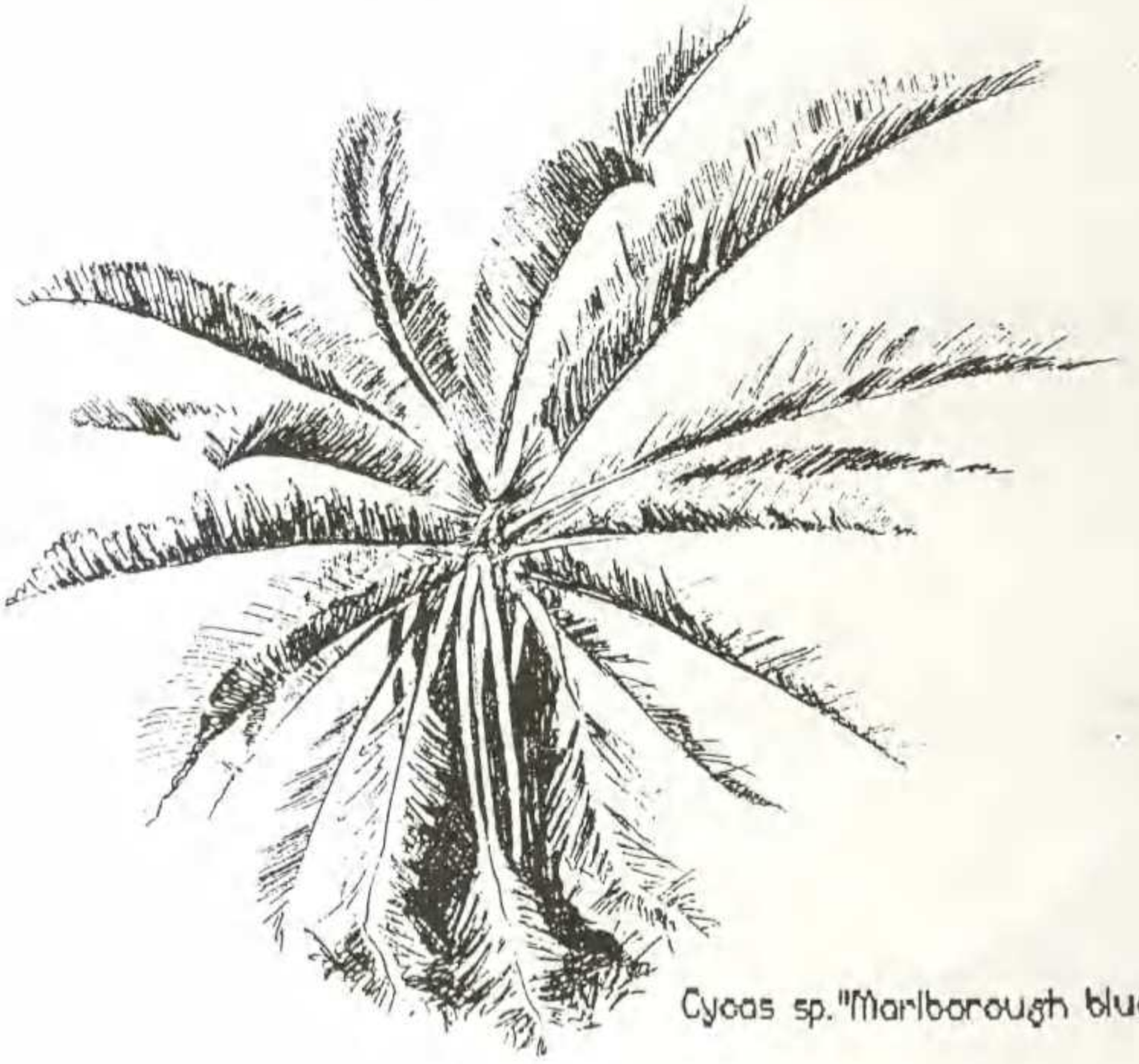


derived from ancient sandstone but seed production from the colony had been extremely sparse for a number of years.

Travelling further inland I found a large colony of the Phoenix palm sized Macrozamia moorei near a town called Springsure.These seemed to extend for several miles at least.I could see the large cycads dotted on distant hillsides with their blue-green fronds contrasting against the dry grass.Seed production had been plentiful as it often was.

The last cycad I was to see in habitat was Lepidozamia peroffskyana growing at Mt Tamborine south of Brisbane.Very mature specimens grow in a reserve area flanked by avocado orchards growing on the deep free draining soil.The trunks would have been about 5 ft tall on average.This is a more cold tolerant cycad than L.hopei.Its pinnae are narrower and the trunks thicker and much shorter.

I would thoroughly recommend any cycad enthusiast to visit Australia.Make contact with people in the Australian Palm & Cycad Society who will no doubt be more than happy to get you headed in the right direction,as they were with me.I know I will be returning at the first available opportunity.



Cycas sp."Marlborough blue"

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NOTES ON GERMINATING CYCAD SEEDS IN EUROPEAN CONDITIONS

by Ottorino Stainer

A great deal has been mentioned in this magazine about growing cycads from seed; I believe it is very beneficial for members to exchange information and would like to contribute my experiences.

It is important to note that I have grown only limited numbers of seeds from each species. These have been grown in an unheated greenhouse environment and in a single soil mix. When seeds arrive, the following processes are carried out: (a) the seeds are scratched and washed, (b) they are soaked for three days in an anti-fungal mixture, (c) they are then placed inside a closed case with a transparent cover (Figure 1) to allow germination, and (d) once germinated, seeds are transferred to individual pots (Figure 2). In some cases (e.g. with older seeds) it is necessary to split the sclerotesta to facilitate germination.

Results of my germination "trials" over the past three years are given in Table 1.

Ottorino Stainer writes from : Via Lisbona 25, Treporti 30010, Venezia, Italia.

