ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTH AFRICA

TYDSKRIF VAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA

NO. 71 SEPTEMBER 2002 ISSN 1012-9987

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COVER / VOORBLAD : ***Encephalartos transvenosus*** **(Modjadji, Northern Province / Noordelike Provinsie). Female plant with mature cones and a new flush of leaves. / Vroulike plant met volwasse keëls en 'n nuwe stel blare.**

Photo / Foto: Derik Minnaar

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NEW CYCAD PUBLICATIONS

COX, P.A. & SACKS, O.W. 2002. **Cycad neurotoxins, consumption of flying foxes, and ALS-PDC disease in Guam.** *Neurology* 58: 956–959.

[The Chamorro people of Guam have been afflicted with a complex of neurodegenerative diseases (now known as ALS-PDC) with similarities to ALS, AD, and PD at a far higher rate than other populations throughout the world. Chamorro consumption of flying foxes may have generated sufficiently high cumulative doses of plant neurotoxins to result in ALS-PDC neuropathologies, since the flying foxes forage on neurotoxic seeds.]

First author's address: Institute for Ethnobotany, National Tropical Botanical Garden, 3530 Papalina Road, Kalaheo, Kauai, HI 96741, U.S.A.

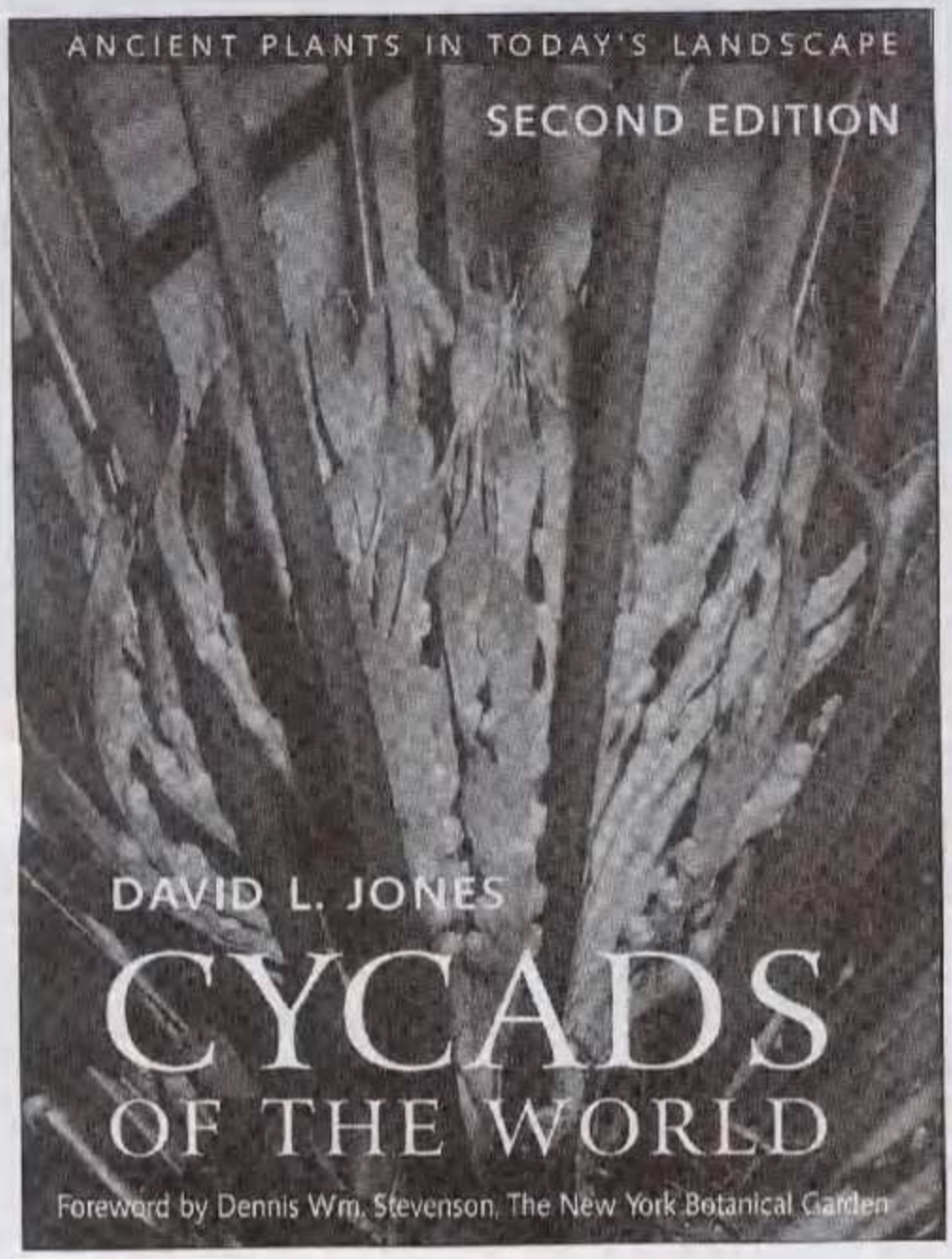
STEVENSON, D.W. 2001. **Orden Cycadales, Monografia No 21, Flora de Colombia.** Published by the Instituto de Ciencias Naturales, Facultad de Ciencias, Universidad Nacional de Colombia, Bogota, Colombia.

[This 92-page book in Spanish, is a most useful international contribution to the knowledge of the cycad flora of Colombia, South America. Introductory chapters deal with taxonomic history, vegetative and reproductive morphology, cytology, pollination biology and conservation aspects. In the systematic treatment, the two cultivated *Cycas* species and the 18 native Zamiaceae are described, discussed and keyed out. Maps and black-and-white line drawings are included. The Colombian Zamiaceae comprise the two *Chigua* species and 16 *Zamia* species, five of which are described for the first time in this publication, viz. *Zamia amazonum, Z. disodon, Z. encephalartoides, Z. hymenophyllidia* and *Z. melanorrhachis*.]

Author's address: The New York Botanical Garden, Bronx, New York 10458, U.S.A.

Compiled by ***Nat Grobbelaar,*** *P.O. Box 15357, 0039 Lynn East, South Africa.*

BOOK REVIEW / BOEKBESPREKING



JONES, DAVID L. ***CYCADS OF THE WORLD,*** ed. 2.
SYDNEY: Reed New Holland, 2002. 456 Pages, 361 colour photographs plus reproductions of old engravings, line drawings, monochrome photographs, and maps. Price:. R528.50 + R441.80 postage = R971.30. See advertisement in *ENCEPHALARTOS* **71**: x (June 2002).

Ed 1 reviewed in *ENCEPHALARTOS* **35**: 36 (1993).

We live in a golden age for publications on cycads. For the fourth issue in succession we are reviewing a new book on cycads, again by a member of our Society.

This book is a success story: first published in 1993, it was reprinted in 1994, 1998, and 2000; originally in Australia but co-published by other publishers in other parts of the world, including South Africa. I would have liked to know how many copies were sold, as virtually every cycad enthusiast has one. At a time when information on cycads were scattered and hard to come by, that book fulfilled a need as never before. Now, nine years later, a second edition has appeared, in a vastly different world. In the intervening years more than a hundred new species have been described. A number of excellent books have appeared on the biology of the cycads, on cycads of different parts of the world, and even most recently on cycads of the whole world. How then does this book in its revised guise stand up? Remarkably well, I have to say.

This new edition contains 456 pages and 361 colour photos compared to 312 pages and 220 colour photos in the first edition, and the number of taxa treated increased from 185 species in the first edition to 292 species and 10 subspecies in the new edition. As previously, the book is divided into two parts.

The first part, titled *Structure, biology and cultivation*, consists of 10 very useful chapters preceded by a world distribution map. On this map it is surprising to see how the coloured areas showing the presence of cycads have expanded since the first edition, mostly in Asia but also in Australia. The chapters are:

1. Introduction to cycads.
2. History and prehistory of cycads.
3. Cycad conservation.
4. The structure of cycads.
5. The economic importance of cycads.

6. The biology of cycads.
7. The cultivation of cycads.
8. Pests, diseases, and ailments of cycads.
9. The propagation of cycads.
10. Cycads for containers.

These chapters are essentially the same as in the first edition, except where new information necessitated updating. A useful addition is illustrations to these chapters, mostly in the form of black and white photographs illustrating specific aspects. These chapters contain a wealth of information, and are likely to provide answers to most questions likely to be asked by novice as well as experienced cycad enthusiasts.

The second part, titled *The living cycads*, contains treatments of individual species, genus by genus and all in alphabetical sequence so that it is easy to find a species if the name is known, but difficult to find an unknown species In this section the author strived to treat every known cycad. Nevertheless some recently described species are omitted, for instance *Ceratozamia mirandae* here confused with *C. norstogii, C. zoquorum, Encephalartos relictus, and E. tegulaneus* subsp. *powysii*; all described in 2001. Conversely, it contains names which have not yet been published effectively, including *Cycas brachycantha, C. collina, C. condaoensis, C. dolichophylla, C. fugax, C. hoabinhensis, C. pachypoda, C. tropophylla, C, yunnanensis, Zamia amazonicum, Z. disodon, Z. hymenophyllidia*, and *Z. melanorrachis*. There is also some unfamiliar taxonomy: *Dioon edule* var. *angustifolia* is again given specific status, but it is not said on whose authority; and *Zamia lindenii* is included under *Z. poeppigiana* while Whitelock in *The cycads*, pages 314 & 326, provides some compelling reasons to doubt their conspecificity. *Zamia kickxii* is placed in synonymy with *Z. pygmaea*, whereas Whitelock (*Op. cit.* page 311) maintains that they are separate species. More seriously, not every species is illustrated, and the illustrations for any species don't show the all essential aspects of habit, leaf detail, and male and female cones. I understand that there simply are not photographs available of every last species, but I get the impression that the publisher imposed a restriction on the number of photographs, which seriously compromises the usefulness of the book. Also, quite a number of the photos which appeared in the first edition, are no longer in this one. On the positive side, the *photographs* are all in colour and of excellent quality; and the non-repetitive lay-out where the photos are of different sizes and appear in different places on each page, breaks the monotony and makes it a pleasure to page through the book. In fact, the lay-out is beyond reproach.

There is only one *key*, to the cycad genera. I like this, yet most readers will have no difficulty in distinguishing genera without this key. Keys to species within genera would have been more useful.

For every genus there is one *distribution map* showing the distribution of every species. This is very nice, for it shows the distribution of species relative to each other. Still, I miss individual maps for every species. These maps, however, should be used carefully: The unpublished species listed above do not all appear on the maps. Furthermore, there is something seriously wrong with the map of southern Africa on page 242: the records for almost every species is so way out that the map is entirely useless. To witness, *E. concinnus* near the Botswana border, *Encephalartos ferox* in the Limpopo province but not in KwaZulu-Natal, *E. friderici-guilielmi* in Lesotho but nowhere else, and *E. arenarius* far inland. *E. aemulans* does not appear on the map at all. On page 242 the distribution of *E. barteri* is grossly understated. On page 304 the distribution of *E. septentrionalis* is given as Uganda and Sudan, yet the map on page 243 shows it in the Central African Republic and the Congo as well. One can only hope that the other maps are more correct.

For each species the *author name* is provided, but no reference to the place of publication. To my delight the author names are not abbreviated. Towards the end of the book (Appendix 2) the full name as well as the dates of birth and death of these authors are given, rather irrelevantly to my mind. The author to a plant name does not imply any sort of honour, but is intended to guide the reader straight to the original description of the species – the bibliography (see below) is not always useful in this respect

A shortish *description* of the plant, illuminating the essential features, is followed by paragraphs on *distribution and habitat*, *notes* which are mostly historical but often includes information on degree of abundance (which more properly should have been under *distribution and habitat*), *cultivation*, and *propagation*. Here I have a problem: to advise propagation "from seeds or basal offshoots" is really repeating the obvious *ad nauseam*; and all too often under *cultivation* the same advice is given for species which react very differently. For instance, *Ceratozamia mexicana* is said to be suitable for "tropical, subtropical and perhaps temperate regions", *Dioon edule* to "subtropical and temperate regions", and "*Zamia poeppigiana* [including *Z. lindenii*] to "tropical and warm subtropical regions". Yet in Stellenbosch, at 34° S where we don't get frost but where we wear jerseys almost up to Christmas, *Ceratozamia mexicana* outperforms the other two and habitually produce perfect new leaves in the winter months of May and June when new leaves of other species, if unseasonally produced, are invariably dwarfed and discoloured. *Dioon edule* does not at all do well with us, apparently because it does not get enough heat. And *Zamia poeppigiana* [my plants are referable to *Z. lindenii* from Ecuador], supposedly the most tropical of the three, is an unexpected and pleasant surprise, doing exceedingly well.

As in the first edition, *synonyms* are given as full entries, while I would have preferred to see them listed under the correct names. Appendix 1 lists synonyms with their correct names without divulging the sources on whose authority this was done. Appendix 2 is the inventory of authors' names already referred to. Appendix 3 treats a *selection* of cycad fossils under the headings *etymology*, *description*, *distribution*, and *notes*. None of these are illustrated. In view of the rarity and inaccessibility of most of them in museum collections, I cannot see any practical use for the information, though having to admit that it is nice to know that there are fossils attributed to the genera *Bowenia*, *Ceratozamia*, *Cycas*, *Dioon*, *Lepidozamia*, *Macrozamia*, and *Zamia*, but not any *Encephalartos*. This

has some value in putting time scales to the origin and migration of genera, but the available material is so fragmentary that I am very cautious of the identifications. There is a useful *glossary*, a *bibliography* containing some obscure entries and omitting some important and useful ones, and an *index* including names of species which is superfluous as the species are arranged alphabetically in the text.

The book contains so much useful information, yet it is not without mistakes: the inset photo on page 283 shows a female cone of *Encephalartos senticosus*, not *E. lebomboensis*; and that on page 393 almost certainly shows *Zamia vazquezii* rather than *Z. fischeri*. The *Dioon edule* on page 231 is in a most untypical habitat. The reproductions of old engravings are a delight to the eye, but they don't form a coherent theme or add information, and as such merely add to the cost of the book.

The publisher's price is crippling, and we can only hope that someone will freight in copies to South Africa so that we don't have to pay this crippling postage on top of the book's price.

The merit of this book is that it treats in a single volume all the known species except the very latest, and does so in an informative and attractive way. It is truly amazing that so much information could be packed into 456 pages. It is difficult to imagine any question on cycads to which this book will not provide an answer. It is everything which the first volume was, plus much more. As previously, the book is visually attractively designed, printed on nice semi-glossy paper which brings out the best in the photographs, and sturdily bound in cloth with an attractive dust jacket. Anyone having the first edition will want this one as well, and I have no doubt that any-one who buys this book will be very happy with it.

Piet Vorster
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WARNING: there are still copies of the first edition on some bookshops' shelves. Members who wish to buy the second edition are cautioned to make sure that they get the second edition, not the first edition with a dust jacket different from that with which it originally came out.

ARTICLES / ARTIKELS

PHOENIX TREES : THE RECOVERY OF *LEPIDOZAMIA PEROFFSKYANA* AFTER BUSHFIRE

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Received 20 June 2002

One of the more poetic names for cycads was coined by the Chinese, who called them "phoenix tail trees" (Faxiang and Huibo 1996). While this evocative name was inspired more by the mythology than ecology, the comparison of cycad foliage with phoenix feathers is actually very apt considering the remarkable ability of cycads to regenerate in the aftermath of bushfires. I recently had the opportunity to observe such regeneration following the burning of a wild population of *Lepidozamia peroffskyana* growing in Northern New South Wales.

THE DAY AFTER THE BURN

As good luck would have it, I happened to be visiting the national park in question on the day after the bushfire had gone through. The familiar *Eucalyptus* forest with its lush understorey of *Lepidozamia* had been transformed into a surreal landscape of chaos and devastation (Colour Figure 1). Blackened and hollowed-out tree trunks still smouldered with angry red coals glowing along their length. Lingering plumes of wood-smoke drifted silently among the trees. The ground was blanketed by several inches of grey-white ash that crumpled underfoot like snow.

All traces of greenery within five metres of the forest floor had been destroyed. The damage to the *Lepidozamia* was variable. In places were the fire had been less intense, or on those plants with a relatively tall trunk, the foliage had been withered and obviously killed, but not actually consumed by the flames (Colour Figures 1, 5). But in most cases the leaflets had been burnt away completely leaving

Table 1
***Lepidozamia peroffskyana*, Female Cone Production**
in circular plots of 10 metre radius; burnt and un-burnt stands.

	Plot 1	*Plot 2*	*Plot 3*
3 Randomly selected plots, un-burnt population, 2001	3	5	4
The same plots, unburnt population, 2002	6	4	1
3 Randomly selected plots, burnt population, 2002	0	0	0
3 Plots deliberately centred on a coning individual, the burnt population, 2002	1	2	1

only the charred rachises projecting from the ash-bed (Colour Figure 2). The smaller plants appeared to have had all their above-ground biomass destroyed.

A FIERY BEAUTY IS BORN

Writing at a time when the species was still known as *Macrozamia denisoni*, Charles Joseph Chamberlain (1935, p.69) referred to *Lepidozamia peroffskyana* as "the most beautiful of all cycads." To see a population of these magnificent plants regenerating a few weeks after bushfire is to witness a splendour worthy of the mythical phoenix herself! I returned to the burnt *Lepidozamia* population on the 20th of November, 55 days after the bushfire event. The blackened hillside was now cloaked in a stunning display of newly-flushed cycad foliage (Colour Figures 3, 4). The post-fire recovery time of *Lepidozamia peroffskyana* is so rapid that within this short period the leaf area of the burnt population had returned to a level comparable with an unburnt stand. The "before" and "after" photographs in Colour Figures 5 and 6 provide a dramatic illustration of the extent of this recovery.

Too often in botany, one encounters the perception that the cycads are a group of "primitive" relicts incapable of competing on equal terms with flowering plants. Unfortunately, no-one seems to have explained this to the *Lepidozamia*! Even though the *Eucalyptus* forests of Australia represent some of the most fire-tolerant plant communities on Earth (White, 1994), the cycads at the bushfire site were easily the first plants of the understorey to fully recover their leaf area after the burn. As can be seen in Colour Figures 3 and 6, after 55 days the ground beneath the recovering cycads was still essentially barren. A few straggling blades of grass and tentative *Eucalyptus* seedlings were the only traces of angiosperm greenery present.

Even relatively small cycad individuals, (with two or three leaves and less than 50 cm of vertical height) were carrying new leaves after the fire. Hence, even at a very early stage in their development, *Lepidozamia peroffskyana* can accumulate sufficient starch reserves in their underground caudex to completely replace their existing complement of foliage in the event of its sudden destruction.

CONING RESPONSE TO THE FIRE.

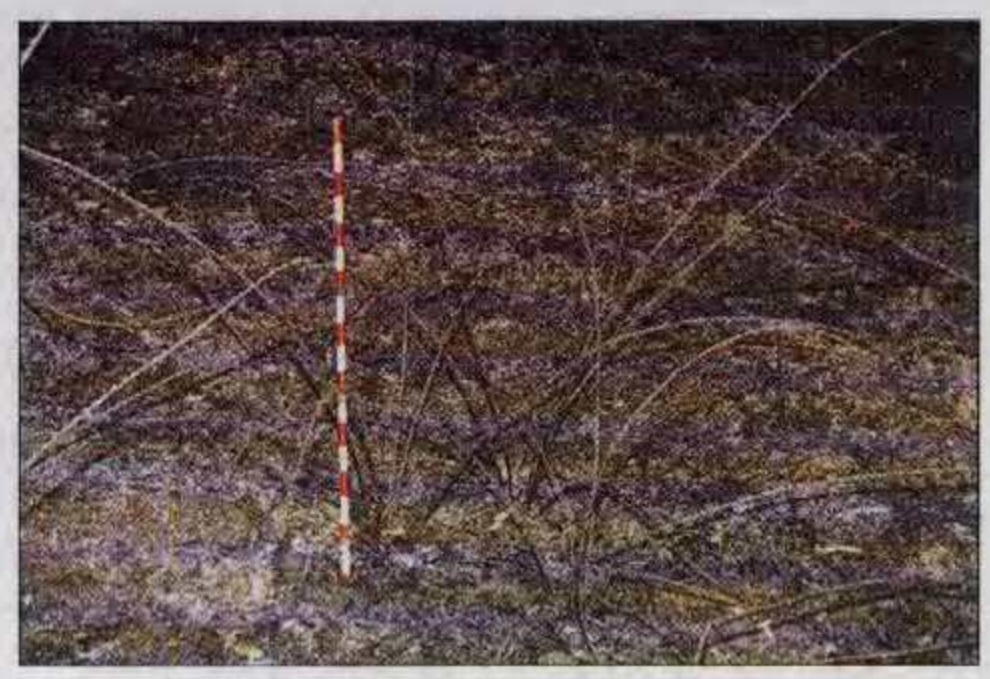
Cycad researchers have often speculated that fire might play some role in synchronising the reproductive cycles of cycads in wild populations, creating an alternation between years of minimal reproduction and spectacular mass-coning events. (eg. Tang 1990, Ballardie and Whelan 1986, Jones 1993, Hill and Osborne 2001). I returned to the burnt stand of *Lepidozamia* in May, some eight months after the bushfire event. By this time the summer pollination season was over and the female plants were maturing the seed. I compared the production of female cones in the burnt population with an un-burnt stand of *Lepidozamia* from elsewhere within the park, (as part of an ongoing research project, I had coning records for the un-burnt stand from the previous year as well). The comparison of the various plots is presented in Table 1.