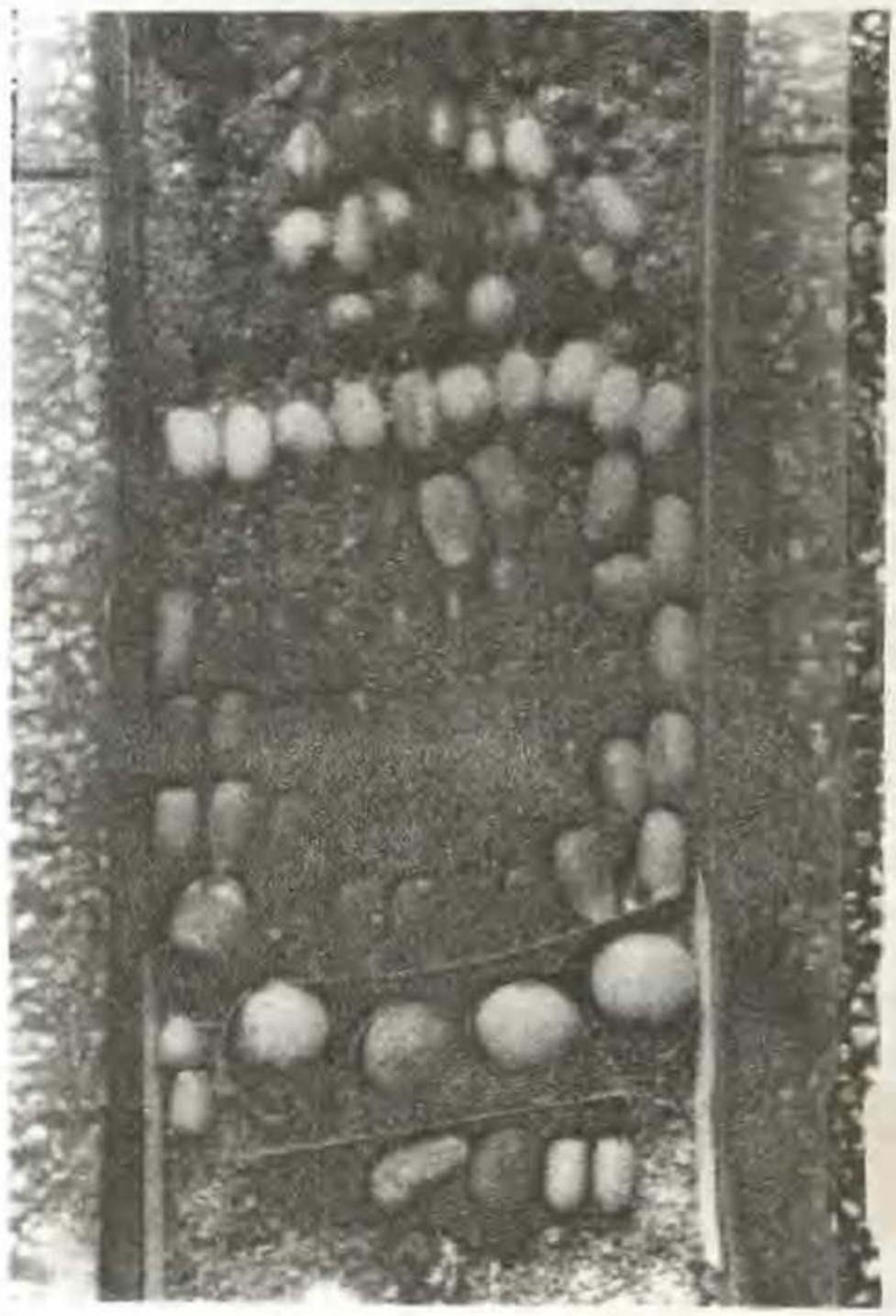


Figure 1 (right): Seeds are planted initially in containers with transparent covers.

Figure 2 (below): After germination, seeds are placed in individual pots, again with transparent covers in the early stages.

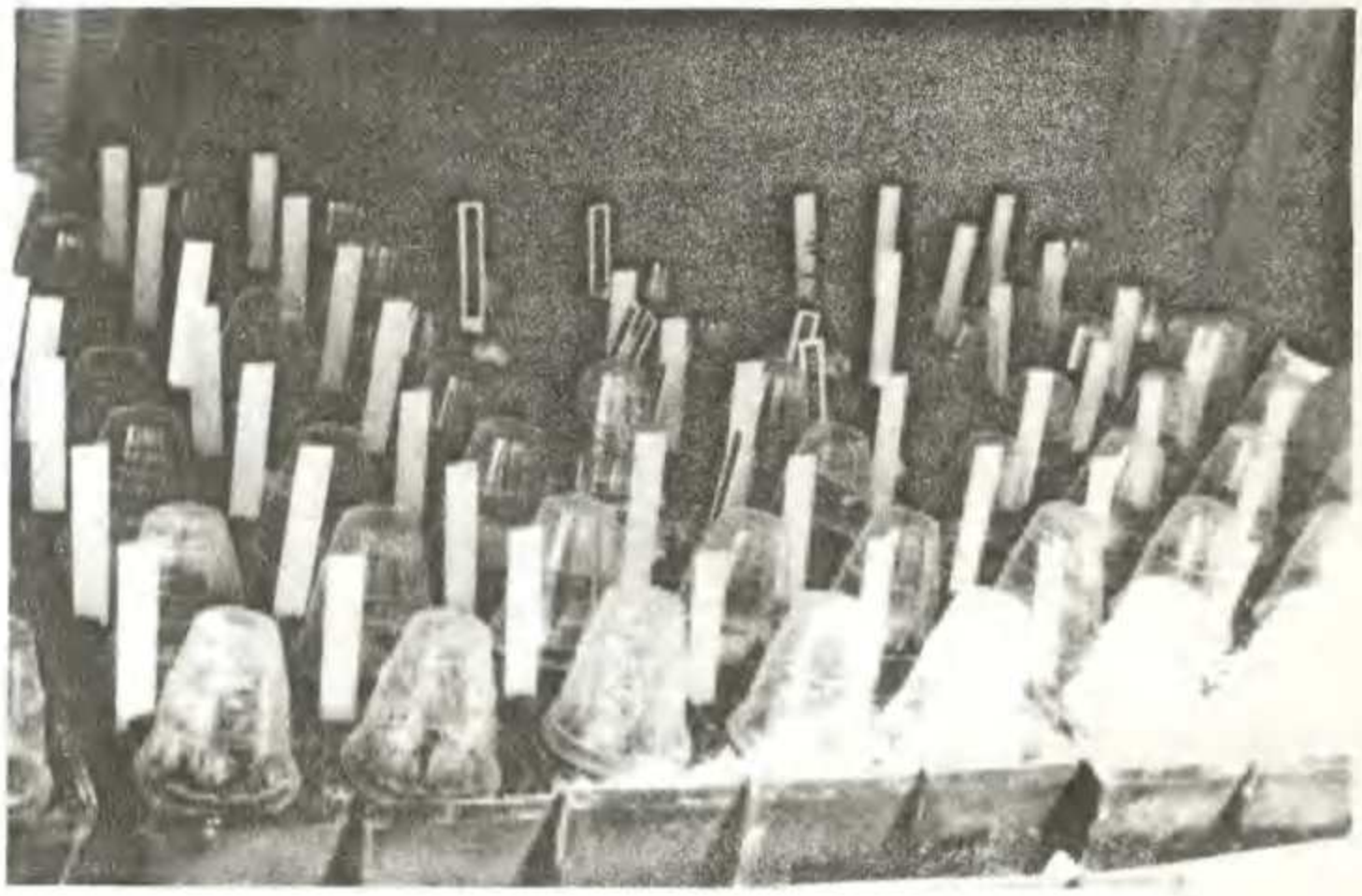


Table 1: Germination results with cycad seeds
(E = Encephalartos, S = Stangeria, M = Macrozamia, B = Bowenia Ce = Ceratozamia, Cy = Cycas, Z = Zamia)

Species	Reference	No. seeds	% Germination
E. natalensis	6.87	20	80%
E. natalensis (broad)	6.87	20	30%
E. lanatus	6.87	5	40%
E. ferox	6.87	5	nil
E. villosus	11.87	2	100%
E. lebomboensis	11.87	1	nil
E. ghellinckii	11.87	1	100%
E. longifolius	11.87	1	100%
E. natalensis	8825	8	41%
E. natalensis	7.88	4	75%
E. lebomboensis	7.88	4	100%
S. eriopus	8819	2	100%
M. miquelii	8819	3	33%
E. natalensis	8825	8	41%
E. natalensis	8862	32	40%
S. eriopus	8862	4	50%
E. villosus	8842	30	60%
E. villosus	8839	10	50%
E. friderici-guilielmi	Forrester	105	38%
E. altensteinii	8861	10	70%
M. riedlei	Mesa	20	80%
E. altensteinii	8918	5	40%
M. macdonnellii	Mesa	5	80%
M. riedlei	Kores	10	80%
E. lehmannii	8933	4	nil
E. natalensis	8928	8	84%
E. villosus	8927	16	61%
S. eriopus	8925	8	41%
E. ferox	8937	5	nil
B. serrulata	8948	2	100%
M. riedlei	8945	2	100%
M. pauli-guilielmi	8932	5	80%
E. manikensis	8942	4	75%
M. riedlei	Hunt	2	nil
M. macdonnellii	Hunt	3	nil
Z. furfuracea	Kores	5	60%
Cy. thouarsii	Danesin	2	nil
Cy. kennedyana	Hunt	7	57%
Cy. calcicola	Kores	30	3%
Cy. rumphii	Hunt	5	40%
Cy. media	Hunt	10	10%
M. spiralis	Mesa	25	76%
M. miquelii	Hunt	10	60%
B. serrulata	Hunt	10	40%
E. lebomboensis	Kores	5	nil
E. natalensis	5.90	50	14%
Cy. thouarsii	5.90	3	nil
E. ferox	5.90	3	33%
E. villosus	5.90	2	100%
E. transvenosus	5.90	4	75%
Ce. mexicana	Tang	15	74%
Z. fischerii	Tang	15	100%

CYCADS IN THE ADELAIDE BOTANIC GARDEN

by Julie Roach & John Roach

Introduction

Adelaide is the capital city of the state of South Australia and is situated on the central southern coast of the continent. The climate is described as "mediterranean" with most of the rain falling from April to October.