As can be seen from the table, the burnt population did *not* experience a mass coning event in the first reproductive season after the bushfire. In fact, the production of female cones was so minimal that I had to deliberately centre the plots on coning individuals for their presence to register at all. I found less than half a dozen coning female plants in the entire burnt population. In contrast to the dramatic and universal production of new leaves, the production of female cones was substantially less than that recorded from a comparable unburnt stand. I conclude that, having completely replaced their leaf area, the burnt plants typically had insufficient resources to present cones that year as well. This raises the intriguing possibility that a mass coning event might actually occur in the *second* reproductive season after the bushfire - a hypothesis I will investigate further next year.

FIRE TOLERANCE OF CYCADS - ADAPTATION OR PRE-ADAPTATION?

The Tertiary period (extending from the extinction of the dinosaurs to the beginning of the Quaternary period some 2 million years ago), was a time of sweeping changes for the

Colour Figure 1 Devastation of *Lepidozamia peroffskyana* habitat the day after a bushfire. Fallen logs still smoulder in the background.



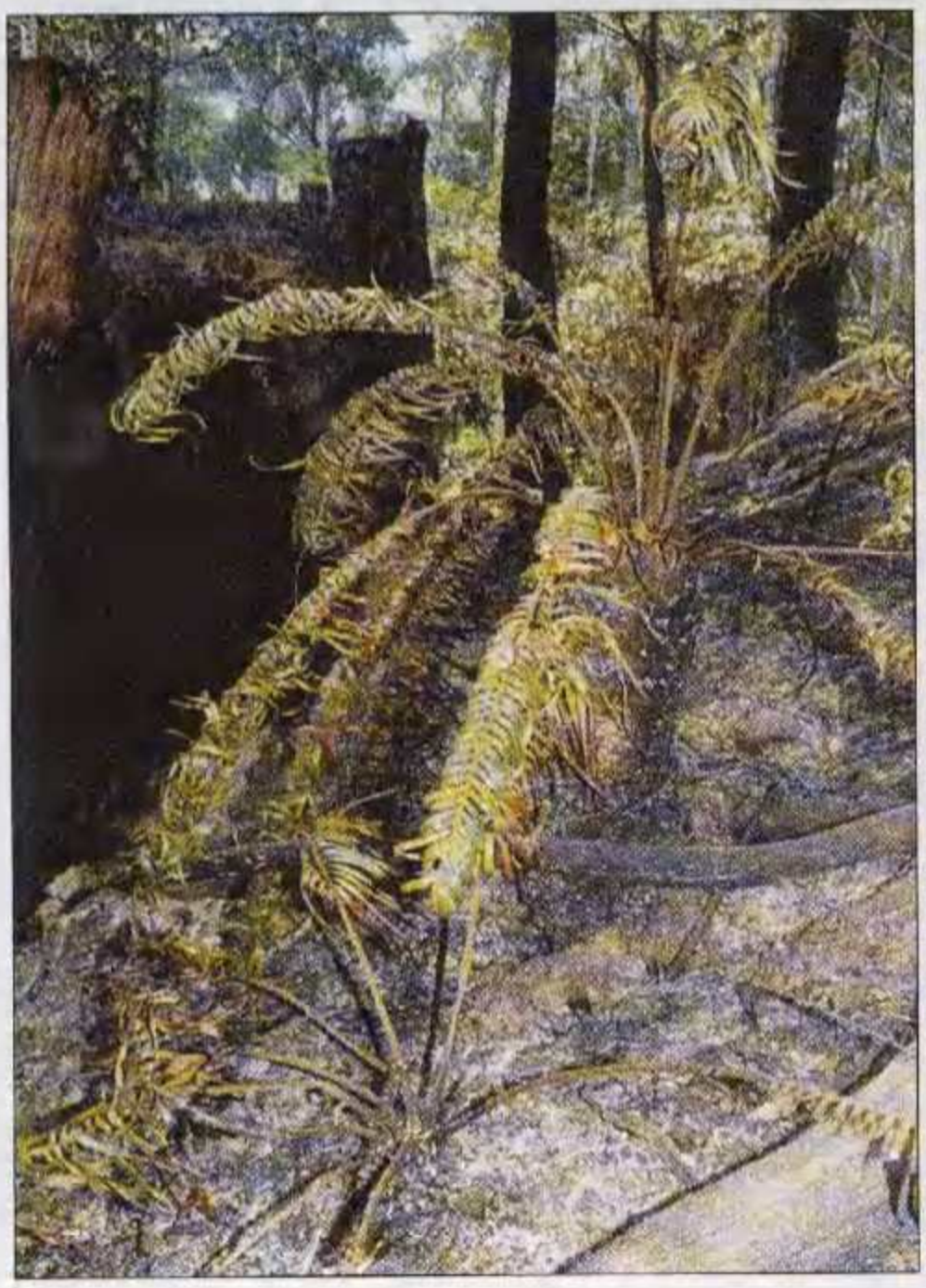
Colour Figure 2 Rachises of burnt *L. peroffskyana* projecting from the ash-bed. Note the total destruction of understorey greenery. Scale-bar interval = 5 cm.

Colour Figure 3 After only 55 days, the burnt hillside was covered with a stunning display of newly-flushed cycad foliage. Note the relative scarcity of other understorey greenery.

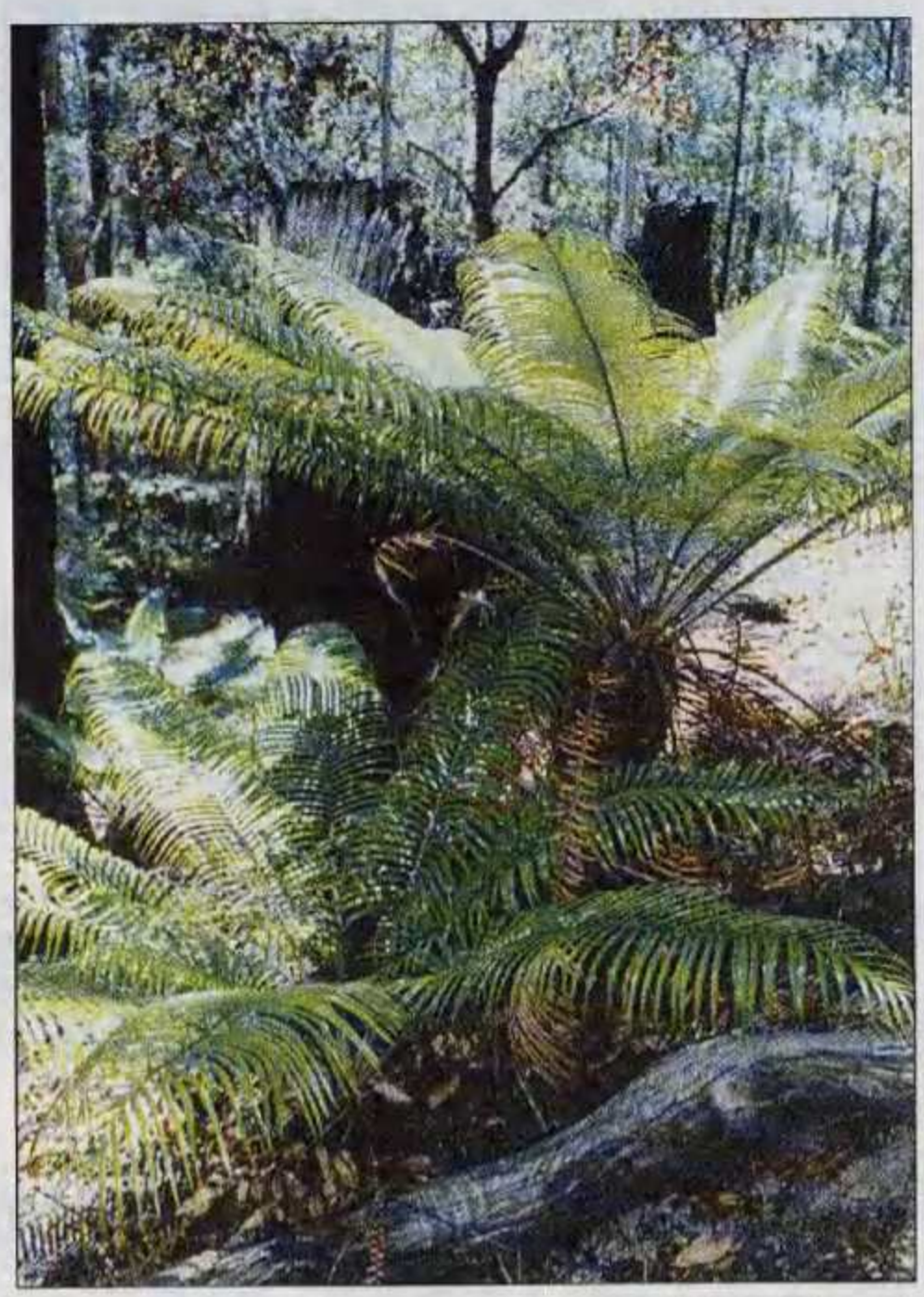
flora of Australia. Around 23 million years ago, the ancient rainforests that had once dominated the continent began contracting in the face of drying climates and an increasing frequency of fire (White 1994). It was these conditions that favoured the emergence of the Australian "bush" as we know it today - a sclerophyllous or "hard leaved" vegetation type whose species evolved numerous adaptations for surviving the extremes of bushfire and drought. For example, the rainforest ancestors of *Eucalyptus* trees developed lignotubers - dormant subterranean buds that can resprout rapidly when the original stem is destroyed by fire. Such lignotubers are characteristic of all but a handful of the Australian *Eucalyptus* species today (Gill 1993).

The Australian *Cycas* and *Macrozamia* cycads claimed their own significant niche in the developing Australian bush. The taxonomist Robert Hill (1998 p. 515) notes that the diversity of these genera increased dramatically during the Tertiary and that they are still "clearly actively evolving" today. *Cycas* and *Macrozamia* both recover rapidly after bushfires - but so do *Lepidozamia* and *Bowenia*, two genera characteristic of wetter forest types more similar to the original Gondwanan rainforests. This suggests that the fire tolerance of the Australian cycads is a common ancestral feature or *preadaption*, rather than a recent *adaptation* that evolved directly in response to the climates of the late Tertiary. But why would ancestral cycads possess such a preadaption to fire? The possibility that fires were a significant part of the Mesozoic ecosystems that preceded the Tertiary seems unlikely. The "southern conifers" (families Araucariaceae, Cupressaceae, Podocarpaceae and Taxodiaceae) represent the living descendants of the conifer trees that once dominated Jurassic forests. But unlike cycads, the southern conifers "have few adaptations to permit them to survive fire or regenerate well after fire" and are "generally killed outright" by a serious blaze (Kershaw and McGlone 1995 p. 55). In view of this vulnerability, it is hard to believe that fire could have been a characteristic feature of the Jurassic forests where cycads and southern conifers coexisted for much of their evolutionary history.

Here we have a conundrum - cycads and conifers evolved together, yet only the cycads seem to have been preadapted to fire. I would suggest that the ancestral cycads were not preadapted to fire as such - rather they were adapted to the sudden and total destruction of their foliage by some other means. What feature of the Mesozoic world could have inflicted such devastation on cycad populations? Herbivory by dinosaurs provides an obvious mechanism. Modern elephants play a major



Left: Colour Figure 4 The morning sun highlights the spectacular beauty of young *Lepidozamia peroffskyana* foliage, presented in the aftermath of a bushfire.



Colour Figure 6 The same two plants (see Colour Figure 5) exhibiting a total recovery of leaf area just 55 days later. The vibrant "grassy" green of young *L. peroffskyana* leaves darkens to emerald as the foliage matures.

Left: Colour Figure 5 Two burnt *L. peroffskyana* photographed the day after the bushfire.

role in suppressing the development of trees on the African savanna (Begon *et al.* 1996). Sauropod dinosaurs such as *Brontosaurus* weighed up to 30 tonnes - the equivalent of some sixteen elephants! Their fossilised track-way's confirm that they travelled across the landscape in herds (Norman, 1985). The devastation wrought by a group of such giant plant-eaters passing through a cycad grove would have been almost beyond belief. Large plants would have been stripped bare and the smaller seedlings trampled underfoot. Under such conditions, a plant's ability to completely replace its foliage by drawing on stored energy reserves would have been placed at an evolutionary premium. Hence I would suggest that the starch-rich caudex of cycads is an ancient adaption for recovering from defoliation due to dinosaur herbivory. As chance would have it, this capacity for rapid regene-ration left cycads superbly preadapted to the ravages fire, even after the plant-eating giants themselves had long since vanished from the forests of the Earth.

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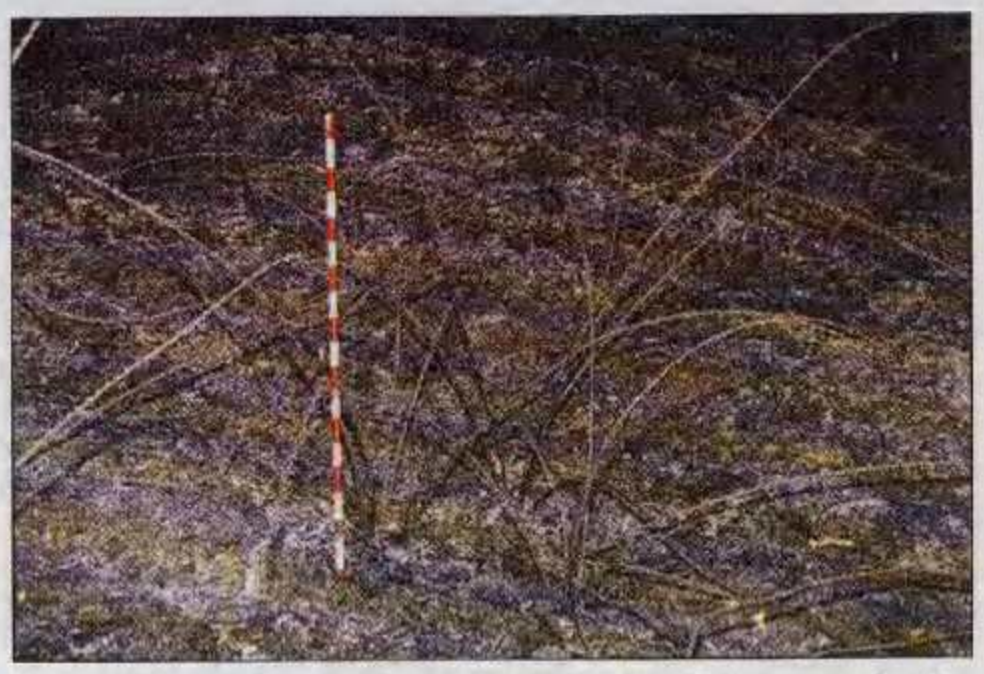

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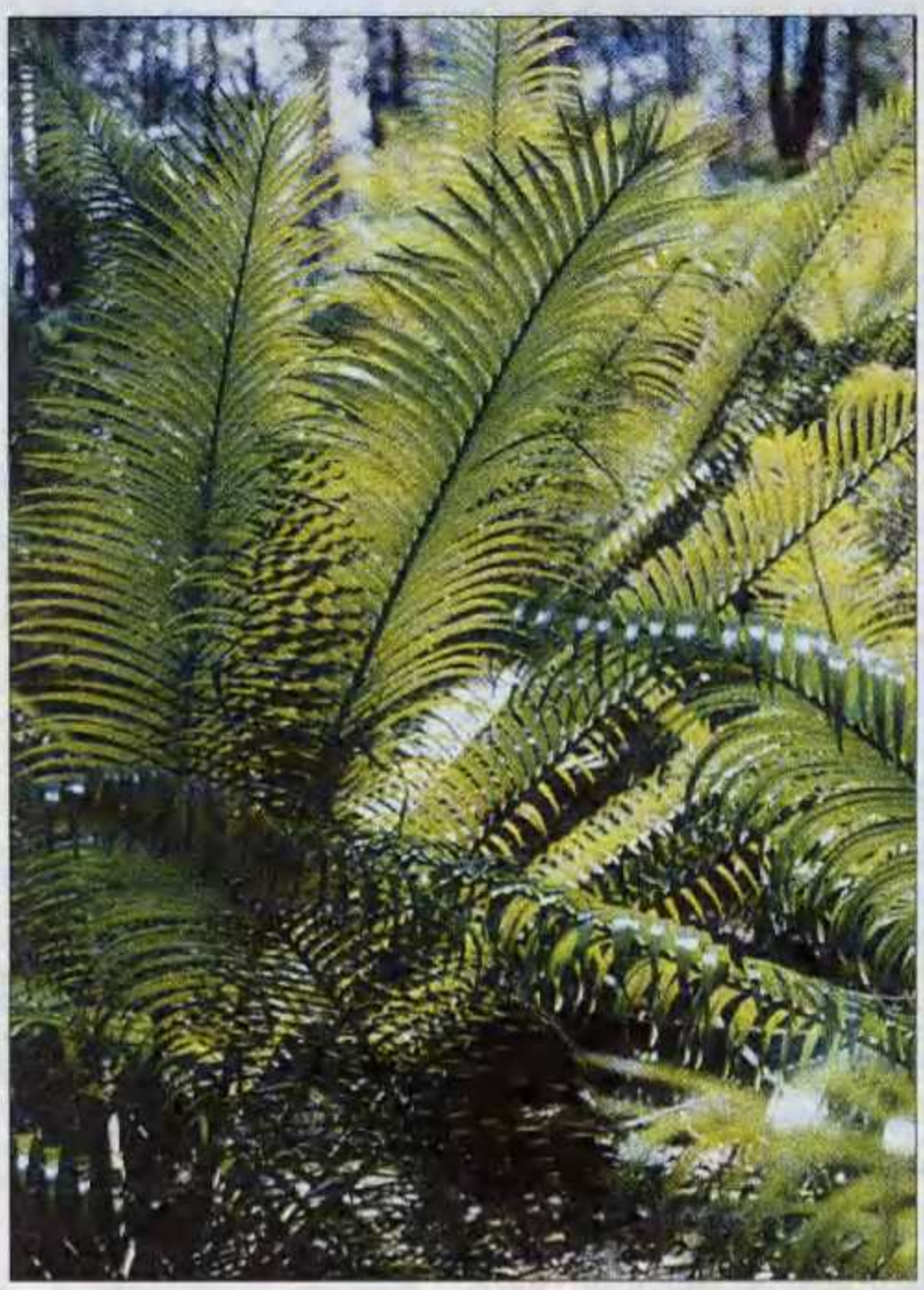