The Adelaide Botanic Garden, at its present site, has been open to the public since 1857. In the first catalogue of plants, released in 1859, there were two cycads listed: *Cycas revoluta* and "Zamia spiralis NSW", the latter more likely to have been Macrozamia spiralis.

Although there have always been cycads in this botanic garden, in was not until 1978 that a particular section was set aside for them. In 1984 an additional area was set aside to house the native species. The total collection now numbers 52 species of which 23 are growing outdoors.

Non-Australian cycad collection

The collection of non-Australian cycads is situated centrally within the garden, to the south of the main lake. A gentle slope in most of this area provides reasonable drainage, considering the soil type is red brown earth over clay marl and has an alkaline pH value of 8.5. Trees provide varying degrees of shade. The collection is well maintained and has become quite of feature of the garden.

The addition of a specimen of *Cycas revoluta*, weighing 3.8 ton when transplanted in 1979, helped add both age and height to the collection. This specimen, together with another weighing 2.5 ton and several smaller plants, all re-established successfully.

Plants have responded to the local conditions in a variety of ways. One typical slow, but healthy, grower is *Dioon edule*, planted in 1978.

Growth Statistics: (Dioon edule)

Year	Longest Leaf	Caudex. Ground level to apex
June 1986	960 mm	200 mm
June 1987	1010 mm	210 mm
June 1988	1025 mm	220 mm
June 1989	1000 mm	220 mm

An example of a plant which has responded well is *Encephalartos lebomboensis*, obtained in 1984 as a small plant and transplanted in 1987. A whorl of leaves was produced the following year with the longest leaf measuring 1.97 m. The plant coned in 1989.

Proven non-Australian species in the Adelaide Botanic Garden:

Cycas revoluta - sun, part shade
C. rumphii - sun, part shade (slow)
C. taiwaniana - part shade
Dioon edule - part shade
D. spinulosum - part shade
Encephalartos altensteinii - full sun
E. concinnus - full sun
E. lebomboensis - full sun
E. natalensis - sun, part shade
E. poggei - full sun
E. princeps - full sun
E. trispinosus - full sun
E. villosus - full sun
Stangeria eriopus - sun, part shade (slow)

The Australian cycad collection

The Australian endemic cycads are grown as a separate collection and form part of the understorey of an arboretum devoted to Australian trees. Scattered plantings were brought together in 1984 to form the basis for this collection. The oldest of these, a *Macrozamia communis*, has been in the garden since 1958. Paradoxically, the Australian species, as a group, have proven more difficult under cultivation than those from overseas. This is primarily due to the heavy clay soil in this area; in their natural habitat many Australian cycads occur as colonies amonst granitic boulders. The low humidity is also a restricting factor, particularly for the subtropical and tropical species.

Establishment is usually quite slow; plants either stay static, or decline for a number of years, before they develop a reasonable root system and begin strong foliage growth. For example, a breeding pair of *Macrozamia lucida* received in December 1983 were planted out in 1986, and have been very slow to establish.

Growth Statistics: (Macrozamia lucida)

Year	Longest leaf		Caudex Groundlevel to apex	
	male	female	male	female
1986	900	800 mm	95	90 mm
1987	900	800 mm	95	90 mm
1988	1000	800 mm	95	90 mm
1989	950	760 mm	95	90 mm
1990	1000	1080 mm	95	90 mm

Lepidozamia peroffskyana is a species that does well is this area which, being predominantly wooded, and receiving various amounts of shade, is similar to its habitat conditions. The garden now has all currently-valid Australia species except *Macrozamia secunda*.

Proven Australian species in the Adelaide Botanic Garden:

Lepidozamia peroffskyana - part shade
Macrozamia communis - part shade
M. fawcettii - sun, part shade
M. lucida - part shade
M. miquelii - part shade
M. moorei - part shade
M. pauli-guilielmi - sun, part shade.

Australian species difficult to cultivate:

Bowenia spectabilis
Cycas armstongii
C. cairnsiana
C. calcicola
Lepidozamia hopei
Macrozamia heteromera

Nursery

Those plants which either need specialized attention, have been in quarantine, or are not large enough to be planted in the public display areas, are held in either a glasshouse or an outdoor holding area. The latter area is provided with a mimimum of 50% shading in summer. Culture under glass provides protection from Adelaide's winters, which are often too wet and cold for many of the subtropical and tropical species and can predispose them to rotting.

Propagation of cycads at the garden is carried out under glass with bottom heat maintained at 25 deg C. Air temperature ranges from 15 to 28 deg C and 75% shading is provided in summer. Once leaves are established, young plants are transferred to a glasshouse where temperatures range from 15 to 33 deg C and where 60% summer shade is provided. Potted plants are grown in a free-draining organic-based potting mix of 4 parts by volume of coarse sand, 1 part peat, 2 part composted pine bark (ex *Pinus radiata*) and 1 part 10-12 mm gravel. The final mix has a pH of about 6. Plants are given a nutrient-balanced foliar fertilizer during the spring to autumn period.

Due to the attention that the cycads receive in the propagation and growing-on phases, there is a high success rate. The major pest encountered has been a weevil infestation - believed to have been introduced from a donated plant. Several applications of a systemic insecticide (dimethoate) and vigilant observation were necessary before this problem was controlled.

Cycas thouarsii is the fastest growing cycad in the Adelaide Botanic Garden, having been grown from seed received in May 1987 from the Southern African Cycad Society.

Growth Statistics: (Cycas thouarsii)

Year	Longest Leaf	Caudex. Ground lev to apex
June 1988	490 mm	50 mm
June 1989	820 mm	90 mm
June 1990	1000 mm	120 mm

Another plant of interest to southern African readers is an *Encephalartos munchii* which was received as a caudex in March 1989 from the Harare Botanic Garden in Zimbabwe. Both parties were required to get the appropriate CITES documentation from their respective countries. The "pup" was grown in quarantine for 12 months where it grew its first set of leaves before being released. The longest of these measured 1054mm.

Bicentennial Conservatory

Statistics

Length	100 m
Width	47 m
Winter Temperature Range:	16°C - 25°C
Summer Temperature Range:	25°C - 33°C
Relative Humidity:	65-85%
Floor Area:	2500 square me

The Bicentennial Conservatory was designed for the growing of a wide range of rainforest plants from tropical and subtropical Australasia and the near Pacific region. It was constucted in 1988 to commemorate Australia's Bicentenary. Internal climatic conditions and free-draining growing medium of pH 6.5 - 7, provide an excellent growing environment for some otherwise "difficult" species.

All cycads already planted have grown well without any detectable signs of setback: *Cycas circinalis, C. rumphii, C. normanbyana, C. calcicola, Lepidozamia hopei* and *Macrozamia platyrachis*.