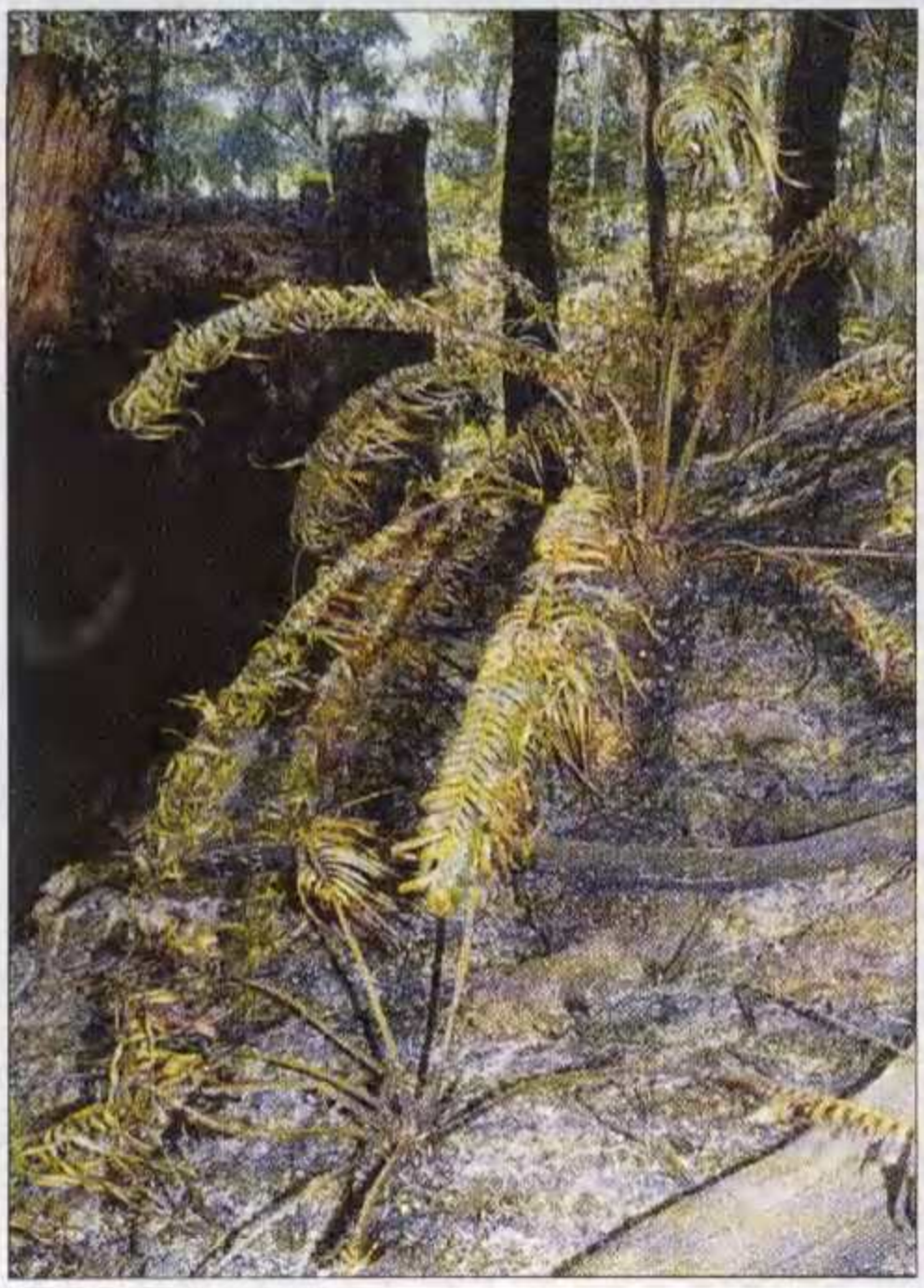

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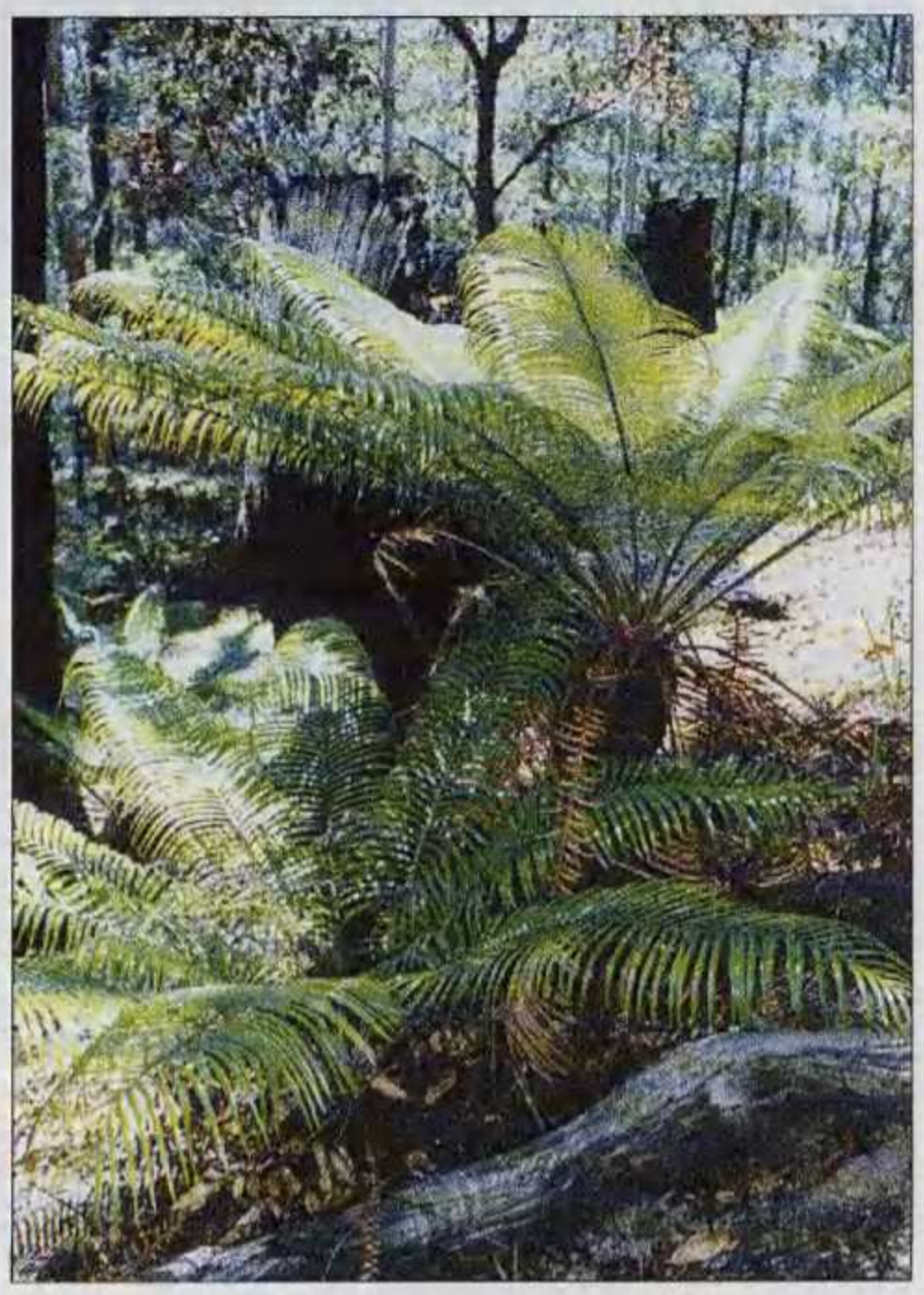

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GROWING CYCADS AT 34° SOUTH

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Every year when the Christmas holidays start, out telephone starts ringing "*You don't know me, by I am a member of the Society happening to be vacationing in the Cape, and I have wondered if I could come round to see your cycads.*" We live close to the sea, and over Christmas the whole country seems to be on holiday here. As for me, this is the only time of the year when I can do constructing, maintenance, and just enjoy the fruits of my labours, so often our poor members are not welcomed very cordially. Besides, our modest collection cannot compete with the awesome plants which have been growing in Kirstenbosch botanic garden for 87 years, not to mention those of our members from further north, and it really is a waste of time to spend prime holiday time looking at our scruffy plants. To save such people's time, but also to solicit some sympathy for the difficult conditions in which we try to keep our plants alive, we will take you all on an armchair tour through our domain.

Dear Reader, before you enter this gate, just keep in mind that you are standing a mere 34 degrees north of the Antarctic, and that between us and that hole in the ozone layer there is nothing but ice cold water. This means that we never get enough heat for our plants, and this is why we still wear jerseys shortly before Christmas. On the positive side we have to say that we never get frost, so that we can grow a wide variety of plants.

The archaeic sandstone soils of the Cape of Storms are amongst the nutrient-poorest in the world. However, we are not on sandstone but on shale, which weathers into a heavy clay soil. Furthermore, our soil is no deeper than 50 cm, below which there is a solid undisturbed layer of shale. "*Don't your plants then die and rot in winter when it rains for months at a time?*" Interestingly enough, no. We are on a slight slope with a fall of about 2 metres over the width of the property. Yet it can become pretty wet in winter with water constantly bubbling from the ground and running away. What happens, is that all the rain which falls on the mountains above our property penetrates into the soil until it encounters the solid shale layer, and then moves horisontally down the slope. We think our salvation is this slope, because the water which runs through our soil never becomes stagnant but is well aerated. We have never lost a plant in winter, though our editor, Isabella Claassen, has lost quite a number on a similar soil in Pretoria after heavy summer rains - her property is also on a slight slope, but she does not get the same degree of horizontal water movement through aerated water from upslope pushing away otherwise stagnant water. What also counts in our favour, is that all our cycads are in raised beds (Colour Figures 7 and 11). Furthermore, we constantly modify our soils by the addition of organic mulches. Every bit of plant material cut off, including from the lawn, is used for mulch, and in autumn we gather as much leaves as we can from the sidewalk along the street. We never dig these mulches into the soil, firstly because we don't have time, and secondly because we don't want to disturb the cycads' coralloid roots. Instead we recruited earthworms to do it for us, and at least the upper layers of our soil has a very nice structure.

Scarcity of water is a problem, as in so many parts of South

Africa. We do not have our own underground supply, so in summer have to rely on expensive municipal water. Our summers are different from those in the summer rainfall area in that the atmosphere is pretty dry, so that after watering our gardens dry out much more rapidly than in the summer rainfall region. We water our garden for 4 hours every third day in summer (not the whole garden for so long, but different sectors in succession), which translates to a massive 12 kilolitres every time, yet we only manage to keep the upper few centimetres moist. Winter rains seem to be quite beneficial for the cycads, and we think they actually grow slowly throughout winter, for which reason we feed them during winter.

Wind is our main problem. Where we live, we get neither the destructive winter northwestern, nor the debilitating constant southeastern in summer, but once or twice a year we do get a gale that blows for days on end and literally strips the leaves off the cycads. Of course the emergence of new foliage is always an harbinger of gales to come. Our friends in Florida like to complain about their occasional huricanes, but because of their warm climate the damage is largely repaired within a few months. We, however, never get ahead because long before the damage is repaired, another gale or two has struck.

With due respect to these restraints, come in and see what we try to do. (Figure 1).

Figure 1 Do enter, and meet our security officer.

"*What a nice garden!*", you say (Colour Figure 9). Not at all. Personally I am not interested in gardening, and merely try to maintain a collection of interesting plants in a visually attractive way. Never will this garden win any prizes in competition. Like most other people, we initially made the mistake of planting our cycads too close together, and now we have an impenetrable thicket. Besides, Elsa is not interested in cycads but needs space to plant her plants, which don't alway harmonise very well with the cycads (Colour Figure 7).

"*Did you buy the place like this?*" No, we built the house ourselves on a piece of bare land (Colour Figure 8). We have been here for 23 years, since 1979.

"*How big is your gardening staff?*". Only ourselves, plus the security detail whom you met on entering the gate (Figure 1). And make no mistake, this place does not at all perpetuate the myth of the carefree garden.

"*How big is your land?*" It is 1400 square metres, of which the house takes up 180 square meters and the driveway also quite a bit. It looks larger, and one reason is that we placed the house in one corner of the plot so that we could have the maximum undivided space in front.

"*You must feed a lot.*" We do. Because our soils are poor, we have to feed quite regularly, about once a month. We apply 3:4:5 on top of the mulch, from where it can slowly percolate into the soil as the plants get watered. We cannot afford to apply trace elements regularly, but when plants produce new leaves we give one application of hydroponic mixture, and we are careful to feed well during and after a coning event. We have some nutrient problems, which we will point out as we go along.

"*How many cycads do you have?*" We don't count them, but we do have an accession register in which origin of plants is recorded. On this plot we have run out of space. In the nursery are numbers of very interesting plants which cry out to be planted in the open ground, but the only way that can happen is by removing other less desirable species from the garden. We foresee a lot of that happening in the next few years.

"*What then of all that lawn?*" (Colour Figure 9). In spite of the urging from fellow cycad collectors as well as local greenies who see lawns as mere water guzzlers to shrink or replace with plantations of cycads, it is psychologically very important, because it lends an effect of spaciousness. Over the years it has shrunk to about half its original size, and henceforth not a square centimetre shall be removed, not even to plant a slender palm. It sets the tone for the whole design, and you will notice that near the horizon it narrows at various points into paths vanishing into the bordering vegetation, thus beckoning one to explore. You will also notice that the open space created by the lawn is not just a blank space, but provides vistas which is the second reason why the place look much larger than would be the case with a more or less circular lawn. As said previously, the cycad beds have all been raised, being built up with rocks (see Colour Figures 7, 9, and 11). Even here where our rain falls as drizzle rather than torrential

Colour Figure 7 A cycad thicket caused by planting young cycads too close together. On the positive side, it provides a splendid island of foliage. Note the raised bed.

Colour Figure 8 In the beginning.

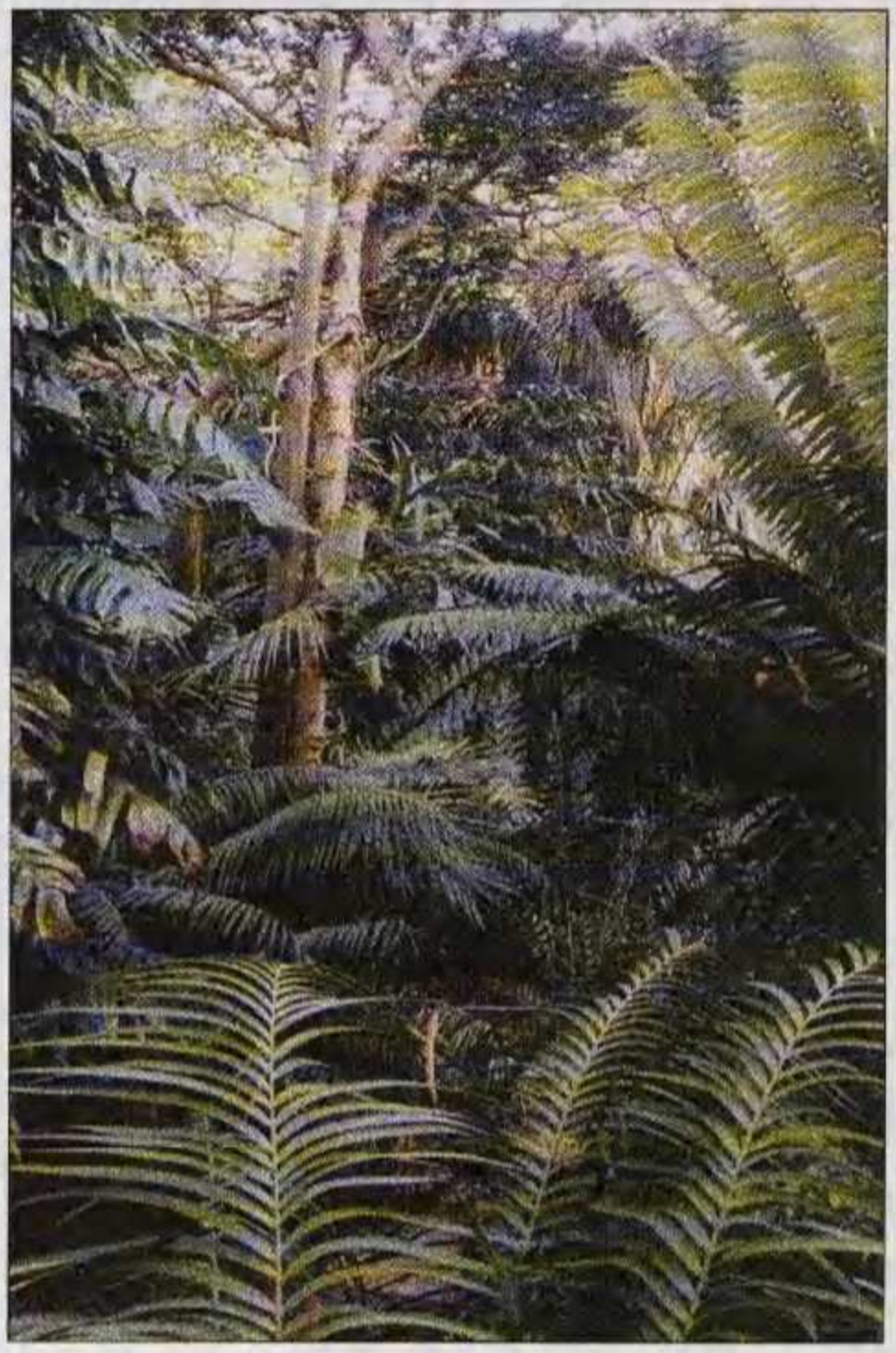
Colour Figure 9 The untouchable lawn.

downpours, it is prudent to stabilize the soil with rocks rather than just making a soil mound.

Part of our open space is occupied by a pond – this does not break the effect of spaciousness, and provides habitat for waterplants and various aquatic animals which we like to have around (Colour Figure 10).

"*How complete is your collection?*" Not very complete at all. There are a lot of cycad species which are not showy or

Colour Figure 10 The pond.



Colour Figure 11 Part of our forest. *Ceratozamia mexicana* from Mexico in the foreground, and in the background *Rhaphidophora pinnata* from the rainforest of northern Queensland (left) and *Encephalartos paucidentatus* (right).

difficult to grow here, or simply too rare to be in private hands. We don't aim to compile a complete collection, but we have examples of all the genera except *Chigua*.

"*Do you specialize in indigenous cycads?*" No. We have cycads from all over the world. Furthermore, we are adamant that a garden made entirely with cycads is a

Colour Figure 12 Two more interesting palms: the artificial intergeneric hybrid *Butyagrus nabonnandii* (left background), and *Wodyetia bifurcata* from Queensland (right background).

Colour Figure 13 Some of the Philodendrons, kept separate from the cycads, but with *Cycas thouarsii* and *Stangeria* on left, *Zamia furfuracea* x *Z. loddigesii* in foreground, and *Bowenia spectabilis* hardly visible on right, and an epiphytic bromeliad in the background.

Colour Figure 14 A *Tillandsia* grown as epiphyte on the stem of *Wodyetia bifurcata*.

Colour Figure 15 Various epiphytic Bromeliaceae, mainly *Tillandsia*, growing as epiphytes on otherwise bare branches of *Acacia sieberiana*.

Colour Figure 16 *Platycerium bifurcatum* growing epiphytically on *Encephalartos altensteinii*.

Colour Figure 17 *Platycerium superbum* from eastern Australia growing on *Syagrus romanzoffianum* from Brazil.

disaster. Similarly we don't believe in "indigenous" gardens – the world's flora is far too interesting to restrict oneself to plants of a few groups or a limited geographical area. We believe that our auxiliary plants are very important to the visual appeal and interest of the garden. Firstly, part of our border has been planted with trees. We tried various species, but eventually settled for *Acacia karoo* which does very well but has a very dense crown, and *Acacia sieberiana* which has a lovely shape and a sparse crown which lets through a lot of light (Colour Figure 15). On part of our windward border we planted a selection of palms, which make a very effective windbreak

(Colour Figure 7). However, under our conditions of shallow soils and dry summers palms are very aggressive competitors and we could not plant them everywhere. The remainder of the windward border was planted with various delectable trees, but over a period of 20 years they repeatedly got blown over, only a large and vicious *Faidherbia albida* remaining. We have now planted a hedge of Australian *Eugenia*, a species which we had never seen blown over. It is also an aggressive competitor, though hopefully not as fiercely so as palms, and we know that we will have to pay the price, but we really have no alternative. This windbreak needs some depth in order to be effective, so it takes up a not inconsiderable space. Yet this has its advantages, providing suitable protection for those special forest plants including truly shade-loving cycads such as *Encephalartos villosus* and *Ceratozamia mexicana* (Colour Figure 11).