IN MEMORIAM

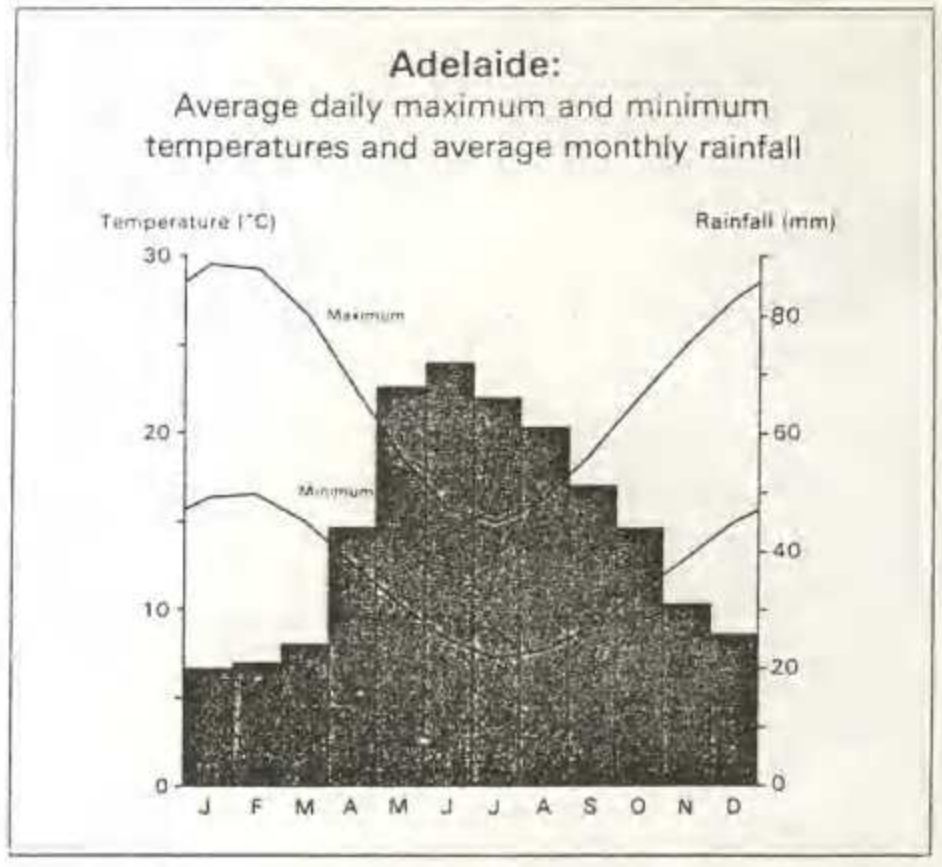
Members of the Society, especially those from the Natal Section, will join all readers in expressing our deepest sympathy to **Yvette Phipson** and her family, of Mid-Illovo, on the loss of her husband, **Gifford**, on 30 September 1990 after a long illness.

Conclusion

In general, most cycads can be grown in Adelaide provided that their drainage, in particular, and moisture requirements are met. The collection is progressing well, thanks to the many contacts in the cycad-collection community.

As the collection is representative of all genera and as the Australian collection is nearly complete (at least to species level), the emphasis is now changing towards the development of breeding colonies wherever possible.

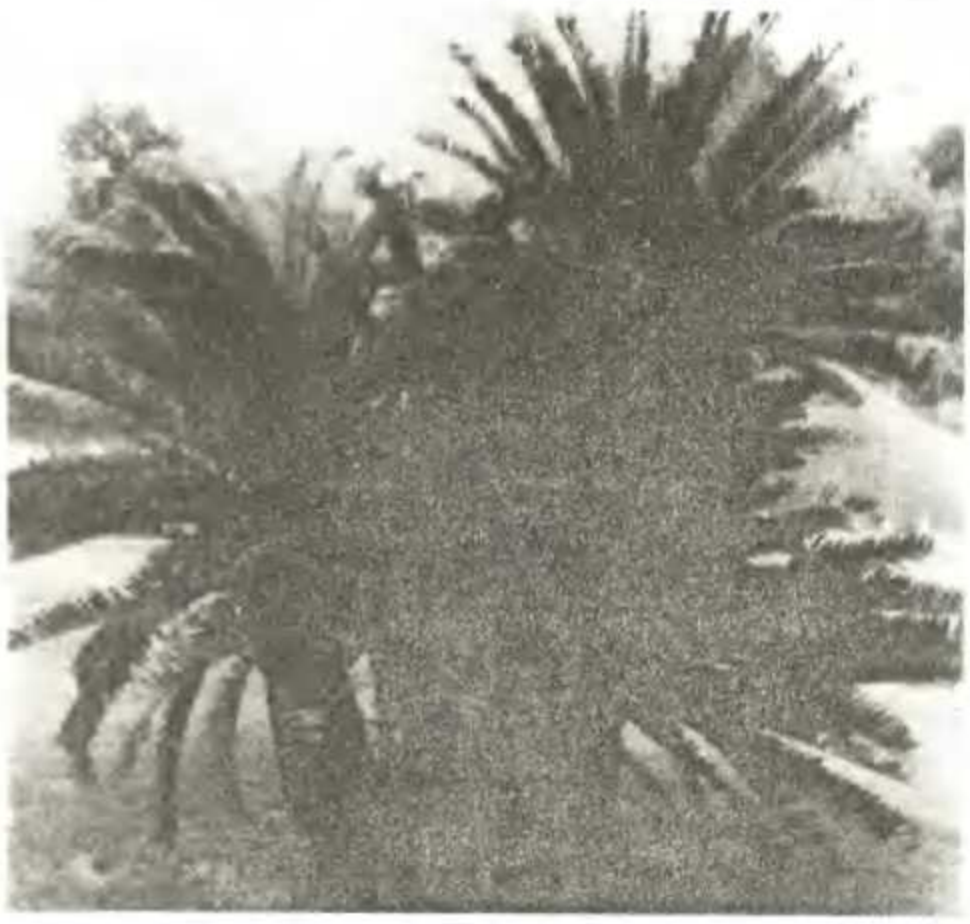
Julie F. Roach and John C. Roach are on the staff of the Botanic Gardens of Adelaide, North Terrace, Adelaide 5000, South Australia. This article was prepared from information presented in poster form at the CYCAD 90 Conference.



Temperature and rainfall, Adelaide, South Australia
Atlas of South Australia, Government Printing Division, 1986

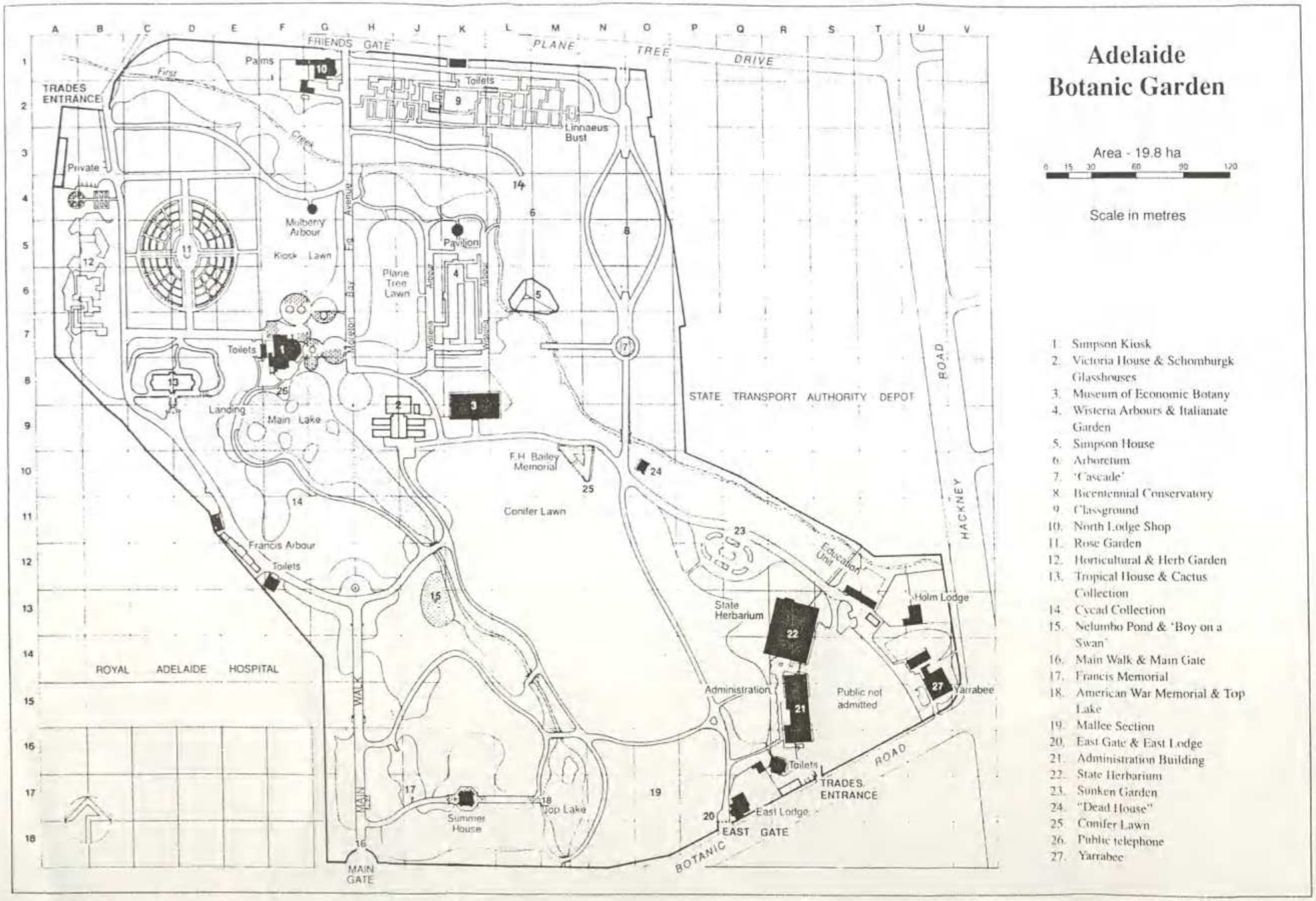
Adelaide Botanic Garden Statistics

Latitude	34° 55' 42" S
Longitude	138° 35' E
Height above sea level	50 m
Temperature	Mean daily minimum 11.9°C
	Mean daily maximum 22.4°C
	Lowest temperature 0°C [1909]
	Highest temperature 47.6°C [1939]
Annual precipitation	531 mm
Total annual evaporation	1815.4 mm