Secondly, let us have a look at some of the auxiliary plants. Firstly, there are the palms. There are about 3000 species of palms, of which a surprising number can be grown in our climate. There are people in our Society which hate the very mention of palms, yet we find it impossible to resist their lure. But make no mistake: palms have a very different appearance from cycads, and they don't harmonize well. We therefore use palms to shape the background or frame the landscape. When we made our plantings, we had only common species available. Yet I would like to single out four particularly interesting palms. Near the front gate there is a *Rhopalostylis sapida*. This is the palm which in nature occurs the farthest from the equator, on the islands round the New Zealand coast. We got this as a tiny seedling in a joghurt container, and in spite of its reputation as a slow grower it has already reached flowering size. Then there is the delectable *Parajubaea cocoides* (Figure 2) with its shaggy hairy trunk. None of the palm enthusiasts in the warmer parts have it, because it won't grow there. It comes from the cloud forest zone of the Andes Mountains, where it grows at an altitude of 3000 metres. Then this little palm is *Wodyetia bifurcata*, a new species and new genus discovered in 1981 in a remote part of tropical Queensland in a very specialized habitat. Against all expectations it proved to be a very adaptable palm, and today it is grown throughout the world. This one was grown from one of the very first seeds collected. That huge palm next to the pond is an artificial intergeneric hybrid, *Butyagrus nabonnandii* (Colour Figure 12). It has a three-seeded fruit like a miniature coconut. In this case two of the three seeds germinated to give rise to a double-stemmed plant. To the dismay of all who sees it, it is entirely sterile so we have no seedlings to share out to our friends. A most useful palm this is for supporting epiphytes: one stem harbours bromeliads, and the other a selection of orchids including *Oncidium sphaecelatum*, various Miltonias, some *Cattleya*, some *Laelia*, and some *Brassia*. These orchids grow in almost full sunlight. We also have others, mainly small indigenous species but also various *Cattleya*, *Laelia*, *Stanhopea*, and *Dendrobium* which like a bit more shade, up in an *Acacia sieberiana*. We do not collect orchids, and have always resisted their lure, but those which we have are very successful, and every month of the year we have orchids in flower. We also have some Philodendrons (Colour Figure 13) all den-

Figure 2 A delectable and rare palm: *Parajubaea cocoides* from around 3000 metres on the easten slopes of the Andes, with an *Encephalartos transvenosus*, which we grew from seed, behind.

droid (free-standing rather than climbing types) because we simply don't have enough trees to support the climbing ones. These large-leafed plants cannot be mixed with cycads, firstly because they rapidly overshadow the cycads, and secondly because their soft leaves get broken when blown against cycad leaves. For that reason we keep them in a separate bed.

Then there are the Bromeliads (Colour Figures 13, 14, and 15). Practically all of these are epiphytes, and our Tillandsias brighten up the otherwise bare branches of a sparse *Acacia sieberiana*. The larger types are grown in the leaf axils of palms, but for many of the Neoregelias their charm lies in the colourful crowns which cannot be seen when they grow up in a tree, therefore these types have to be grown on the ground. On the ground they don't really harmonize very well with cycads, so this has to be done very carefully.

We think that epiphytes include some of the most romantic plants one can get. One mostly thinks of epiphytes as plants of the very wet tropics, but this is not necessarily the case. Our very first epiphyte was a *Platycerium bifurcatum* which had outgrown its little pot. In exasperation we tied it to the stem of our biggest *Encephalartos altensteinii* (Colour Figure 16) as we had no other supports available at the time. Not only did it survive, but it grew very well

indeed. Some years later we discovered that this is not an unnatural combination, when we found *Platycerium bifurcatum* growing on the stems of *Lepidozamia peroffskyana* in New South Wales. Over the years we added various other species, and today they are a feature of the garden. So successful are they that sporelings spontaneously come up all over the garden on cycad stems.

Those two enormous plants on the *Syagrus romanzoffianum* (Colour Figure 17) are *Platycerium superbum* from eastern Australia.

But enough of this: you wanted to see cycads; and in the next issue we will look at some of the cycads which we are growing.

THE GREATER ANTILLES AND THE CYCADS OF PUERTO RICO

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CONTINENTAL DRIFT AND THE FORMATION OF THE CARIBBEAN BASIN

Over the quarter billion-year history of cycads, the land surface of the earth has transformed itself many times. Continents collided and were later sundered. Mountain chains rose and then eroded away. These events and their resulting climate changes had profound effects on the cycads inhabiting them. Thus, to understand the origin and history of any cycad it is essential to have a grasp of the geologic history of the lands they inhabit. Puerto Rico is part of the Greater Antilles island chain. To understand the cycads of Puerto Rico we must first look at the geological history of the Greater Antilles and of the Caribbean basin as a whole. The Greater Antilles is the major chain of islands in the Caribbean Sea (see Figure 1) . This island chain stretches west to east, beginning off the Yucatan Peninsula of Mexico. For the purposes of this article the Greater Antilles includes Cuba, the Cayman Islands, Jamaica, Hispaniola, and Puerto Rico. All of these islands have indigenous cycads.

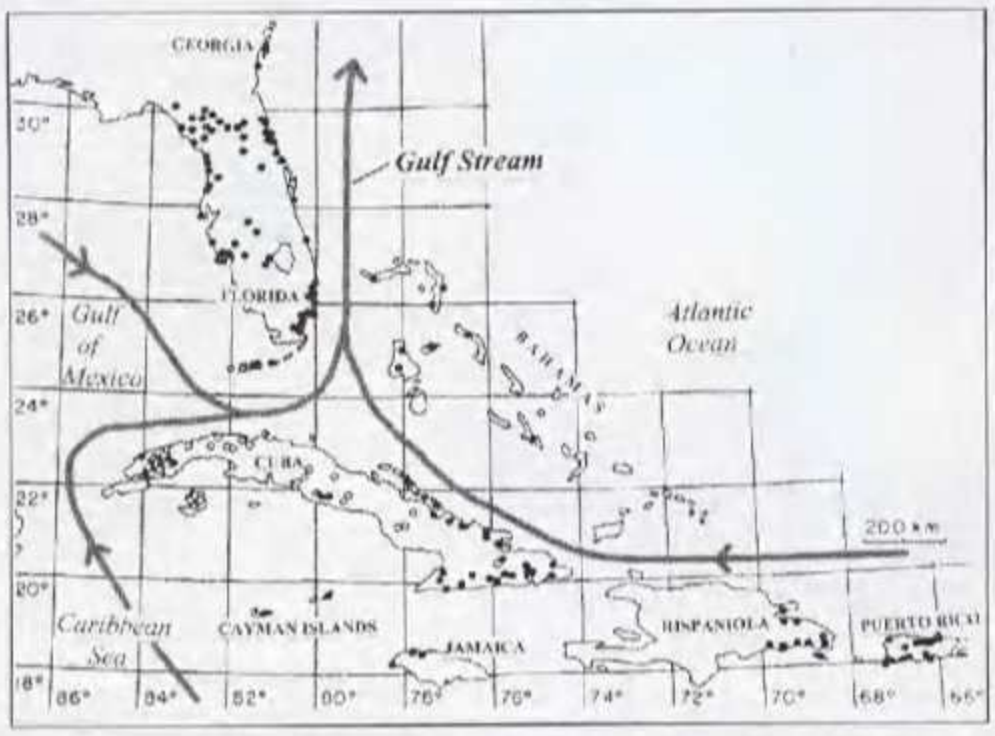


Figure 1 Distribution of cycads in the Greater Antilles is indicated by circles. The arrow shows the direction of the Gulf Stream, possible route for seed dispersal by ocean currents from Cuba to the Bahamas and Florida. Modified from Eckenwalder (1980a).

The geological history of the Greater Antilles is complex. The following summary is based on Pindell (1994). The story begins in the Jurassic period 175 million years ago (mya) when the land masses we know today as South and North America were still joined and South America was still attached to Africa (see Figure 2A). The Caribbean Sea and the Greater Antilles did not yet exist. At this time rift valleys, much like the one in East Africa today, were forming in this area and by the early Cretaceous period 130 mya these rifts in the earth's crust had split North and South America apart, forming the Proto-Caribbean Seaway (Figure 2B). As South America moved west away from Africa, the sea floor of the Pacific was subducted, or pushed underneath that of the South American plate. Volcanos formed along this subduction zone giving birth to land the would become the Greater Antilles.

From the late Cretaceous to the early Paleocene (approx. 90-60 mya), a period spanning the end of the dinosaurs to the rise of the mammals, land that would later become the Greater Antilles formed an isthmus connecting North and South America. Animals and plants, such as cycads, were able to disperse across this land bridge (Savage 1982). With time this isthmus shifted north and eastward as the Caribbean plate expanded. Farther to the west, along the western edge of the Caribbean plate, another arc of volcanic islands was forming (see Figure 2C). This new volcanic arc would later become Costa Rica and Panama and form a second isthmus, which connects North and South America today. By the early Eocene period (49 mya) the Greater Antilles had separated from the mainland and were beginning to take their current positions (see Figure 2D).

PAST AND PRESENT DISTRIBUTION OF CYCADS IN THE GREATER ANTILLES

Isolated from direct land dispersal from North and South America for some 50 million years, the cycad flora of the Greater Antilles is today distinct from that of Central and South America. *Microcycas calocoma* in western Cuba is believed to be either a relic left over from an earlier age or a species that has evolved in isolation over millions of years

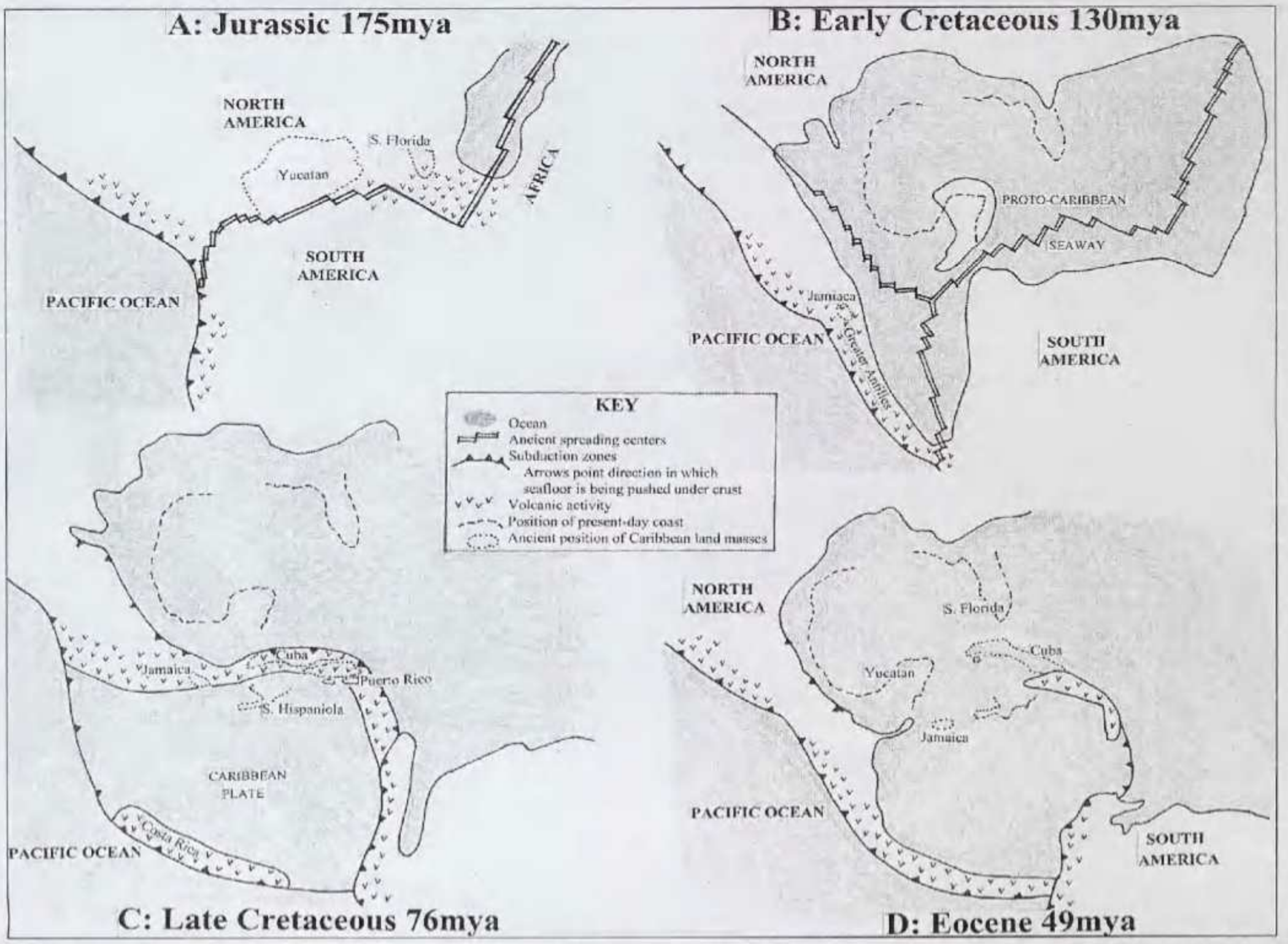


Figure 2 Reconstructions of the Caribbean area and the Greater Antilles in different geological periods, simplified from Pindell (1994): A) Jurassic (175 mya) – the Caribbean Sea and Greater Antilles do not yet exist, rift valleys begin to force North and South America and Africa apart; B) Early Cretaceous (130 mya) – Proto-Caribbean Seaway forms, Greater Antilles begin to rise between North and South America; C) Late Cretaceous (76 mya) – Greater Antilles form part of a land bridge between North and South America and another island arc rises to form present day Costa Rica and Panama; D) Eocene (49 mya) – Greater Antilles separate from the mainland and begin to take their present-day positions.

to the point where it no longer has any close relatives (Osborne and Milanes Santana 1995). Fossil cycad leaflets assigned to the genus *Zamia* are known from the late Eocene (approx. 30 mya) of Puerto Rico (Hollick 1932). Today the zamias of the Greater Antilles, here called the "*Zamia pumila* group", form a natural grouping of cycads clearly related to one another, yet morphologically distinct from all other zamias. The distribution of the *Zamia pumila* group extends into the Bahamas and the states of Florida and Georgia in the United States (Figure 1).

Unlike most continental cycads, all the cycads of the Greater Antilles, including *Microcycas* and the *Zamia pumila* group, lack spines. Spines function to deter large vertebrate herbivores (Tang 1991), such as antelope and pig. Such animals are not native to the Greater Antilles. The only large herbivores known to have inhabited the Greater Antilles were ground sloths, which went extinct in the Pleistocene period (Morgan and Woods 1986). The chromosome number of the *Zamia pumila* group is 16, different from the majority of Mexican and Central America *Zamia* so far examined (Moretti *et al.* 1991). Limited hybridization studies suggest that they can not interbreed with the Mexican zamias (Tang 1986, unpub. data). DNA studies (De Luca 2002) indicate that they are genetically distinct from Mexican and Central and South American *Zamia*. A study of protein variation in the *Z. pumila* group (Walters and Decker-Walters 1991) also indicates that they have been genetically separated from Mexican zamias for over 10 million years. All this evidence supports the notion that the Caribbean *Zamia* have been isolated in their range for a long time, evolving down a different evolutionary path from other cycads. Overall, both morphological and genetic evidence suggests that cycad distribution in the Caribbean basin mirrors that of reptiles and amphibians (Savage 1982), groups which are about as old as the cycads.

POSSIBLE ROLE OF OCEAN DISPERSAL

How isolated and distinct are the scattered populations of

the *Z. pumila group* from one another? The islands of the Greater Antilles are mountainous and separated by deep ocean. In contrast, the Bahamas and Florida are flat, low lying land masses. During interglacial periods, when sea levels rose, most of the lands of the Greater Antilles remained above water. The Bahamas and Florida, however, were highly affected by sea level changes. Three million years ago, during a Pliocene interglacial, sea levels were 35 metres higher than present. Virtually all of the Bahamas and southern Florida and most of central and northern Florida were submerged. On the other hand, 20,000 years ago, at the height of the last ice age, sea level was 120 metres lower than today, exposing extensive areas of shallow coast. The above water land surface of Florida and the Bahamas were 2-4 times more extensive than now (Schweitzer and Thompson 2002) and distances between their coastlines and that of Cuba were much shorter. Many zamias of Bahamian and Florida land masses were likely wiped out by flooding and recolonized several times during these periods of fluctuating sea levels.

It has been hypothesized that seeds of these zamias may be transported on floating mats of vegetation from island to island, contributing to interbreeding among different island populations (Eckenwalder 1980b). The major current affecting the Greater Antilles is the Gulf Stream. Branches of the Gulf Stream originate in the Gulf of Mexico and Caribbean Sea and then converge toward Cuba from the west, south, and east (see Figure 1). These branches join together off the northern coast of Cuba and then flow toward the Bahamas and along the east coast of Florida. Hurricanes and tropical storms strong enough to flood coastal areas and wash *Zamia* seeds out to sea strike Cuba dozens of times each century. The most likely route of dispersal, via the Gulf Stream, is from the north coast of Cuba toward the Bahamas and Florida. Long distance dispersal between islands is a relatively rare event and this is compounded by the low probability of seedling establishment once the seeds arrive on hot, salty beaches. The low probability of successful ocean dispersal is demonstrated by the limited distribution of *Zamia* in the Bahamas. They are known from only six out of hundreds of islands in the Bahamas chain. If dispersal and establishment were a common event, we would expect that many more of these islands would have been colonized by *Zamia* since they re-emerged after the last interglacial period. The fact that they are found only on six of the largest Bahamian islands indicates that size of a target island greatly increases chances of establishment. The absence of *Zamia* from the southern half of the Bahamas, off the main dispersal route of the Gulf Stream, also indicates how important this fast moving current is to successful dispersal.

Thus, although largely shaped by continental drift, the distribution of the *Zamia pumila* group has likely been influenced by ocean dispersal, particularly via the Gulf Stream. The exchange of seeds between islands may be an important route of gene flow between populations of *Zamia* in the Caribbean and may explain the similarity of some of the populations in Cuba, Florida, and Bahamas and perhaps Hispaniola, Jamaica, and Puerto Rico as well. The *Zamia* on each of the six Bahamas island are quite distinct from one another, suggesting that each was founded by a separate dispersal event, perhaps from Cuba, which has the highest overall diversity in *Zamia* leaf shape among the Greater Antilles (Eckenwalder 1980a). For example, *Zamia angustifolia*, a narrow leaf form on the Bahamian island of Eleuthera is very similar to a form in eastern Cuba, named variously as *Z. angustissima, Z. guggenheimiana, Z. multifoliata, Z. stricta* and *Z. yatesii* (Stevenson 1987a,b). On the other hand, some populations of *Zamia* in Puerto Rico and Cuba, are quite distinct from any other known population, suggesting that isolation is also important in shaping evolution in the Greater Antilles.

NATIVE CYCADS OF PUERTO RICO

In March of this year I travelled to Puerto Rico to examine the cycads of this island firsthand. Like most of the islands of the Caribbean, Puerto Rico has a wet and a dry side. Moisture laden Atlantic winds blow from the northeast, releasing 140-150 cm of rain, distributed year round, on the north coast. This supports a dense evergreen forest. The mountains of Puerto Rico, which rise to 1338 m, cause a rain shadow effect on the southern side of the island. After dumping most of their moisture on the steep northern slopes of these mountains, air masses descending the southern side are dry and support only a sparse forest on the southwest part of the island. Approximately 40% of the trees in this drought prone forest are deciduous and coexist with cactus, agave, and other succulents (Farnsworth 1991). Not surprisingly, there are two distinct species of *Zamia* inhabiting Puerto Rico. One is adapted to the shaded limestone hills on the wet north coast and the other to the more open forest in the dry southwest.

On the north coast, stretching from the city of San Juan west to approximately the city of Isabella, is a line of coastal hills known locally as mogotes. Shaped like haystacks and with steep sides, they are clothed with dense evergreen forest (Figures 3-4). *Zamia amblyphyllidia*, described only recently as a distinct species by Stevenson (1987b), lives here. Stevenson considers this cycad to be conspecific with forms occurring in Jamaica and western Cuba. These plants can occur in very high density in the shade of these forests (Colour Figure 18). Newell (1983) measured a density of 3.5 adults and 2.5 seedlings per square meter, making this one of the densest populations of cycad known. This species grows with its stems subterranean, often wedged into the cracks of the limestone and clay substrate. Its leaflets are wide, averaging between 22-25 mm in width and leaves often reach over a metre in length (Colour Figures 19-20). This Puerto Rican species has been the subject of several ecological studies, including reproduction and leaflet variation (Newell 1983, 1985, 1986, 1989a,b, Negron-Ortiz and Breckon 1989a,b, Negron-Ortiz et al. 1996). The studies of Newell ended when the mogote, on which her study population was located, was dynamited to make way for the construction of highway 2, which now runs across this rugged section of the north coast. Fungus gnats and beetles may play a role in pollinating this species (Negron-Ortiz et al. 1996). Since

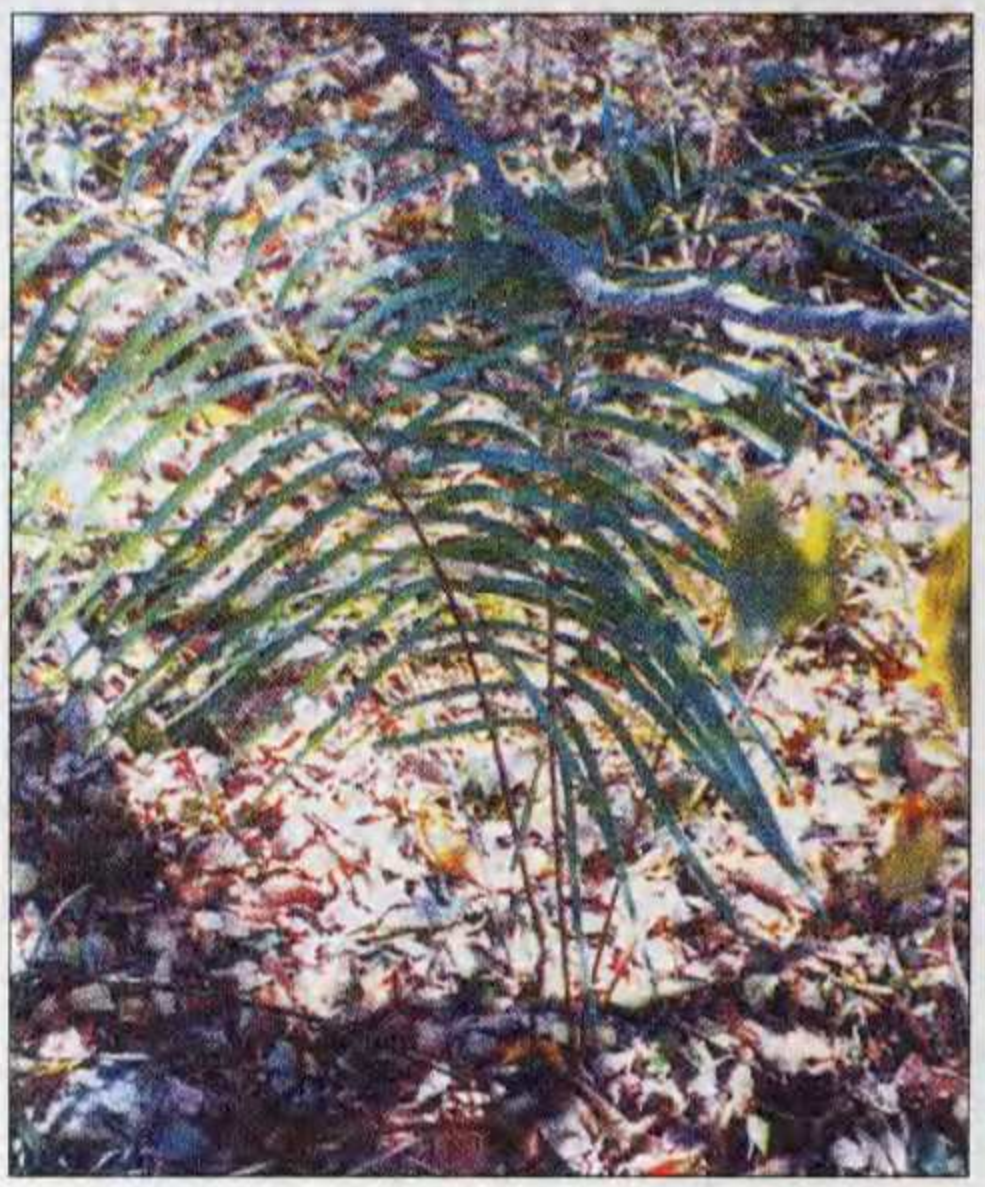
Colour Figure 18 *Zamia amblyphyllidia* **in its understorey habitat at Cambalache forest in north Puerto Rico.**

Colour Figure 19 Leaf close-up of *Z. amblyphyllidia* **at Cambalache forest. Note the lichen growth on leaflet surfaces.**

Colour Figure 20 Female cone and seedling of *Z. amblyphyllidia* **at Cambalache forest. U.S 25 cent coin gives scale.**

the mogotes are too steep for farmland and pastures, much of the vegetation is intact and this native *Zamia* still occurs in large numbers. Plants can be seen sticking out of the steep forested slopes as one travels along highway 2. Several good populations can be visited in protected reserves such as Cambalache and Vega Alta.

Colour Figure 21 *Zamia portoricensis* **at Guanica dry forest.**



Colour Figure 22 Close-up of leaf of *Z. portoricensis* **at Guanica.**

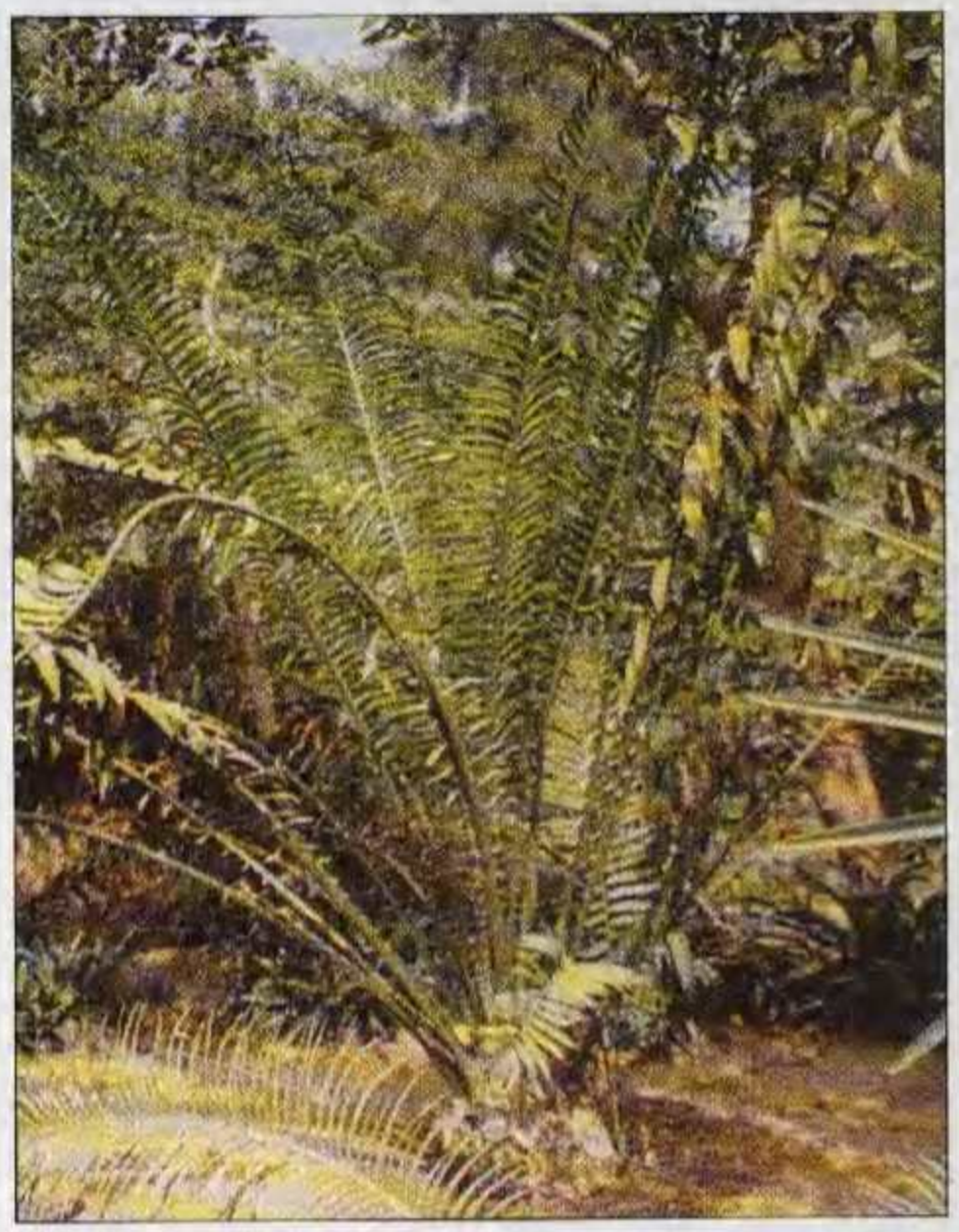
Colour Figure 23 New and old female cones on a *Z. portoricensis* in Guanica forest. These cones contain no fertile seed, suggesting that pollination is sporadic. Photo: Willie Tang.

Colour Figure 24 Dr. Fred Schaffner stands by a lush specimen of *Zamia amblyphyllidia* at the visitor centre of the Botanic Garden of the University of Puerto Rico. Photo: Willie Tang.

Colour Figure 25 *Dioon merolae* decorates the front entrance of the volunteer's centre. To the left is *Zamia furfuracea*, and to the right is *Dioon edule*. Photo: Willie Tang.

In the southwest coast of Puerto Rico stretching from Cabo Rojo eastward to perhaps Ponce is another species, *Zamia portoricensis*. This species has a much narrower leaflet, averaging 7 mm in width. Stevenson (1987a,b) recognizes

Colour Figure 26 Seedlings of *Encephalartos altensteinii* emerging through the litter of pine needles. Photo: Pieter van der Westhuizen.



Colour Figure 27 What is the correct botanical name of this *Encephalartos*? Photo: Shri Dhar.

this species to be unique among the Greater Antilles *Zamia* in that its leaflet margins are truly entire, lacking any well defined teeth. This species grows in much lower density and numbers than *Z. amblyphyllidia*. In the forest preserve at Guanica (Figure 5) small patches are encountered among drought adapted *Thrinax* palms, small deciduous trees, cactus, and agave (Colour Figures 21-22). Here rainfall is only 90 cm a year. In general this is a smaller species with leaves reaching less than a metre in length. Unlike the dark red cones of *Z. amblyphyllidia*, the cones are tan (Colour Figure 23). The vegetation in the southwest is fragile and highly disturbed. Situated mostly on gently sloping ground,

Figure 3 Limestone mogotes in north Puerto Rico, the habitat of *Zamia amblyphyllidia*.

Figure 4 Close-up of a mogote. Note the dense canopy of evergreen trees.

much of the natural vegetation has been cleared for pasture and farming. Despite this, this cycad can been seen persisting in pastures (F. Schaffner, pers. comm.), with leaves emerging from subterranean tubers. Unlike *Z. amblyphyllidia*, which is among the best studied cycads, little is known about the ecology of *Z. portoricensis*. It is protected in two preserves, Guanica Dry Forest, recognized as a United Nations Biosphere Reserve and operated by the US Fish & Wildlife Service, and Susua Forest.

In south central Puerto Rico there are records of a *Zamia* with leaflet widths intermediate between *Z. amblyphyllidia* and *Z. portoricensis* (Stevenson 1987b). This may be a hybrid zone between the two species or perhaps a third species which requires further examination. No forest preserves exist in this section of the island and natural populations of this plant, if they still exist are probably highly disturbed.

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Figure 5 Dry forest at Guanica, southwestern Puerto Rico, the habitat of *Z. portoricensis*.

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SHORT COMMUNICATIONS / KORT MEDEDELINGE

CYCADS OF THE PUERTO RICO BOTANICAL GARDEN

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Puerto Rico is a territory of the United States, granted the status of "Commonwealth" by the U.S. Congress. Its people are U.S. Citizens. The island was a Spanish colony from its discovery by Columbus in 1493, until the Spanish-American War in 1898. While Spanish remains the primary language in Puerto Rico, English is commonly spoken as a second language throughout the urban centres. The University of Puerto Rico (UPR) has several campuses,

including the original campus in the capital city of San Juan. Located near the southern outskirts of the city in the area known as Rio Piedras, the Botanical Garden of the University of Puerto Rico (or the Puerto Rico Botanical Garden) is situated on a hilly area on grounds formerly belonging to the Agricultural Experiment Station. Founded in 1971 and operated by the UPR system's Central Administration (Office of the President), it was conceived as a scientific, educational, and recreational facility. With a visitor centre (Centro de Información), several lakes, and open vistas, it is an island of greenery in the ever spreading city of San Juan. The U.S. Forest Service's International Institute of Tropical Forestry has its offices and library adjacent to the garden and the garden facilities are used to conduct research and educational exhibits.

The Garden's most recent director is Dr. Fred Schaffner. Dr. Schaffner and I were roommates in graduate school and he was kind enough to give me a tour and share with me his visions of the garden. The cycad collection of the garden consists of at least eight species of cycads. These are scattered around the grounds. By the visitor centre are large specimens of the northern Puerto Rico species *Zamia amblyphyllidia* (Colour Figure 24 on p. 20). *Zamia furfuracea* can be seen by the front entrances of several of the garden's buildings. The main cycad plantings are located at the volunteer's centre (the Casa Rosada). Gracing the front entrance of this building is an exceptional specimen of *Dioon merolae* (Colour Figure 25 on p. 20). Also around the building are more specimens of the native Puerto Rican zamias, as well as exotic species: *Macrozamia communis*, *Encephalartos hildebrandtii*, and *Lepidozamia peroffskyana*. Large specimens of the *Cycas rumphii* complex also grew here. The Cycas scale, *Aulacaspis yatsumasui* (Tang 1997), however, is now in Puerto Rico and an infestation, unsuccessfully treated with pesticides and Volk oil, has killed these *Cycas* specimens.

The basis of any scientific or educational plant collection is record keeping and proper labelling of plants. One of Dr. Schaffner's first goals in his revitalization plan for the garden was to conduct a complete retroactive inventory of the plant collections, produce an accessions catalog, and renovate the inventory tags and interpretive labels on the plant specimens. New aluminium inventory tags with etched lettering are nailed onto almost 2000 trees so far, and some newly designed trilingual (Spanish, English and Latin) interpretive labels have been installed on trees using stainless steel screws and springs, with the help of students and volunteers. These interpretive labels include the scientific name and the local Spanish names of the plants. These tags have withstood the humid tropical climate remarkably well and are projected to last several decades. The record keeping system Schaffner has tried to establish is essential for accreditation by the American Association of Museums and recognition of the garden as a true scientific and educational botanical garden (Taylor 2000). Such recognition would significantly enhance the garden's ability to obtain major grants for research, education, conservation and public programs. Another of Dr. Schaffner's objectives is community outreach, and Fred has invited local plant societies, such as the horticultural, palm, orchid, bromeliad and natural history societies to donate their time removing weeds and improving the collections. Many new volunteers have signed on in the past few years and the local palm society has added specimens to the garden's palmetum. Dr. Schaffner has attempted to promote and institute many garden improvements at the level of the University's upper administration and the legislature of the Puerto Rican government. His plans face stiff opposition from the university's labour union, which unfortunately sees these improvements as a threat to their power and influence. However, if these changes can be implemented, the Puerto Rico Botanical Garden (currently the only botanical garden operating on the island) can become an important asset of University of Puerto, and the garden will have the potential to become an important centre of research, education and conservation for cycads as well as other tropical plants.

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NEW THEORY FOR GUAM BRAIN DISEASE

Eating bat may be to blame for mystery illness

ASSOCIATED PRESS

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WASHINGTON, March 25 — Scientists have long sought to understand a horrific brain disease that once devastated the native people of Guam — Lou Gehrig's, Alzheimer's and Parkinson's symptoms rolled into one. Now two researchers have uncovered clues that suggest a Chamorro dietary tradition — eating a type of bat that feeds on neurotoxic plants — might be behind the mystery illness.

IT'S CIRCUMSTANTIAL evidence so far. But if the new theory is proved right, it could be more than another dismal

discovery that diet can wreck the human brain. Understanding the Guam disease may help uncover novel ways to treat regular Lou Gehrig's, Alzheimer's or Parkinson's diseases.

The theory, published Monday in the journal *Neurology*, turns on the principle that changing economies can impact disease. The brain disease peaked after World War II brought guns and cash to Guam, spurring commercial hunting until the bats neared extinction — and then the human disease in turn rapidly waned, said ethnobotanists Paul Alan Cox, who studies how indigenous people relate to their environment.

"This is very good news, of course, for the Chamorrons ... but neuropathologists thought they were losing the opportunity to understand the potential linkage" between the three diseases, said Cox, director of the National Tropical Botanical Garden in Hawaii. He co-wrote the article with neurologist Oliver Sacks of New York's Albert Einstein College of Medicine.

NOVEL HYPOTHESIS

Their hypothesis is "very interesting," said Diane Murphy, chief of neurodegenerative research at the National Institutes of Health. "Anything that sheds light on the pathological process in that disease potentially gives you places you could intervene with therapeutics."

The Chamorro disease is a mix of the slow paralysis of Lou Gehrig's disease (known medically as ALS), the tremors of Parkinson's, and dementia. Dubbed ALS-PDC, it occurred at rates more than a hundred times greater than regular ALS elsewhere, and was almost completely confined to Chamorro people who followed traditional cultural practices.

Theories abounded. Water contamination and lack of nutrients were ruled out. No suspicious genes have been found.

FLOUR SUSPECTED

The leading theory turned on cycads, a plant found throughout the tropics whose seeds native populations have long known were poisonous. The Chamorro repeatedly washed the seeds to detoxify them and then mashed them into flour. Toxicologist Peter Spencer of Oregon Health and Science University says they still got enough toxin to build up over time. But Cox and NIH's Murphy say animal studies failed to prove flour alone was the culprit.

Cox's theory is biomagnification: maybe people became ill by eating large bats that ate lots of toxin and stored it in their fat. A single 2-pound bat can eat up to 2½ times its weight a night in plants, he said.

Bat consumption had been largely ceremonial until commercial hunting began after World War II, Cox said. Then a bat population once estimated at 60,000 began to plummet. By the 1970's, one Guam species was extinct and the remaining one was endangered. Guam began importing bat meat from Samoa — where there are no cycads, Cox said.

Rates of ALS-PDC mirrored the change, he argued: In 1956, there were 308 cases of the brain disease per 100,000 people, but just 22 cases per 100,000 by 1985. Today, no one born after 1960 seems to get it, and men — who traditionally ate more bat — got ill more than women, he said.

For proof, he called for testing museum-preserved Guam bats and feeding cycads to bats from Samoa.

Spencer, author of the cycad flour theory, is skeptical. "It would be surprising if consumption of such a delicacy proved to be a more important source of exposure to cycad toxins than what was formerly daily use" of the flour, he said.

Spencer notes that certain populations in Japan and New Guinea that get a similar brain disease also use the toxic cycad, as topical wound treatments or a childhood folk tea.

But Cox says mercury-tainted fish, PCB-tainted whale meat and mad cow disease-tainted beef have all caused brain diseases — and that it's important to know if bats eating a natural toxin could, too.

[See "NEW CYCAD PUBLICATIONS" elsewhere in this issue for the abstract of: COX, P.A. & SACKS, O.W. 2002. **Cycad neurotoxins, consumption of flying foxes, and ALS-PDC disease in Guam.**]

VECTORS OF CYCAD SEEDS

Piet Vorster
Botany Department, University of Stellenbosch, Private Bag X1, 7602 Matieland

Received July 2002

When visiting wild cycads, whether in Africa, Mexico, Australia, or Asia, one commonly finds cycad seed kernels with tiny gnaw marks on the shell, hidden away under rocks. What carried those seeds away, and why?