A fine specimen of *Encephalartos altensteinii* at the Adelaide Botanic Garden (Photo: Trevor Crawford of PACSOA)

***Dioon edule* is a slow but worthwhile plant in cultivation at the ABG (Photo: Trevor Crawford of PACSOA)**



Adelaide Botanic Garden

Area - 19.8 ha

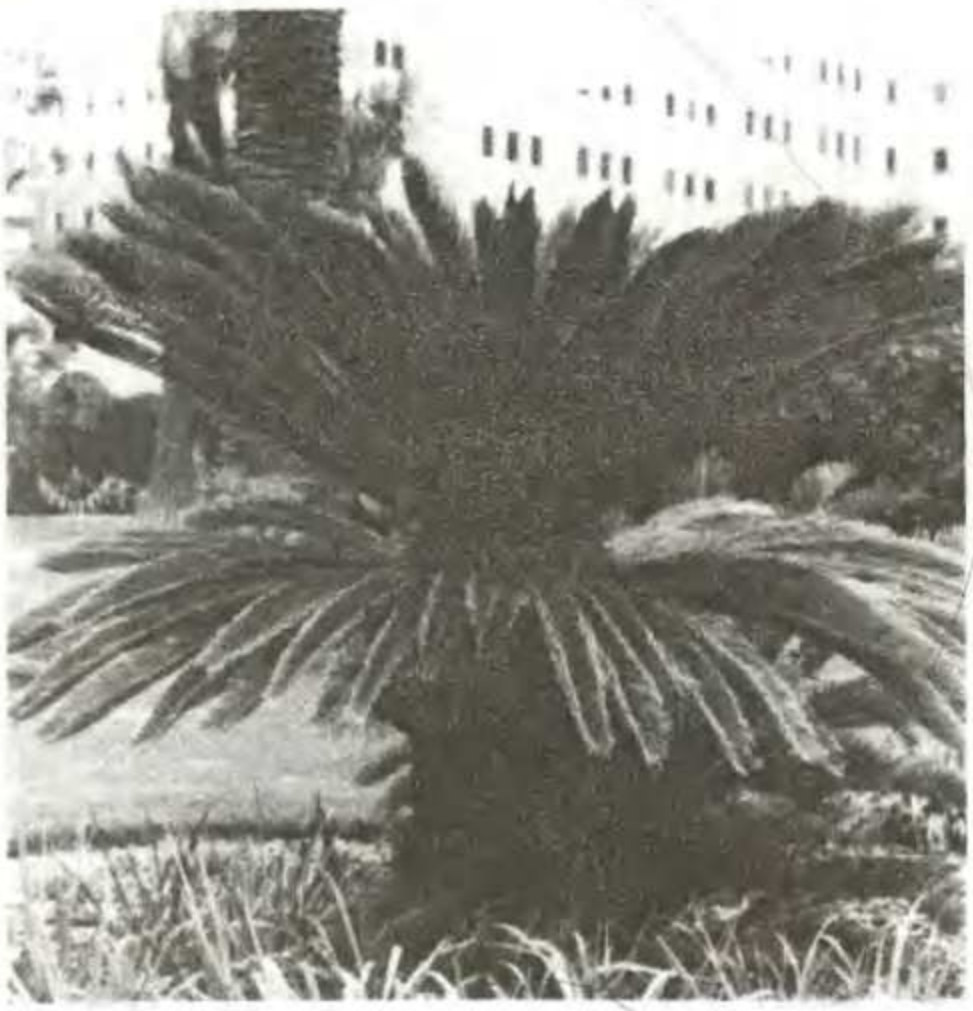
0 15 30 60 90 120

Scale in metres

1. Simpson Kiosk
2. Victoria House & Schomburgk Glasshouses
3. Museum of Economic Botany
4. Wisteria Arbours & Italianate Garden
5. Simpson House
6. Arboretum
7. 'Cascade'
8. Bicentennial Conservatory
9. Classground
10. North Lodge Shop
11. Rose Garden
12. Horticultural & Herb Garden
13. Tropical House & Cactus Collection
14. Cycad Collection
15. Nelumbo Pond & 'Boy on a Swan'
16. Main Walk & Main Gate
17. Francis Memorial
18. American War Memorial & Top Lake
19. Mallee Section
20. East Gate & East Lodge
21. Administration Building
22. State Herbarium
23. Sunken Garden
24. "Dead House"
25. Conifer Lawn
26. Public telephone
27. Yarrabee

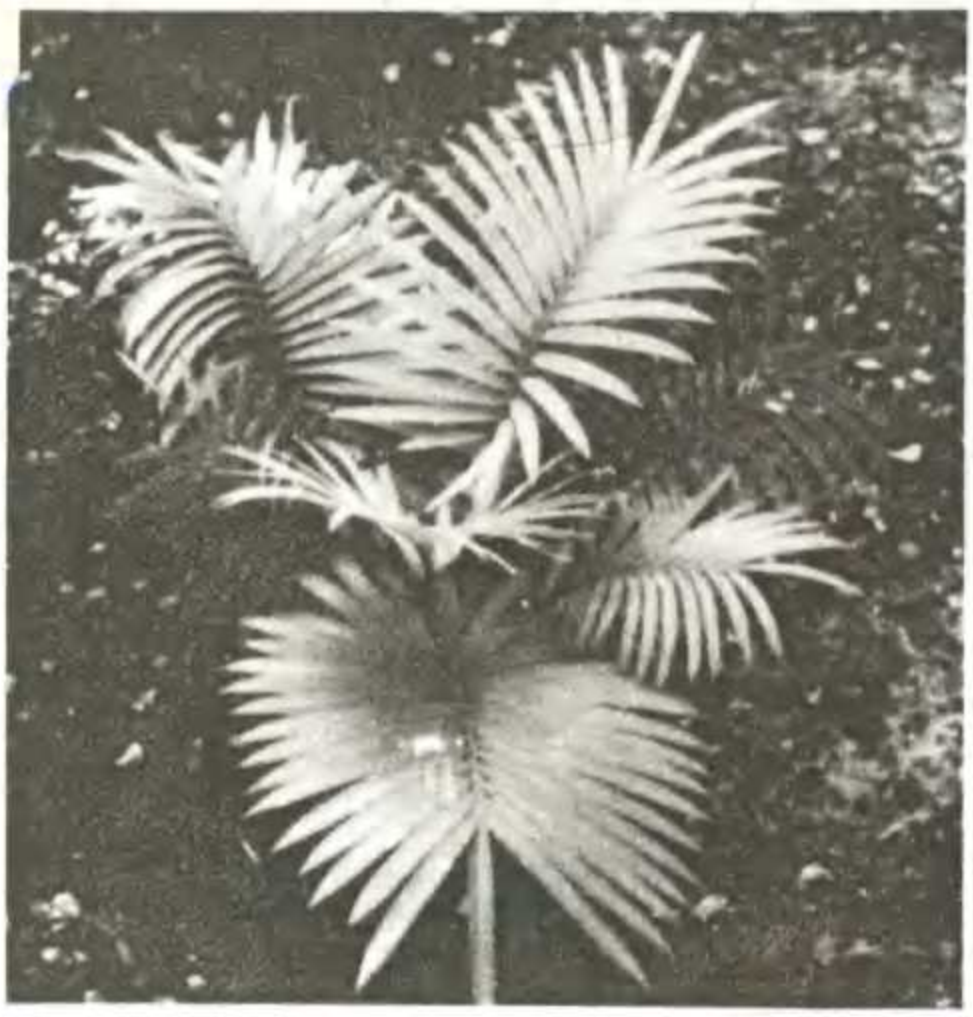
Transplanting a giant *Cycas revoluta* to its new home at the Adelaide Botanic Garden (Photo: October 1980 by ABG staff)