In Africa the culprits are almost certainly various species of rodents. The very first foreign cycad seeds which I ever had, of *Zamia integrifolia*, were stolen from my nursery in Pretoria by a mouse, which also ate the stem of the very first palm seedling which I ever had. Since then I have learnt not to leave seeds with intact sarcotesta within reach of rodents. Female cones of *Encephalartos* are big, so one is often tempted to deposit disintegrating female cones on the nursery floor, only to find seedlings coming up from nooks and crannies and behind pots a year later. Only recently I stored a cone in a flat box on my garage floor, knowing about the rats in the nursery (these are indigenous wild rats). On cleaning the garage, I discovered a small cache of cleaned seeds behind a box, with the tell-tale gnaw marks. Other than various rodents, birds also eat the sarcotesta and so disperse the seeds. Hornbills are often quoted, but in my garden in Stellenbosch the principal bird dispersers are thrushes. They have the charming habit of burying the kernels individually under leaf litter, and this habit is especially troublesome if there is a fruiting *Phoenix* in the neighbourhood - one finds seedlings coming up in the most unlikely places. In our garden we a have an epiphytic *Ceratozamia*, growing in a *Platycerium* fully 5 metres above the ground. Squirrels are rather scarce in our garden, and I am not aware of rats climbing my trees, so I have to acuse the thrushes. Apparently the seed is not too large to be picked up by thrushes.

In Mexico I found *Dioon* seeds with very similar gnaw marks, and conclude that rodents are again involved.

In Australia rodents are probably also responsible, but the role of small marsupials cannot be discounted.

The same types of vectors are thought be active in Asia, but here yet another vector is involved: the fruit bat. I once received seeds of the true *Cycas circinalis* from India, beautifully cleaned but with fearsome gnaw marks on the kernels. The collector told me that collecting was easy: he merely picked them up under a tree where the fruit bats had dropped them after picking the seeds, flying to their favourite dining spot, and gnawing off the sarcotesta. In Stellenbosch we also have fruit bats which make a real mess by dropping seeds under trees; but I haven't seen them taking cycad seeds, probably because my cycads are small and cone close to the ground whereas the fruit bats forage high in trees.

Obviously the sarcotesta of cycad seeds is attractive to a range of animals, transmits a universal message to these animals, and serves to get the seeds dispersed by such animals. Particularly fortuitous from the cycads' point of view is the habit of some of these animals to store the kernels under rocks or litter which can be a respectable distance away from the source, thus providing good opportunities for germination and establishment.

EEKHORINGS DRA *ENCEPHALARTOS* SAAD WEG

Mias Kennedy
Blok A-E 17, Huis Vergenoegd, Hoofstraat 188, 7646 Paarl

Ontvang Julie 2002

Die huis in Paarl waarin ons tot onlangs gewoon het, was naby 'n klein plantasietjie van denne- en bloekombome geleë. Hier het ek feitlik elke oggend met my hond gaan stap. By 'n paar geleenthede was ek verbaas om broodboomsade op die grond tussen die bome te vind, tot so ver as 150 meter of meer van my huis af, en het gewonder hoe hulle daar beland het. Die broodbome in my tuin was die enigstes in daardie omgewing.

Een oggend vroeg, terwyl ek in my tuin was, sien ek toe 'n eekhorinkie wat besig was om sy kieste vol sade te stop onder 'n *Encephalartos natalensis*. Ek het hom dopgehou, en toe hy onder die hekkie deur koers kies na die bome toe en tussen hulle verdwyn, was die raaisel vir my opgelos.

Summary

SQUIRRELS CARRY *ENCEPHALARTOS* SEED AWAY

The former house of Mr. Kennedy was near a small plantation of pine and *Eucalyptus* trees. He used to go there for walks with his dog and on several occasions he was surprised to find cycad seeds lying on the ground up to 150 metres from his garden, which was the only one with cycads in the area. Then early one morning he saw a squirrel cramming its mouth with seeds below an *Encephalartos natalensis*. He kept an eye on the squirrel, saw it creeping through the gate in his fence and vanishing amongst the trees in the plantation and the mystery was cleared up.

FLY BY NIGHT POLLINATORS AND SEED THIEVES

Pieter van der Westhuizen
Stellenbosch, R.S.A.

Received July 2002

Figure 1 The place where the *Encephalartos altensteinii* seedlings were found - -prime squirrel habitat.

In my garden in Stellenbosch I have a number of coning-sized *Encephalartos*. One of these, a female *Encephalartos altensteinii*, recently surprised me when it spontaneously produced viable seed without human intervention. I did not at the time realise that the seeds were viable, but some time later the ground underneath the cycad, where the seeds had fallen, was covered with seedling plants. This can only mean that a pollinating agent is present in my garden, and the next step will be to catch and identify it. I have to accept that such a pollinator must have been imported into my garden with plants, probably hiding in the stem. I cannot categorically say that any plant in my garden was field collected. Running a landscaping business, I compiled my cycad collection through people phoning me when they wanted to sell cycads for some reason, and though these plants all have valid permits, I have no records of their previous history.

Across the street from my house is a piece of open ground, covered with pine trees (Figure 1). Here, fully a hundred meters from my garden, I discovered a spot about 2 metres in diameter covered with *Encephalartos altensteinii* seedlings pushing their first leaves through the litter of pine needles (Colour Figure 26 on p. 20). It is not my practice to dump my garden refuse elsewhere, and I certainly haven't transported the seed there. The only possibility is that squirrels (the American Grey Squirrel is common here) had taken the seeds, transported them, cached them, and forgot about them.

DO YOU WISH TO BE REGISTERED IN TERMS OF CITES AS A COMMERCIAL NURSERY?

Tilania du Preez
083 7566 897

Received 22 August 2002

Complete this Registration Form and fax it to (012) 346 8185.

CITES REGISTRATION AS A COMMERCIAL NURSERY in terms of CHAPTER 14 "CAPTIVE BREEDING AND ARTIFICIAL PROPAGATION" - The Evolution of CITES - MARCH 2000.

1. Name and address of the owner, manager or technical director of the nursery.
2. Date of establishment.
3. Description of the facilities and the propagation techniques.
4. Description of the historical background of the nursery, in particular information on which species of plant

groups have been propagated in the past.

5. Taxa currently in propagation.

6. Description of the Appendix 1 parental stock of wild origin, including quantities and evidence of legal aquisition.

7. Quantities of specimens expected to be exported in the near future.

NUUS OOR DIE NOORDELIKE BROODBOOM WERKGROEP

Xander de Kock
Posbus 21, 0787 Faunapark, R.S.A.

Ontvang 19 Julie 2002

Die Noordelike Broodboom Werkgroep het op 1 Julie 2002 hul tweede vergadering en eerste uitstappie vir die jaar gehou in die broodboomtuin van Helmut Hanaczeck.

Twintig lede was teenwoordig en 'n nuwe komitee is verkies, naamlik Xander de Kock (voorsitter), Phil Grobler (ondervoorsitter), Biem du Toit (sekretaris), Gideon de Kock (skakelbeampte), Whelmi Chalmers en Bossie Kruger (addisionele lede), en Diekie de Klerk (stuifmeelbeampte). Die vorige komitee is bedank vir hul werk.

Ons voel daar is te veel leke-kenners wat broodbome buitensporig waardeer en dat ons 'n pryslys vir gebruik deur lede in die Limpopo Provinsie gaan publiseer. Die pryse sal as 'n riglyn dien en ons besef dat individuele plantpryse volgens geslag, vertoon en vorm sal varieer.

Op toekomstige vergaderings wil ons die verskillende blaarvorme en lokaliteite van spesifieke Limpopo Provinsie spesies bespreek en foto's neem.

Die verdeling van vrugbare sade is bespreek en is as volg: een derde aan die voorsiener van stuifmeel, een derde aan eienaar van vroulike plante wat bestuif is, en een derde aan die persoon wat die bestuiwing gedoen het.

Die vergadering is afgesluit waarna Helmut ons deur sy pragtuin geneem het. Gerrie de Haas het lede touwys gemaak in verband met identifikasie. Die middag was hopeloos te kort vir al die plante in die tuin en sekere plante het beide beginners en ou versamelaars laat kopkrap oor hul identiteit. Die laaste lede is teen sterk skemer terug huis toe.

Summary

NEWS OF THE NORTHERN CYCAD WORKING GROUP

On 1 June 20 members gathered in the cycad garden of Helmut Hanaczek and a new committee was elected. Because laymen value cycads at exorbitant prices, it was decided to publish a cycad price list, based on gender and species, for the use of members in the Northern (Limpopo) Province. After the meeting Helmut took us through his beautiful garden Gerrie de Haas explained to members how to identify cycad species.

NUUS OOR DIE TRANSVAALSE STREEKTAK VAN DIE VERENIGING

Derik Minnaar
Privaatsak X8, 0047 Elardus Park, R.S.A.

Ontvang 8 Julie 2002

Verslae oor onlangse aktiwiteite

Praatjie deur Douglas Goode

Oudergewoonte het die wyd-geadverteerde broodboom-verkoping by Steve Trollip se Grass Roots-kwekery nie sonder groot aantrekkingskrag verloop nie. Na die verkoping het Douglas Goode ons verras met 'n skyfievertoning van sy Afrika toere.

Douglas het sy nuutste skildery bekendgestel en afdrukke was te koop aangebied. Die motief het 'n Afrika ondertoon met diepere simboliek om Douglas se besware teenoor broodboomplundering uit te beeld.

Douglas Goode het verder 'n skyfievertoning aangebied waarmee hy sy wedervaringe in Afrika met ons gedeel het.

Hy vertrek ook later gedurende die jaar na Ghana om *Encephalartos barteri* te besoek en sal gedurende 'n later geleentheid sy ondervindings met ons deel.

Na geleentheid vir vrae en 'n lewendige bespreking, het die byeenkoms verdaag.

Uitstappie na *Encephalartos transvenosus*

Vroeg gedurende die jaar is 'n klein groepie van Pretoria deur Pietersburgers genooi om 'n naweek by Modjadji-kraal deur te bring, waar *E. transvenosus* in oorvloed groei. Sonder om bekende stories te herhaal, het ek gepoog om 'n paar interessante opmerkings neer te skryf.

Weer eens was dit duidelik dat hierdie ongelooflike plante floreer in hulle habitat. Die meeste vroulike plante het volwasse kecls asook 'n stel nuwe blare gehad. Ek sluit 'n foto (Figuur op voorblad) in van 'n vroulike plant met vyf keëls en ongeveer 50 nuwe blare. 'n Reusagtige plant van ongeveer 15 meter (blare ingesluit) se stam was so groot en swaar dat kompressie plooie by die basis gevorm het (Kleurfiguur 28). Verskeie plante het jare gelede onder die gewig gebreek en meer koppe of takke gevorm. Sommige van hierdie takke het spontaan aan die basis begin wortels vorm wat afhang grond toe (Kleurfiguur 29). Ongeveer halfpad deur die wandelpad het ons 'n plant gesien waarvan die blare merkwaardige kort, breë pinnas het. Die pinnas was ongeveer 16 cm lank en op die breedste deel tot 6 cm (Figuur 1). Daar was ook baie saailinge te sien. Dit blyk dat een of ander knaagdier deel vorm van die voortplantingsketting, deur die sade skoon te vreet en te versprei (Figuur 2).

Hierdie broodboomwoud is ongetwyfeld een van die mees indrukwekkende natuurlike kolonies ter wêreld.

Tuinbesoek: Oom Roelf van Wyk

Gedurende Junie 2002 het ons 'n baie interessante tuin-besoek gehad na oom Roelf van Wyk se plek op Mooinooi.

Dit was duidelik dat daar baie moeite met die tuin gedoen is. Oom Roelf is die trotse eienaar van 'n uitgebreide versameling *Encephalartos* (Kleurfigure 30–32), en verskeie ander genusse broodbome is ook goed verteenwoordig, onder andere *Cycas*. Ons het redelik tyd spandeer om deur die interessante versameling plante asook die kweekhuis te gaan.

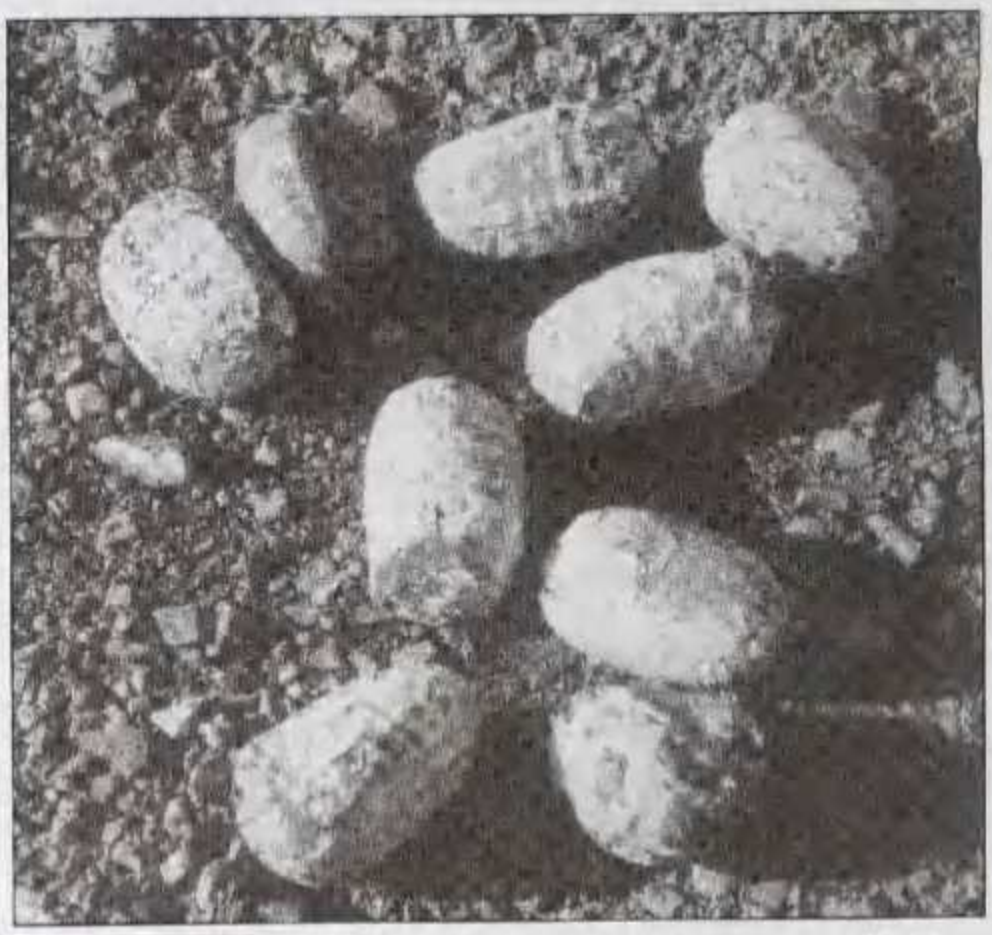
Later gedurende die middag het ons heerlik saam gekuier om tuisgebakte brood en braaivleis te geniet, en wil graag oom Roelf en sy gesin namens ons streektak bedank vir hulle warm en gesellige gasvryheid. Ons sal graag weer 'n uitstappie na hierdie merkwaardige tuin reël.

***Encephalartos middelburgensis* gedurende keëltyd**

Vroeg die oggend van 15 Junie 2002 het 'n klein groepie belangstellendes by Middelburg vergader om *E. middelburgensis* gedurende keëltyd te besoek.

Waar broodboomstamme beskadig word, kan later adven-

Figuur 1 Die pinnas van die blare van een *Encephalartos transvenosus* plant was kort en breed.
Figure 1 Leaflets on leaves of one *E. transvenosus* specimen were short and wide.



Figuur 2 Hierdie *E. transvenosus*-sade is waarskynlik deur een of ander knaagdier skoongevreet en versprei.
Figure 2 These *E. transvenosus* seeds were apparently cleaned and scattered by some rodent.

tiefknoppe vorm wat tot sytakke kan ontwikkel (Kleurfigure 33–34). Gedurende vorige besoeke het ek 'n geval beskryf waar sytakke afgebreek en deur diewe verwyder is (*Encephalartos* **67**: 27). Ons was verlig om te sien dat hierdie skade besig was om te herstel dat ou wonde nuwe adventiefknoppe gevorm het (Kleurfiguur 35) Ons hoop dat hierdie nuwe potensiële sytakke nie ook afgebreek sal word nie. Ons het weer die manlike plant besoek wat baie jare gelede omgeval en in twee gebreek het. Hierdie besondere plant het kroonsytakke gevorm wat met die verloop van tyd agt stamme gevorm het (kyk *Encephalartos* **67** Kleurfiguur 22 op p. 17). Dit was opmerklik dat hierdie stamme, net soos ons ondervinding met *E. transvenosus*, ook elk sy eie wortels begin vorm het.

Daar was geen manlike keëls te sien nie, aangesien dit vroeër ge-oes was om die vroulike keëls te bestuif. Vroulike keëls was in oorvloed (Kleurfigure 36, 37) en selfs die rubberslang (Kleurfiguur 37) by die plante met keëls het nie verhoed dat bobbejane van die keëls afgebreek en geplunder het nie (Figuur 3).

Verskeie *E. lanatus* was ook besig om keëls te stoot en die

Kleurfiguur 28 *Encephalartos transvenosus*, **stam met kompressie plooie by die basis.**
Colour Figure 28 *E. transvenosus*, **trunk with compression folds at the base.**

Kleurfiguur 29 *Encephalartos transvenosus*, **let op die wortels wat afhang aan die basis van sytakke.**
Colour Figure 29 *E. transvenosus*, **note the hanging aerial roots at the base of branches.**

Kleurfiguur 30 *Encephalartos* **plante in die tuin van oom Roelf van Wyk.**
Colour Figure 30 *Encephalartos* **specimens in the garden of Mr. Roelf van Wyk.**

Kleurfiguur 31 *Encephalartos laevifolius* **in die tuin van oom Roelf van Wyk.**
Colour Figure 31 *E. laevifolius* **in the garden of Mr. Roelf van Wyk.**

keëlpunte was duidelik sigbaar onder die wit wol.

Die middag se stap is afgesluit met 'n gesellige braai by die hoofkantoor.

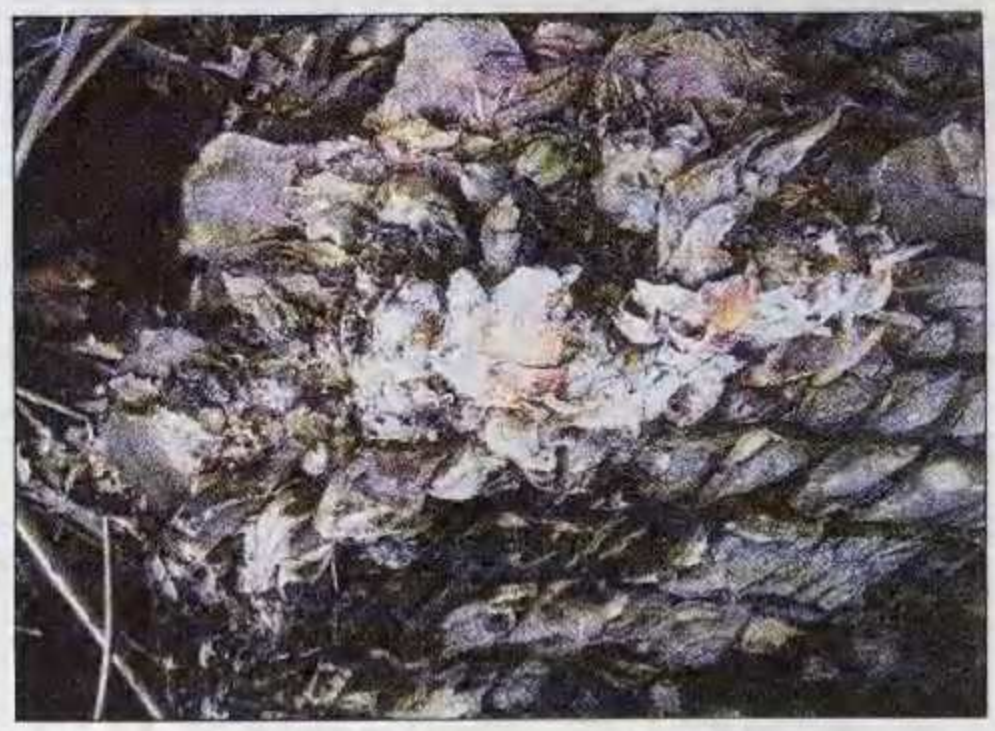
Toekomstige bedrywighede

Die Transvaalse streektak van die Broodboom Vereniging sal hulle jaarafsluiting by die Botaniese Tuin van Pretoria

Kleurfiguur 32 *Encephalartos transvenosus* **in die tuin van oom Roelf van Wyk.**
Colour Figure 32 *E. transvenosus*, **in the garden of Mr. Roelf van Wyk.**

Kleurfiguur 33 *E. middelburgensis*, **sytakke wat bo-op 'n beskadigde stam ontwikkel het.**
Colour Figure 33 *E. middelburgensis*, **branches that developed on top of a damaged trunk.**

Kleurfiguur 34 *E. middelburgensis*, **'n sytak wat uit 'n wond aan die kant van 'n stam ontwikkel het.**
Colour Figure 34 *E. middelbergensis*, **a branch that developed from a wound on the side of a trunk.**



Kleurfiguur 35 *E. middelburgensis*, **adventiefknoppe wat op 'n ou wond ontstaan het.**
Colour Figure 35 *E. middelburgensis*, **adventitious (auxillary) buds developed on an old wound.**

Kleurfiguur 36 *E. middelburgensis*, **vroulike plant met vier volwasse keëls.**
Colour Figure 36 *E. middelburgensis*, **female plant with four mature cones.**

Kleurfiguur 37 *E. middelburgensis*, **op een van die vroulike keëls is 'n gomlastiek slang geplaas in 'n poging om bobbejane weg te hou.**
Colour Figure 37 *E. middelburgensis*, **a rubber snake was placed on one of the female cones to keep baboons away.**

Figuur 3 *Encephalartos middelburgensis*, **'n vroulike keël wat deur bobbejane afgebreek en beskadig is.**
Figure 3 *E. middelburgensis*, **a female cone was removed from the trunk and damaged by baboons.**

hou op 26 Oktober 2002 om 14h00. Die vergadering, waartydens die verkiesing van die bestuur vir 2003 en 2004 gehou sal word, sal afgesluit word deur 'n bring en braai. Die byeenkoms is ouder gewoonte by Velcichhuis in die tuin van die Nasionale Botaniese Instituut, Pretoria, aan die noordelike kant van die rant. Die bestuur van die tak sal pap en vleis gratis voorsien maar verder moet elke persoon sy/haar eie eet- en drinkgoed sowel as eetgerei saambring. Lede wie se vanne met **A** tot **M** begin moet asseblief vrugteslaai bring, terwyl diegene wie se vanne met **N** tot **Z** begin mengelslaai moet bring. **RSVP aan Lynette Minnaar voor 16 Oktober 2002** by 083 417 7608 na-ure.

Summary

NEWS OF THE TRANSVAAL REGIONAL BRANCH

Report on recent activities

Steve Trollip's widely advertised Cycad Sale at his Grassroots Nursery on 20 April 2002 was well patronized. After the sale Douglas Goode gave a talk and slide show on his African tours.

Early this year, a small group of Pretoria members was invited by the members in Pietersburg to spend a week-end at Modjadji where *Encephalartos transvenosus* is growing in profusion. Most of the female plants had mature cones and new leaf flushes (Front Cover). The trunk of a large specimen was so heavy that compression folds formed at the base (Colour Figure 28). Some branches developed aerial roots at their bases (Colour Figure 29). The leaflets on leaves of one specimen were remarkably short and wide (Figure 1). Apparently seeds found on the ground were cleaned and scattered by some rodent (Figure 2).

During June we visited the garden of Mr. Roelf van Wyk at Mooinooi (North-West Province) (Colour Figures 30–32).

On 15 June a small group of enthusiasts visited the Cycad Hiking Trail near Middelburg (Mpumalanga) to see *Encephalartos middelburgensis* in cone. Several plants with branches that developed on damaged parts of the trunks were observed (Colour Figures 33, 34). In *Encephalartos* **67**: 27 we reported that branches have been removed and stolen. On some of these wounds quite a number of auxillary (adventitious) buds have developed (Colour Figure 35), which can grow to form new branches. Many of the female plants produced more than one cone (Colour Figures 36, 37). A rubber snake was placed on a female cone (Colour Figure 37) trying to stop baboons breaking off and damaging cones as can be seen in Figure 3.

LETTERS TO THE EDITOR / BRIEWE AAN DIE REDAKTEUR

Dear Editor

CALL FOR A LEGAL EAGLE

As an ex Deputy Sheriff some misinformed people seem to think that I have a profound knowledge of the law and ask for advice. Fortunately they don't usually act on it!

One such person phoned me today with his problem. His plot was sold in execution of a Court Order. The auctioneer drew the attention of those present that the cycads, although planted in the ground, were not included in the sale. The new owner now refuses the previous owner (lets call them owner "A" and "B") permission to remove the cycads despite the fact that owner "A" has a permit to possess these plants from the Department of Environment. In my blithe ignorance (fools rush in where Angels fear to tread!) I suggested that he obtain a notarized statement from the auctioneer that the announcement regarding the cycads had actually been made. He could then proceed either in the criminal or civil courts against "B".

By the time this appears in print the dust will have long settled, but a point arises, our own abysmal ignorance of the various laws regarding cycads. Surely among the illustrious members of our Society there must be a "Learned Gentleman" who can, and will, explain to our South African members the legal situation regarding the ownership and position of protected plants in our various Provinces. There are a multitude of other queries that also

require answers.

Here is just one: If I order a packet of seed, say, from the Cape Province and it is sent to me by one of the ubiquitous courier services, who has broken the law? The buyer, the seller or the unknowing courier who broke the law by transporting the packet from one Province to another?

If ignorance is no excuse for breaking the law, will some kind person please enlighten us before we inadvertently run foul of the Majesty of the law!

Jack van der Merwe, *P.O. Box 39, 0835 Duiwelskloof, R.S.A..*

Received 28 May 2002

[As far as I know, when selling your property and you wish not to include any cycads you own in the sale, you have to state this in writing in the deed of sale. I call on all the Nature Conservation Authorities in South Africa to send us copies of their laws on anything regarding cycads and allow us to print them in our Journal. **– Editor.**]

Dear Editor

RE "EXPORT OF INDIGENOUS CYCAD MATERIAL" BY DERIK MINNAAR (*Encephalartos* 68: 12, December 2001)

I believe Dr Minnaar is misguided and misinformed in his thinking as he makes the following statements:

1. "Most collectors are not interested in the art of cultivation, resulting in plant collections that only produce the odd hybrid".

2. "It is fair to conclude that the export of cycad material has no advantage to the species whatsoever. On the contrary the main drive for the export of cycad material is personal enrichment to the disadvantage of nature and those who try to conserve it for future generations."

3. "It is many people's belief that the export of cycad material from South Africa should be banned until cycads can be considered abundant and freely available to the public."

I would like to address each of these issues one at a time:

ISSUE 1

As a commercial nursery dealing with many indigenous plants I wish to say that we and many other indigenous nurseries are committed to the propagation of rare indigenous plants, including cycads. We are also licenced to propagate and sell cycads which have been artificially propagated from seeds or off-sets to the local and overseas market.

Our "drive" is to do *all* this by confirming rigidly with the permit system so that we may conduct an honest business which brings in an income to many people who would otherwise be unemployed.

Our suckers and seeds are all garden produced, legitimately removed from gardens in our area.

We follow a strict regime of hand pollinating plants in our own botanical garden as well as in the gardens of other cycad nurseries. We thus ensure that seed is true to the species and of good quality.

It can, therefore, be seen that contrary to Dr Minnaar's thinking there are large stocks of cycads available from nurseries and this in itself contributes a great deal to conservation as it takes the pressure off many plants in the wild as plants can easily be acquired from nurseries.

To this end our nurseries are well supported by nature conservation.

ISSUE 2

It is clear from this statement that Dr Minnaar would have us believe that stopping the export of this kind of plant material is the ultimate panacea.

Unfortunately the reverse is true.

It was discovered that when Mexico banned the export of its succulents and cycads there was an immediate increase in smuggling of plant material.

ISSUE 3

I believe that we have the support of nature conservation for the long term propagation and sale of these plants.

The cycads will find homes for posterity both in our gardens as well as botanical gardens in other countries.

Our nurseries provide a valuable resource of plant material and should be given full credit for the work they are doing.

It is hoped that "*Encephalartos*" distances itself from the controversial views held by Dr Minnaar who is in fact one of the Society's regional officers.

Welland Cowley*, Manager, Cape Flora Nursery, P.O. Box 10556, 6015 Port Elizabeth, R.S.A.*

Received 29 May 2002

Dear Dr. Vorster

IDENTIFICATION OF A CYCAD

I have an *Encephalartos* plant in my garden which I had presumed to be *E. villosus*, but Mr. Willie Tang corrected me and identified another *Encephalartos* plant as *E. villosus*. When I looked through books I found Mr. Willie Tang was correct. I am enclosing a photograph (Colour Figure 27 on p. 20) of my *Encephalartos* which I was wrongly calling *E. villosus*. As it is rather large and the leaflets are nearly 11–12 inches long, I would, therefore, like to know what is the correct botanical name of my plant.

Shri Dhar, *20 Ballygunge Park Road, Calcutta 700 019, India.*

[Some years ago Mr. Dhar send me photographs and leaflets of some of his cycads and asked if I could identify the species. The leaflets of the one that he named *E. villosus* (a photograph of this plant also appeared in *Encephalartos* **50**: 31, Figure 1) were exactly similar to leaflets of *E. hildebrandtii*, but a photograph of this female plant in cone showed that the cone had the same colour as female cones of *E. gratus*. I understand that some *E. hildebrandtii* female cones have a reddish colour but unfortunately I haven't seen any of them. Unfortunately I returned Mr. Dhar's photographs to him at that thime. If the photograph of the plant in cone could have been published together with this letter it would have been easier to identify the species. Mr. Dhar does not say whether Willie Tang had actually seen his plant or only a photograph because if Willie saw the plant he would have known whether it is *E. hildebrandtii* or not. In a note Piet Vorster wrote that he does not know the name of the species but it might be *E. gratus*. Could any of our readers identify the species? – **Editor.**]

Dear Editor

MR LEVIN: FOR YOUR INFORMATION

Mr Levin, do you have problems with Gauteng Nature Conservation ignoring your requests?

Answer: Take them to court in terms of PROMOTION OF ADMINISTRATIVE JUSTICE ACT No 3 of 2000.

Preamble: Whereas section 33 (1) and (2) of the Constitution provides that everyone has the right to administrative action that is lawful, reasonable and procedurally fair and that everyone whose rights have been adversely affected by administrative action has the right to be given written reasons.

Definition of "**administrative action**" means any decision taken **or any failure** to take a decision, by

(a) an organ of state when

(i) exercising a power in terms of the Constitution or a provincial constitution

or

(ii) exercising a public power or performing a public function in terms of any legislation.

Definition of "**decision**" means any decision of an administrative nature made, proposed to be made, or required to be made as the case may be under an empowering provision, including a decision relating to

(a) making, suspending, revoking or refusing to make an order
(b) giving, suspending, revoking or refusing to give a certificate, consent or permission
(c)
(d) imposing a condition or restriction.

Definition of "**failure**" in relation to the taking of a decision includes a refusal to take the decision.

Sec 3(2)(b)(a): The administrative action must give adequate notice of the nature and purpose of the proposed administrative action.

Sec 5: Reasons for administrative action

(1) Any person whose rights have been materially and adversely affected by administrative action and who has not been given reasons for the action may within 90 days after the date on which a person became aware of the action request that the administrator furnish written reasons for the action.
(2) The administration to whom the request is made, must within 90 days after receiving the request, give that person adequate reasons in writing for the administrative action.
(3) If an administrator fails to furnish adequate reasons for an administrative action it must, subject to subsection (4) and in the absence of proof to the contrary, be presumed in any proceedings for judicial review that the administrative action was taken without good reason..

Sec 6: Judicial review of administrative action. Any person may institute proceedings in a court for the judicial review of an administrative action, not later than 180 days after the date that the person was informed of the administrative action Sec. 7(1).

Sec. 8: Remedies in proceedings for judicial review. Here the court may grant any order that is just and equitable, including orders directing the administrator to give reasons or to act in a manner the court requires, or declaring the rights of the parties in respect of any matter to which the administrative action relates or granting a temporary interdict or other temporary relief.

Sender's name left out by special request.

Received 22 August 2002

INQUIRIES / NAVRAE

These inquiries and information were sent via E-mail to us and will no doubt also be of interest to other cycad enthusiasts. We call on our members/readers to help us resolve the questions asked by writing to us either via E-mail **<GTheron@nsnper1.up.ac.za>** or through the post.

Hierdie navrae en inligting is per E-pos aan ons gestuur en ander broodboom entoesiaste sal waarskynlik ook daarin belangstel. Ons versoek ons lede/lesers om ons te help om die vrae te beantwoord deur aan ons te skryf per E-pos **<GTheron@nsnper1.up.ac.za>** of gewone pos.

[Members/Readers, please let the publication of these letters by people asking advice about some problem or other concerning cycads inspire you to respond and help in solving the problems. Unfortunately, during the nearly ten years that I have been editor of "*Encephalartos*" (since October 1992), I found that only a few (if any) of our members/readers ever responded to questions asked in "Letters to the editor". **– Editor.**]

[Lede/Lesers, mag die publisering van hierdie briewe deur mense wat advies vra oor een of ander probleem aangaande broodbome u almal inspireer om te reageer en te help met die oplossing van die probleme. My ondervinding gedurende die bykans 10 jaar (sedert Oktober 1992) wat ek redaktrise van "*Encephalartos*" is, was ongelukkig dat baie min (indien enige) van ons lede/lesers gereageer het op vrae wat in "Briewe aan die redakteur" gevra is. **– Redaktrise.**]

Subject: cycads
From: "Dominic Donaldson"
<dominic.donaldson@marconi.co.za>

Gooday

Firstly, I would just like to say that I definitely intend subscribing to the "Cycad Society of South Africa" within the next month.

My wife and I have just taken the plunge and have purchased a house – we will be taking occupancy within the next 2 weeks. As part of the deal, I purchased an existing cycad collection from the owner. As of yet I have not identified the cycads other than 8 mature *Cycas revoluta* plants. Bearing in mind that I have never owned a garden let alone worked in a garden – this is going to be a totally new experience for myself and my wife – which we are really looking forward to. In fact, it was the garden of the house that we purchased that "sold" us.

Based on this, I have decided that I will become an avid cycad collector considering that I have already made an investment. I have been doing some reading and have actually went out and purchased some more cycads for the garden. I did not purchase anything special: 2 x *Encephalartos natalensis*, 1 x *E. ferox*, 2 x *E. lebomboenis*, 1 x *E. villosus*, and 1 x *Dioon spinulosum*. At the time, what I did not realise was that I did not pay much for these because the plants were all small – probably just past the seedling stage! ! !

Could you please assist me with the following questions that I have:

1) I stay in Springs, Gauteng. Where, in your opinion, are the best places to purchase larger and more developed cycads?
2) I would like to transplant my cycads from their black bags into the garden. I have read that well drained soil is a requirement. How exactly would I go about this process, what soil mixes would I use and in what order, etc.? What size hole would I require assuming plants will reach maturity in the position planted?
3) What fertilizer should I use? I am interested in healthy and good looking plants – my main concern is not necessary to speed up growth.
4) What other cycads would you recommend for a start up collector?

Your response would be greatly appreciated and is eagerly awaited!

Dominic Donaldson, *Tel: 082 904 1048.*

Subject: Can you please help?
From: "GEVA Sales" **<gevasale@mweb.com.na>**

Good day!

I live in Windhoek, in Namibia, and simply love all cycads! However, I am now only starting with my own cycads, and urgently need some advice. I acquired over the last few months, four species of cycads, namely *Encephalartos natalensis, E. ferox, Zamia furfuracea* and *Cycas revoluta*.

What I need to know, is how often do I have to water them? As you probably know, it is very hot and dry here with us, and we have to water all our other plants at least twice a week. Naturally I have been watering the cycads as well. Yet lately I noticed that some of the leaves are turning dry and brown, eventually falling off.

Can this perhaps be due to the fact that I give them too much water? Or do they perhaps need some special mixture of soil? I honestly do not know what I am doing wrong, and would therefore appreciate every bit of advice that I can get! I would very much like to grow my own cycads successfully!

Karin Coetzee, **gevasale@mweb.com.na**

Subject: cycads
From: "witbankcc" **<witbankcc@freemail.absa.co.za>**

Hi

I want to start growing cycads but would firstly like to know about the legal implications i.e. permits, etc. as well as where to buy seeds from, the cost per seed, the ideal hot house as well as the ideal growing circumstances.

Derick Gouws, *Cell: 083 263 2936*

Subject: re: Advise, please
From: "Louise Heckl" **<exlibris@corpdial.co.za>**

Dear Cycad Society

I wonder if you could please help me with some advice as to what the following species of cycads need in terms of planting out seedlings.

Our books do not list these specific species – and when, then not what the conditions are the seedlings need to be planted into.

Encephalartos inopinus
E. msinganus
E. nubimontanus
E. senticosus

These seedlings have been in pots for two years and now need and are big enough to be planted into the garden.

Mr. And Mrs. Wolfram Heckl.

Subject: Re: Cycad
From: "Arthur Hope (UIF-HQ)"
<ArthurH@LABOUR.gov.za>

Goeie dag

Ek is op soek na meer inligting i.v.m. broodbome. Kan u vir my inligting gee van waar ek sade kan koop om te groei (indien ek mag)? Moet ek êrens registreer om so iets te kan doen? En 'n laaste vraag, kan ek meer inligting kry van hoe om die bome behoorlik te laat groei?

Arthur Hope *(Asst. Manager IT)*
arthur.hope@labour.gov.za
Tel: (012) 337 1972

Subject: Joining the CSSA
From: "David" **<greenhld@emirates.net.ae>**

Hi there Prof

My name is Steven Wortrich, I am a horticulturist and SA national, employed to establish what will become the largest plant propagation nursery in UAE. Our company, Green Holdings, is situated in the emirate of Dubai.

My speciality is the Cape Fynbos, from which I shall be importing species suitable to this region, for propagation purposes. This region seriously, lacks both diversity as well as variety. I have included in my plant list four *Encephalartos* species which given my research should adapt very well to the prevailing landscape conditions. I would, however, be guided by your knowledge, should you feel the contrary.

My immediate dilemma is the obtaining of the necessary permit documentation required to import these specimens. I spoke to Kirstenbosch yesterday, whom advised that I contact the Society regarding this information. May I, therefore, prevail upon you to provide me with the necessary info at your convenience.

The species which I require are the following:

Encephalartos hirsutus
E. horridus
E. ferox
E. lehmannii

All things being equal, it is my intention to import 200 of each, initially, to establish my mother stock as well as for sales to the landscape industry.

I may be reached on phone no. 971 4 2211011 or
e-mail: **greenhld@emirates.net.ae**

Steven Wortrich.

Subject:
From: "fairagri@emirates.net.ae"
<fairagri@emirates.net.ae>

Dear Sir

We wish to introduce ourselves as one of the largest horticultural plants producers and importers in UAE based in Dubai. In our nursery we are producing different kinds of plants, palms, grasses, etc. We are importing plants from Italy, Holland, South Africa, India, Sri Lanka, Thailand, etc. Major portion of our products we are supplying all over UAE for landscaping companies and retail traders. We have a vast and wide nursery with well-advanced greenhouse and other facilities. Apart from plant supply we have a landscaping division and other sales division supplying coco-peat, peat moss, etc.

We hereby express our wish to know about your company more and to have a good business relationship by importing products from you. So please reply me with all your details and your product catalogue.