The Bicentennial Conservatory at the Adelaide Botanic Garden (Photo: November 1989 by ABG staff)



The ubiquitous *Cycas revoluta* makes as fine a decorative plant at the ABG as elsewhere (Photo: Trevor Crawford of PACSOA)

***Macrozamia communis* in the understorey planting in the indigenous portion of the ABG (Photo: Trevor Crawford of PACSOA)**



***Cycas rumphii* ex Fiji, in the Conservatory of the ABG (Photo: ABG staff)**

NATAL SECTION NEWS : GIDDY & OSBORNE ON CYCAD 90

An enthusiastic audience attended the last event organised for 1990, a report back meeting on 16 November by Cynthia Giddy and Roy Osborne on the CYCAD 90 Australian Conference. Treated to a plethora of excellent slides of cycad "personalities", cycad habitats, Australian rural and city scenic shots, the audience felt this was the next best thing to being part of the southern African delegation to Australia.

As customary at the Natal Section meetings, a prize was awarded for the best plant of show; this was won by Dennis Ross for his fine specimen of *Cycas revoluta*. The prize, in this instance, was the Joel Smoker poster of *Cycas pruinosa* in the Ord River Valley at Kununarra on the Western Australia/Northern Territory border; the poster having been donated by our good friends of the Palm and Cycad Society of Western Australia specifically for one of our evening events.

Right: A photograph from the poster depicting *Cycas pruinosa* in habitat. Enquiries in connection with obtaining copies of the poster should be addressed to Red Dirt Arts, P.O. Box 608, Kununarra, WA, Australia.

NATAL SECTION NEWS : JOHN PATE'S VISIT

Natal Section members were privileged to meet **John Pate**, Professor of Botany of the University of Western Australia, who recently spent a brief time in Natal while on a lecture tour of South Africa. As a joint venture between the Society and the University of Natal, John presented a fascinating illustrated lecture on *Macrozamia riedlei* on 29 October 1990. This cycad "superspecies", endemic in south-western Australia, is distributed over an area about 1400 km long and comprises at least three different forms. John's 15 years of field work on this plant has given him a detailed and rare insight into its ecology and physiology and has allowed him to conduct important studies on the nitrogen-fixing metabolism associated with its coralloid root structures. John has estimated that some specimens are about 800 years old, that they are closely dependent on a fire cycle and that the cycad populations can fix some 20 kg nitrogen per hectare per annum.

(Right): Whilst in South Africa, Professor John Pate took the opportunity to gather coralloid root samples from some local plants for further laboratory investigations. He is pictured here with Cynthia Giddy gathering material from *Encephalartos paucidentatus* at the Giddy's Umlaas Road Nursery (Photo: Roy Osborne).

NATAL SECTION NEWS

Thirty-five members and their guests enjoyed the morning of Sunday 21 October - touring two private cycad gardens in Yellowwood Park, a well-treed suburb on Durban's outskirts. First visited was the garden of Esther Simes: here members were greatly impressed by the way an important cycad garden could be developed on a relatively small stand, and how cycads and other plants could be blended together to maximum effect. The second garden was that of Danie Steyn, where the focus was on groupings of cycad plants in an open landscape. After visiting these two gardens, members moved to the nearby Stainbank Nature Reserve to enjoy a braai and social get-together.

Natal Section members visiting the garden of Esther Simes on 21 October 1990 (Photo: Roy Osborne)

TRANSVENOSUS - WOODII TWINS

Dr Gerald McCay from Pietermaritzburg tells us of a successful crop of seeds from a female cone of *Encephalartos transvenosus* pollinated with pollen from *E. woodii*. This cross, which has not previously been recorded, will undoubtedly lead to a magnificent garden plant (if it combines the features of its parents as anticipated).

The accompanying photograph shows that one of the seeds even produced twin embryos - an unusual phenomenon previously documented in ENCEPHALARTOS for other cycad species.

POLLEN BANK

Cynthia Giddy, who ran our pollen bank since its inception, has indicated that she can no longer serve us in this capacity. We would like to express our appreciation for all she did - surely there must be countless seedlings throughout the country if not the world which owe their existence to her matching bureau.

This means that we no longer have a pollen bank, and we therefore urgently call for volunteers to take over this very important aspect of our activities.

Whereas previously the pollen bank acted mostly as an information bureau to place members with plants of different sexes in contact with each other, we should perhaps consider starting a physical pollen bank from which members can be supplied with vials of pollen. This entails a lot of work (as Danie Ne can testify in connection with the seed bank), as well as research into methods of storing pollen and testing for viability.

Volunteers are requested to contact the President at the earliest opportunity.

FOR SALE: *Encephalartos friderici-guilielmi* seed.
Price: R30-00, selected R40-00 per 100, full tested.
Apply: L. Forrester, P.O. Box 26, Cathcar Tel. (04562)-2003.

CYCAD CONSERVATION REPORT

A comprehensive scientific report detailing the present problems in cycad conservation in southern Africa, and proposing a seven-point conservation strategy, has recently been published. The report, researched and written by past President Roy Osborne, appears in the *South African Journal of Science* 86: 220-223. It is well illustrated with photographs and contains tables of the southern Africa cycad taxa and reserves in which they are presently protected. The strategy proposed includes aspects under the headings of legislation, conservation, botanic garden collections, horticulture, a national cycad register, education and research. The article has prompted the journal to feature this topic on its front cover. This work will undoubtedly become the definitive scientific publication on cycad conservation, at least in the immediate future. The Wildlife Society of Southern Africa has already agreed to adopt the proposed conservation philosophy.

A copy of the publication can be obtained from Roy Osborne on application (address: 20 Maryvale Road, Westville 3630).

LETTER TO THE EDITOR

Sir,

I am a cycad enthusiast and have been a member of the S.A. Cycad Society for five years. I have a reasonable collection of cycads and am currently establishing a full-scale palm and cycad nursery in Auckland. Some South African seed has been obtained over the past years and a few excellent plantings have now been established in private gardens as well as at Auckland University and a local botanic garden. *Encephalartos* grows superbly here, even species such as *E. horridus*, despite the climatic differences. We have wet cool winters and mild to warm summers with few frosts - 1600 mm rain p.a., falling in winter, maximum summer temperature seldom above 25 deg. C and a high summer humidity.

I am anxious to make contact with anyone who can sell quantities of 100 to 1000 of any *Encephalartos* species except *E. friderici-guilielmi*. I am also able to offer seeds of Australian cycads in exchange for S.A. species.

Bryan J. Laughland
20 Vic Butler Street
Mt Roskill, Auckland,
New Zealand.

ON THE HOT TRACK

It is now well known that the male cones of many cycad species show significant temperature increases at about the time of pollen release. What has puzzled the plant physiologists, is how this happens. One of the possible metabolic "triggers" is the substance salicylic acid - better known to the layman (in the form of its acetyl derivative) as "aspirin". **Willie Tang** and co-workers have been exploring this metabolism, and they now report that salicylic acid is quite widely spread in the plant kingdom, and that the level in the male cones of *Dioon edule*, at 0.1 milligram per gram fresh weight, was higher than in any other plant material investigated. Significant amounts of salicylic acid were also found in microsporophylls from *Encephalartos ferox* and *E. gratus*.

The work, by Ilya Raskin, Hanna Skubatz, Willie Tang and Bastiaan Meeuse, is published under the title "Salicylic acid levels in thermogenic and non-thermogenic plants" and appears in the *Annals of Botany* **66:** 369-373 of 1990.

GARDEN & HOME FEATURE

It is refreshing to come across a general article of cycads which is well-written, well-researched and up-to-date. Such qualities are found in horticultural journalist Robyn Simpson's article "A Fatal Attraction" which appears in the November 1990 issue of *Garden & Home* (pages 28, 31 and 210). The article is essentially a report on the present status of *Encephalartos* in South Africa, particularly the conservation aspects. It is also pleasing to see that the contact address for our Society accompanies the article.

A Bouquet for SAA

A Transvaal customer reports that after buying a cycad in Natal, he decided to take it back with him by air. The Nursery placed it in a net bag (as in orange or onion bag) and he carried it on board as cabin luggage together with his briefcase. As the seat next to him was empty, he placed the cycad on the seat and not at his feet. When refreshments were served the smiling air hostess served him with a cup of coffee and "a glass of water for your friend".

LARVAE of the leopard moth which cause so much damage to cycad plants in the Highway area at this time of the year.

Moth 'invaders' back in town

Highway Mail Reporter

CYCADS in the Highway area are once again being plagued by a tiny moth.

Dr Roy Osborne, Westville resident and past president of the Cycad Society of Southern Africa, said the leopard moth is really bad news for cycad growers.

"It seems to be able to seek out cycads from distances of several kilometres away. The female then lays a clutch of 50 to 100 small yellow eggs on the underside of the new soft leaves which cycads produce at this time of the year. Within 24 hours these eggs hatch and the larvae start to decimate the plant."

There are many gardens with extensive cycad collections in the Highway area. Some of them have large and rare specimens which are extinct or near-extinct in their natural habitat.

"Owners of these plants have a moral responsibility to protect these plants and also to ensure that their gardens do not become breeding territories for the leopard moth," said Dr Osborne.

The moth, (*Zeronopsis leopardina*), which feeds exclusively on cycad leaves, is easily recognised by its markings - the wings have bold black spots on a orange background hence its name.

"Its control requir constant vigilance," sa Dr Osborne. "One ca easily rub off the eggs hand or even squash th larvae before they do to much damage, but bad infested plants nee spraying with a conta or systemic insecticide."

Highway Mail November 30, 1990

THE DAILY NEWS

OCTOBER 18, 1990

Cycads probe

PORT ELIZABETH: The Department of Nature Conservation in the Eastern Cape is conducting a nationwide investigation into one of the biggest illegal consignments of cycads from that region. —Sapa

THE NATAL MERCURY, TUESDAY, SEPTEMBER 11, 1990

24 000 attend Wildlife Expo

Mercury Reporter

ATTENDANCE at this year's Wildlife Expo was almost double that of last year.

When the four-day Wildlife Expo ended on Sunday, 24 000 people had gone through the gates at the Durban Exhibition Centre — an increase of more than 10 000 compared to last year's five-day event.

Mrs Jean Senogles, Natal branch chairman of the Wildlife Society, said: 'The overwhelming public response far exceeded expectations.'

She said funds raised through the Sappi Saiccor-sponsored Expo would be used for conservation projects throughout Natal, including the Umgeni Valley project, which arranges field trips for between 12 000 and 20 000 schoolchildren every year.

Some of the money raised will also be used for cycad anti-poaching measures and a 'massive' Marine Day project to be launched in December.

THE PRETORIA NEWS Wednesday December 12 1990

SA's 'image damaged' over cycad exports

ROBERT BRAND Staff Reporter

THE "lackadaisical" attitude of nature conservation authorities towards the illegal exporting of cycads to France and Madeira had caused "considerable damage" to South Africa's conservation image abroad, a commission of inquiry has found.

The Van Zyl Commission of Inquiry on the Export of Certain Cycads, appointed last year to investigate the illegal export of 71 endangered cycads to Nice and 297 to Funchal in Madeira, found that the granting of permits for the export of these plants had been irregular.

The plants were valued at more than R400 000.

Although the officials involved had acted in good faith and no corruption had occurred, "immediate remedial steps should be taken", the commission found.

The Transvaal and Cape Provincial Administrations had not complied with the regulations of the Convention on International Trade in Endangered Species of wild fauna and flora in granting the export permits, the chairman and sole member of the commission, Mr C F W van Zyl, said in his report, released yesterday.

These investigations revealed "several omissions" by the conservation authorities "and in particular the Cape Department of Nature Conservation".

"If the ineptitude of this department in regard to the Nice and Madeira consignments is typical of the attitude displayed . . . towards other consignments of cycads leaving the country, then immediate remedial steps should be taken," the report said.

The report cleared the buyer and exporter of the cycads, Mr Joe Berardo, of criminal activity in the export of the cycads.

Mr Berardo, a leading figure in the South African Portuguese community, is a former chairman of the Johannesburg Mining and Finance Corporation and a former member of the State President's Economic Advisory Council.

The cycads were shipped out of South Africa on the pretence that they would be donated to the Botanical Gardens in Funchal, Madeira.

However, they were planted at a private guest house belonging to a company of which Mr Berardo is a director.

The other consignment of cycads was shipped to Nice, ostensibly to be planted in the Nice Botanical Gardens. They found their way to a a private development scheme, the Arenas Floral Park, in Nice.

Permits were granted for the exports, although the applicants had: failed to obtain import permits from the countries of destination, wrongly listed the cycads, and failed to obtain reports or recommendations from a scientific institution, as required by law.

Reacting to the report, the Minister of Planning, Provincial Affairs and National Housing, Mr Hernus Kriel, said the Administrators of all four provinces had already taken steps "to exert better control over the export of rare fauna and flora".

Export permits now had to be personally approved by the Chief Director of Nature Conservation in a province, while "sensitive applications" for export permits had to be referred to the Executive Committee.

A special task force had been created to counter illegal trade in endangered cycads, while review of present policy, legislation and punitive measures was under way between the provinces to ensure uniform action.

"In future, strict action will be taken against officials who disregard instructions and against unscrupulous traders in fauna and flora," Mr Kriel said.

He added that the report would be referred to the Minister of National Education and Environmental Affairs, Mr Louis Pienaar, to study the commission's recommendations regarding uniform legislation.

Inquiry clears Pik, PW, of cycad involvement

By Keith Abendroth

THE INQUIRY into the illegal export to Madeira of 297 cycads, some possibly up to 500 years old, has pinpointed two senior and one former State official with involvement in the deal, but exonerated them. It has also named a former top Johannesburg businessman.

The one-man commission has also found that in negotiations leading up to the export (as in an illegal export in 1986 of 71 cycads to Nice, France), there was "name dropping" but no involvement of former State President P W Botha and Foreign Minister Pik Botha.

Evidence before the commission was that R285 000 was paid for the Funchal, Madeira, consignment and R139 850 for the one to Nice.

In the enquiry into the Nice export, the commission exonerated the Department of Foreign Affairs, which gave its conditional blessing to the scheme on the basis of unverified and incorrect information from its Embassy in Paris.

Here, the commission found that the department had acted in good faith following consideration of the issue at departmental level without the involvement at any stage of the Foreign Minister.

In the Madeira export the report, released yesterday, names the 12 people involved in the deals, including the former Chairman of Johannesburg Mining and Finance Corporation and former member of the State President's Economic Advisory Council, Mr Jose Manuel Rodrigues Berardo.

The cycads were paid for with cheques drawn on the account of a company Aujac Investments (Pty) Ltd, the directors of which were Mr Berardo and his wife.

Mr Berardo, now living in Funchal, Madeira, and described by the Commissioner, Mr C F W van Zyl as a leader of South Africa's Portuguese community, is one of four Portuguese people named as having been involved in the "irregularities."

Yesterday Mr Hernus Kriel, Minister of Provincial Affairs and National Housing, said when releasing the report, that the four provinces had already taken steps to tighten the control of rare fauna and flora.

Mr Kriel said he was satisfied, too, that no corruption had been involved in the exports.

The findings by the commission were that the Cape Province and Transvaal, from where the cycads were exported, did not comply with regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flora, (CITES).

Mr Kriel said that in future, however, strict action would be taken against officials who disregarded instructions.

The state officials named by the report are Mr Gert Niewoudt van Wyk, assistant director of Nature and Environmental Conservation in Cape Town, for authorising the issue of the CITES export permit; and Mr Michael John Fryer, principal nature conservator in East London, who authorised certain permits allowing the "plucking" of cycads.

Also named is Ms Charlene Jennifer le Roux, former administrative officer of the department, in Cape Town for issuing and signing the CITES permit.

Of the Portuguese citizens involved two actually wrote letters thanking the South African Government for the "donated" cycads — Mr Miguel Alfonso, Director of the Botanic Gardens in Madeira, and Mr Rui Emanuel Baptista, Economic Secretary, Madeira.

THE PRETORIA NEWS Thursday December 13 1990

Microchips may thwart theft of cycads – Neethling

Own Correspondent

Cape Town

MICROCHIP technology is being considered to curb the theft of cycads, Cape Provincial Administration chief director of Nature and Environmental Conservation Dr Johan Neethling has announced.

The chips would be shot into cycads which were endangered and growing in their natural habitat. The rare plants could then be traced with scanners, he said.

"The only problem is financing the scheme. As a unit the chips will not cost more than R2 or R3 but we would need hundreds of thousands to mark plants, especially the outstanding species, throughout the country," Dr Neethling said.

Various financial options were being considered but Dr Neethling hoped the scheme could be financed by a levy on cycads cultivated and sold by nurseries.

At a Press conference yesterday called in response to the Van Zyl Commission's findings on the export of cycads, Cape Administrator Mr Kobus Meiring said the chief directorate's top priority continued to be the conservation of the province's natural heritage, especially its endangered species in situ.

"For this reason the chief directorate finds it difficult to accept that the export of plants which occur in garden collections, which are therefore no longer in their natural state and have lost their ecological value, could be 'disastrous' for the continued existance of endangered species," he said.

It should be pointed out that there were numerous garden collections of cycads in South Africa which had been built up and cultivated legally.

"This was made possible by the fact that cycads were previously not regarded as an endangered species," he said.

The Star Wednesday December 12 1990

Cycads affair probe finds no corruption

Pretoria
Correspondent

A commssion of inquiry into the illegal export of cycads from South Africa to Madeira and France has found no evidence of corruption, but states that the affair has caused "considerable damage" to South Africa's conservation image abroad.

The Van Zyl Commission of Inquiry on the Export of Certain Cycads, appointed last year to investigate the illegal export of 71 endangered cycads to Nice and 297 to Funchal in Madeira, found that the granting of permits for the export of these plants had been irregular.

The plants were valued at more than R400 000.

Although no corruption had occurred, "immediate remedial steps should be taken", the commission found.

The Transvaal and Cape Provincial Administrations had not complied with the regulations of the Convention on International Trade in Endangered Species of Wild Fauna and Flaura in granting the export permits, the chairman and sole member of the commission, C F W van Zyl, said in his report yesterday.

The commission had investigated only two consignments of cycads sent out of the country.

These investigations revealed several omissions by the conservation authorities "and in particular the Cape Department of Nature Conservation".

The report cleared the buyer and exporter of the cycads, Joe Berardo, of any criminal activity.

Mr Berardo, a leading figure in the South African-Portuguese community, is a former chairman of the Johannesburg Mining and Finance Corporation.

One consignment of cycads were shipped out of South Africa on the pretence that they would be donated to the botanical gardens in Funchal, Madeira. They were planted at a private guest house belonging to a company of which Mr Berardo is a director.

The other consignment of cycads was shipped to Nice, ostensibly to be planted in the Nice botanical gardens, but went to a private development scheme.

Permits were granted for the exports, but the applicants failed to obtain import permits from the countries of destination; wrongly listed the cycads and failed to obtain reports from a scientific institution, as required by law.

Reacting to the report, the Minister of Planning, Provincial Affairs and National Housing, Hernus Kriel, said the Administrators of all four provinces had already taken steps "to exert better control".

Export permits now had to be personally approved by the Chief Director of Nature Conservation.

A special task force had been created to counter illegal trade in endangered cycads, while a review of present policy, legislation and punitive measures was under way.

Cycad thefts prompt novel microchip plan

CAPE TOWN. — A revolutionary plan to use microchips and scanners to nip cycad thieves in the bud is being considered by the Cape Provincial Administration's nature conservation directorate.

This was disclosed yesterday at a Press conference by the chief director of nature and environmental conservation, Dr Johan Neethling.

The chips would be shot into cycads, which were endangered and growing on site in their natural habitat.

The cycads could then be traced by the scanners and this would help to track down thieves of the rare plants, which can fetch up to 40 000 dollars (R100 000) on international markets.

"It is very difficult to trace these chips," Dr Neethling said.

However, the scheme was fairly expensive and it was hoped that it could be financed by a levy on cycads cultivated and sold by nurseries.

Both Dr Neethling and the Administrator of the Cape, Mr Kobus Meiring, stressed at the Press conference, called in response to the Van Zyl Commission's findings on the export of cycads, that they believed a distinction should be drawn between endangered cycad species in their natural environment, and those that were growing in gardens as well as those being cultivated in nurseries.

Mr Meiring said the chief directorate "finds it difficult to accept that the export of plants which occur in garden collections, which were therefore no longer in their natural state and have lost their ecological value, could be disastrous for the continued existence of endangered species".

Numerous garden collections of cycads in South Africa had been built-up and cultivated legally.

This was made possible because cycads were previously not regarded as endangered species.

Mr Meiring said the chief directorate had agreed that the applications for export of cycads to Madeira and Nice, the subject of the commission's investigations, should have been considered at a higher level and the chief director was now responsible for approving all export permits.

However, the directorate dealt with 18 000 applications annually, mostly for cycads, and the commission had studied only two of these.

Dr Neethling said even if he had considered the two applications, they would have been approved because diplomatic documents were attached to them and the directorate was in no position to query them.

Mr Meiring said from his experience as Deputy Minister of Foreign Affairs such documents could not have been challenged without creating a diplomatic incident.

Both Mr Meiring and Dr Neethling rejected the commission's findings that the directorate had been negligent or lackadaisical in their handling of the two permit applications and Mr Meiring said he had full confidence in his officials. — Sapa.

Monday 7 January 1991 THE CITIZEN

What 'progress' has done to cycads

WHY all the fuss about and what is a cycad?

Cycads are relics from the carbiniferous period, 50-60 million years ago. In Australia, because they very often poison domestic stock, thus affecting the pocket of the individual, they are mostly regarded as weeds. In South Africa, because of their rarity, they are along with certain European luxury cars regarded as status symbols.

Now let us look at what. so called "progress' has done to our relic, cycad populations over the last 30 or so years.

In the Eastern Transvaal, afforestation with exotics such as pines and other timber trees has all but wiped out our smallest cycad, **Encephalartos humilis** and threatens **Encehalartos paucidentatus.**

When that "white elephant", the Jozini dam, was built on the Pongola river, hundreds of **Encephalartos lebomboensis** were rescued and taken to the Transvaal highveld, where they died during the first severe winter.

In the eastern Cape, thousands of **Encephalartos villosus** and **E.arenarius** were uprooted and probably destroyed to accommodate fields of pineapples and other crops which have since proved uneconomical.

The Transvaal Deparpartment of Nature Conservation did a wonderful job when they propagated thousands of these ancient plants from seed and supplied the needs of a demand. Unfortunately under a bankrupt government, this noble enterprise will be rationalised or privatised, the Afrikaans equivalent of monopoly.

By the turn of the century, the elephant, the rhino and the cycad will have vanished unless the death sentence is imposed for dealing illegally in the first two and as for cycads, when one of our "dom officials" decides to allow the controlled export of seed.

CITES, an international farce, was drawn up by Americans who exterminated 50 million bison in 60 years, and unfortunately this country is stupid enough to follow.

DENNIS McDONALD
Pretoria North

A favourite E. lehmannii in my collection was hit by a hailstone the size of a tennis ball in a devastating storm in December 1987. In the following months a bud developed on the stem just below the crown. Am I correct in assuming that this bud was caused by hail damage?

Photo: Neil Munro

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