We need urgently the following palms (please quote the availability and best price at the earliest):

1. *Cycas revoluta*	35–45 cm brown trunk	100
2. *Cycas revoluta*	35–45 cm overall ht	150
3. *Zamia furfuracea*	35–45 cm overall ht	250

Note:
Here in UAE, the plants or palms imported with natural soil is strictly prohibited. So, all the palms should be in potting soil or in coco peat.

The palms to be send in reefer containers by seafreight only.

If you don't have this much variety and size, please inform the available varieties and size.

If you are not dealing such big quantities, please direct me to a good supplier who can supply.

Mohan, *Manager – Import, Fair Deal Agriculture & Landscaping, P.O. Box No. 4793, Dubai, U.A.E.*
Tel: +971 43599674
Fax: +971 43550590
E-mail: **fairagri@emirates.net.ae**

Subject: Browning of cycad leaves
From: "F. Avenant" **<fanica@absa.co.za>**

A worrying "disease" has raised it's head in collections of *Encephalartos* in especially the Pretoria area this summer, namely the gradual browning of leaves of a wide variety of species. It starts off as a small dead spot on the leaf which gradually spreads and often results in the demise of the entire leaf. A fellow collector mentioned to me that this disease was especially prevelant in the Lowveld. From our observation it appeared to be caused by some sort of fungus and the assistant at the Information Counter at the Safari Nursery confirmed this and told me that numerous distraught collectors had brought along examples of dead leaves in their search for a cure. He recommended "Funginex" which I sprayed on my affected plants and now after two weeks it appears, touch wood, as if the spreading has at least been stopped or slowed down.

What also intrigued me was that, in the case of my own collection, the severity of the fungal attack on my plants was in the following order: *Encephalartos heenanii, E. woodii, E. dyerianus, E. hildebrandtii* followed by *E. friderici-guilielmi.* A fungus with expensive taste I would say! Strangely, in some cases only one plant of a kind would be affected whilst the others of that same species would remain healthy, notwithstanding the fact that they were exposed to absolutely similar conditions. Also, might the early and very heavy rains alternated by extremely hot days we experienced this summer have played a role creating ideal conditions for the growth and spreading of this fungus?

I shall be pleased to hear the observations of other collectors and maybe some of our members could provide a scientific answer to this mystery.

Fanie Avenant.

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Subject: re: Browning of cycad leaves
From: "Prof Nat Grobbelaar" **<natgrob@hotmail.com>**

Fanie, your enquiry was forwarded to me. It is impossible to make a good diagnosis from your description of the disease. From time to time I have encountered a malady amongst my cycads. It always starts with the death and drying out of the tips of one or more leaflets. The dead zone then enlarges towards the leaflet base and eventually the whole leaf dies. Several attempts to find a fungus or bacterium in the leaves that could be the culprit has so far been unsuccessful. Because (a) the disease appears to spread from one plant to its neighbours, (b) the timely removal of affected leaves appears to prevent the spread of the disease, and (c) the regular treatment of the plants with an insecticide such as Chlorpirifos also appears to prevent the spread of the disease, I am of the opinion that the disease is caused by a virus which is transmitted from plant to plant by some insect vector. However, it is still pure conjecture at this stage. If we are talking about the same disease, it would be interesting to learn whether you have had a good response from treating the plants with a fungicide.

In future please direct this type of correspondence to the Editor of "*Encephalartos*" because other cycad enthusiasts will no doubt be interested in your problems and the responses it may elicit.

Nat Grobbelaar.

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Subject: Browning of cycad leaves
From: F. Avenant

Dear Prof Nat

Thank you for your response to my enquiry which was forwarded to you by Prof. Theron. I apologize for taking this route but was under the mistaken impression that the E-mail link on our website was created for the purpose of passing correspondence/articles on to the editor of "*Encephalartos*". With your permission I would like to deliver, by hand, my enquiry as well as your response thereto to Dr Isabella Claassen with a view to possible publication in the Journal.

It might stimulate the interest and degree of observation of some of our members in view of the fact that shortly after my recent enquiry, there appeared an article in Journal No 69 entitled "Two new pests of *Zamia* in Florida" by William Tang which describes an infection of *Mycoleptodiscus indicus* and greatly corresponds with my observations of the local, disease which had affected some of my

plants. My experience of the disease is exactly as you describe it, except that it did not always start at the tip of leaflets but also along the edges, especially the spinier young leaflets of a plant such as *E. woodii*. I did not mention in my previous communication that the leaflets of two youngish *E. dyerianus* and *E. middelburgensis* plants were also badly affected, with the browning starting from the tip and/or from the edge in some cases as a spot on the leaflet.

Spreading of the disease has stopped after bi-weekly treatment with "Funginex" and I see that, in the case of the Florida Problem, William Tang indicates that chemical fungicides may be temporary effective. Incidentally, during this period I was also spraying my amaryllids with "Garden Ripcord" to ward off the destructive amaryllis worm and would, out of frustration, also give my ailing cycads a dose of this very effective poison.

I guess that puts paid to my speculations and reaffirms the fact that amateurs should tread lightly when venturing into the exact world of science.

Fanie Avenant, *Wapadrand, Pretoria.*

FROM THE PRESIDENT

VAN DIE PRESIDENT

Several of our members, from South Africa as well as elsewhere, attended the recent conference on cycad biology in Thailand. As I predicted, it was a particularly endearing but also informative occasion, but everything was so strange that most of us have not yet persuaded ourselves that it had really happened. The publication of this issue of ***ENCEPHALARTOS*** was held back so that we could tell you about the conference before the news became too old, and on page 38–43 you can read something about the conference.

Earlier this year two of our members, Jan van Vuuren and Peter Heibloem, were found guilty in California of illegal trade in cycads. The protracted court proceedings resulted in wide publicity, and our Cycad Society as well as the legal exchange of cycad material between members was harmed to an infinite degree. In persuance of Articles 4.4 and 4.5 of the Constitution of our Society, the Council (excepting two members who abstained) decided to terminate the memberships of these two persons. In his evidence one of these persons implicated two others who are members of our Society or were members until recently. Their memberships were not discussed, because they have not yet been brought before court and found guilty. An accused remains innocent until he is proven to be guilty. This was one of the most difficult decisions which I ever had to take. It is so easy to make a scapegoat of a suitable person, but I know that many of our members benefitted from Peter Heibloem's expeditions to tropical Africa. It is not enough to take a small plant or a few seeds without asking if it is legal, or to purchase a charred stem as long as the documentation is in order. It here goes about the spirit of conservation, and we cannot afford not to follow the laws in the smallest details, whether we like them or not.

'n Hele paar van ons lede, uit Suid-Afrika sowel as elders, het die pas-afgelope kongres oor broodboombiologie in Thailand bygewoon. Soos ek voorspel het, was dit 'n besonder innemende maar ook leersame geleentheid, maar alles was so vreemd dat meeste van ons onsself nog nie kon oortuig het dat dit regtig gebeur het nie. Hierdie uitgawe van ***ENCEPHALARTOS*** is spesiaal teruggehou sodat ons vir u van die kongres kan vertel voordat die nuus te oud word, en op bl. 38–43 kan u een en ander oor die kongres lees.

Vroeër vanjaar is twee van ons lede, Jan van Vuuren en Peter Heibloem, in Kalifornië skuldig bevind op onwettige handel in broodbome. Die uitgerekte hofsaak het baie publisiteit geniet, en is ons Broodboomvereniging sowel as die wettige uitruil van broodboommateriaal tussen lede oneindige skade berokken. Ingevolge Artikels 4.4 en 4.5 van die Grondwet van die Vereniging het die Raad, met uitsondering van twee lede wat buite stemming gebly het, besluit om hierdie twee lede se lidmaatskap op te skort. In sy getuienis het een van hierdie persone twee ander impliseer wat lede van die Vereniging is of tot onlangs was. Hulle lidmaatskap kom nie in gedrang nie, omdat hulle nog nie voor die hof gedaag en skuldig bevind is nie - 'n beskuldigde bly onskuldig totdat hy skuldig bewys is. Hierdie was een van die moei-likste besluite wat ek ooit moes neem. Dit is so maklik om van iemand 'n sondebok te maak, maar ek weet dat baie van ons lede gebaat het by Peter Heibloem se ekspedisies na tropiese Afrika. Dit is nie genoeg om 'n plantjie of 'n paar sade te neem sonder om te vra of dit wettig is nie, of om 'n swartgebrande stam te koop as die dokumentasie in orde is nie. Dit gaan hier oor die gees van bewaring, en ons kan nie bekostig om nie die wette in die fynste besonder-hede na te kom nie, of ons nou daarvan hou of nie.

In the previous edition shots were fired in a feud between Maurice Levin and Gauteng's Directorate of Nature Conservation. Nature Conservation's reply appears in this edition. Please take note that there now is a whole new set of rules, and do study them before you send plants to your friends in other countries.

Piet Vorster

In die vorige uitgawe is skote geskiet in 'n vete tussen Maurice Levin en Gauteng se Direktoraat van Natuurbewaring. In hierdie uitgawe verskyn Natuurbewaring se antwoord. Neem asseblief kennis dat daar nou 'n hele stel nuwe reëls is, en kom op hoogte daarvan voordat u vir vriende in ander lande plante stuur.

Piet Vorster

THE CYCAD 2002 CONFERENCE

IMPRESSIONS BY SOME OF THOSE WHO ATTENDED

Received 27 August 2002

This eagerly-anticipated event took place at the Nong Nooch Tropical Botanical Garden near Pattaya, Thailand, from 27 July to 3 August 2002. A surprising number of our members attented, including Jeff Chemnick from California, Chris Dalzell from Durban, Diekie and Karin de Klerk from Pietersburg, John Donaldson from Cape Town, Paul Forster from Australia, Tim Gregory from California, Denis Heenan and Rosa to whom he got married just before the conference, Bruce and Suzi Ironmonger, as well as Maurice Levin and his whole family from California, Irvin and Allison McDaniel from California, Rolf Oberprieler, Roy and Angela Osborne, and Harvey Ottley from Australia, Christo and Aletta Page from Pretoria, Lou Randall from Australia, Willie Tang from Florida, Steve Trollip from Brits, Wynand and Thelma van Eeden from Ireland, Jan Visser from the Netherlands, Piet and Elsa Vorster from Stellenbosch, Stan Walkley from Australia, and Loran Whitelock from California. Of course our host and owner of Nong Nooch, Kampon Tansacha (Colour Figure 38), is also a member of the Society.

Most conferences are made special by those who attend, but in this case our hosts set the tone. Not for nothing is Thailand known as "the land of smiles", and apart from anticipating and providing for one's slightest needs, their attendance to detail from such small things as tying a bus' curtains to a monumental temple with millions of minute mirrors must be experienced to be believed. From day one every minute of the day was filled with something very special. Of course Thai food is legendary, and every meal was an adventure, though never outrageously so. Especially enjoyable were the fruits, mostly unknown to us ignoramusses and including the legendary but outlawed durian which we had to purchase and consume in the garden.

Conferences are traditionally places where people meet to their mutual satisfaction, and this conference was no exception. The most important facet of this is the scientific sessions, where valuable new information was exchanged, old friendships renewed, and new contacts established. It is also an occasion to meet fellow-growers from all over the world, to learn how they grow their plants, and who knows, maybe make contacts to exchange material to enhance one's own collection. Then there are also serious traders who don't talk to small fry, and who forge transactions worth thousands in corners, under trees, on the beech, or perched on a boulder. In fact, seldom before has so much open and covert trading between attendees been seen. We have even been consulted by the Thailand secret police about a transaction involving *Encephalartos arenarius*, clandestinely recorded by them in the great temple in the Royal Palace (Colour Figure 39) compound of all places.

The scientific programme looked as follows. Not all the announced papers were read, some being withdrawn at the last moment and others presented as posters instead. As is customary by now, these papers will be published in a volume of proceedings - if the efficiency which we saw in action is any measure, this will not take long either.

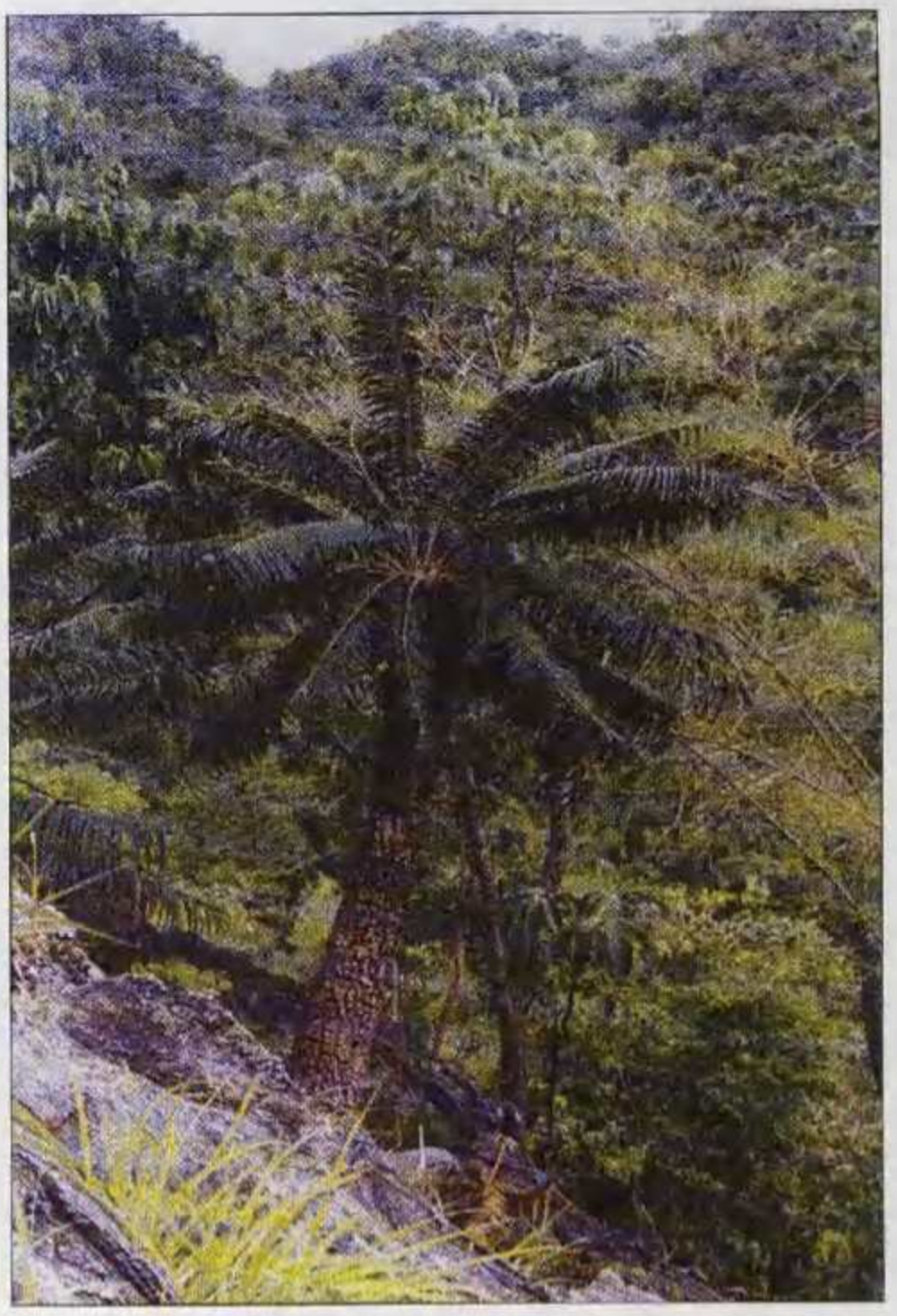
Day 5 **Wednesday July 31**

	Breakfast at Hotel
08:00	Transfer to NNTBG
09:00	Tour of Nong Nooch Garden and Hortus Botanicus
10:30	Refreshments
11:00	Tour of cycad collection
12:00	Lunch at NNTBG
13:00–17:00	**Systematics & Phylogeny Session (Chair: Roy Osborne)**
13:00–13:30	Taxonomy of *Cycas* and notes on Chinese *Cycas* (Liu Nian)
13:30–14:00	Two new species of the genus *Dioon* from Oaxaca, Mexico (Jeff Chemnick)
14:00–14:30	*Cycas*: An overview of our understanding of the largest and oldest cycad genus (Ken Hill)
14:30–15:00	Break (Refreshments served)
15:00–1700	**Conservation Session (Chair: John Donaldson)**
15:00–15:30	An assessment of cycad conservation and diversity in Queensland, Australia (Paul Forster)

Colour Figure 38 Our host, Kampon Tansacha, with *Cycas tansachana* which bears his name. Photo: Piet Vorster.

Colour Figure 39 The ostentatious grandeur of the Royal Palace of Bangkok typifies the aura of the Thailand Cycad Congress. This gold-plated palace was visited by delegates as part of the Conference programme. Photo: Roy Osborne.

15:30–16:00 Conservation of Transvaal cycads (Steve Trollip)
16:00–16:30 *Cycas debaoensis* conservation project in China (Willie Tang & Anders Lindstrom)
17:00 Return to Hotel
Dinner at Montien Hotel
Accomodation: ***Montien Pattaya Hotel***



Colour Figure 40 *Cycas siamensis* in natural habitat. Photo: Piet Vorster.

Day 6 Thursday August 1
Breakfast at Hotel
08:00 Transfer to NNTBG for the Meeting
08:30–11:30 Physiology, Biochemistry & Toxicology Session (Chair: Piet Vorster)
08:30–09:00 An *Ex situ* conservation project in Shenzhen Fairy Lake Botanical Garden in China
09:00–09:30 *Stangeria* conservation project (Chris Dalzell)
09:00–10:00 Cycad coralloid roots, a symbiotic structure harboring nitrogen fixing Cyanobacteria (Peter Lindblad)
10:00–10:30 Break (Refreshments served)
10:30–11:00 Cyanobiont diversity within coralloid roots of cycads (Jose Costa)
11:00–11:30 Diversity and genetic variation among populations of Thai cycads revealed by AFLP Markers (M. Mekanawakul)
11:30–12:00 Poster Session
12:00–13:00 Lunch at NNTBG
13:00–16:00 Biogeography and Ecology Session (Chair: Ken Hill)
13:00–13:30 Ecology of Cycadales in Southern Mexico (M.A. Perez-Farrera)
13:30–14:00 Phylogenetic and Biogeographical Relationship within *Ceratozamia* (Andrew Vovides)
14:00–14:30 Growth form and habitat preference of the Cycadales (Piet Vorster)

Colour Figure 41 Nong Nooch Tropical Garden: an example of the striking landscaping. The liberal use of huge boulders is a trademark of Kampon Tansacha. Photo: Virginia Hayes.

Colour Figure 42 *Macrozamia moorei* and other Australian cycads at Nong Nooch Tropical Garden. Photo: Christo Page.

14:30–15:00 The Biogeography study of *Cycas* in the area of Honghe River, S.E. Yunnan (H. Suhua)
15:00–15:30 Break (Refreshments served)
15:30–16:00 A study of the comminities of *Cycas multi-pinnata* and their floristic features (R. Yumin)
16:00–17:00 Horticulture Session (Chair: Tim Gregory)
16:00–16:30 Renovation of the Ganna Walska Lotusland Cycad Garden (Virginia Hayes)
16:30–17:00 *Macrozamia moorei* for use in landscaping (Rolf Kyburz)
17:00 Return to Hotel
Dinner on own
Alcazar Cabaret Show
Accommodation: ***Montien Pattaya Hotel***

Day 7 Friday August 2
Breakfast at Hotel
O8:00 Transfer to NNTBG
08:30–10:00 Pollination Biology Session (Chair: Willie Tang)
08:30–09:00 Extinction of cycad pollinators: Do generalists or specialists survive as cycads decline? (John Donaldson)
09:00–09:30 Pollination ecology of *Macrozamia* cycads: Association of cone thermogenesis and volatiles with pollinator specificity (Irene Terry)
09:30–10:00 Evolutionary aspects of cycad pollination by weevils (Rolf Oberprieler)
10:00–10:30 Break (Refreshments served)
10:30–11:00 Report from the 2002 Cycad Classification Concepts Workshop (Tim Gregory)
11:00–12:30 IUCN Cycad Specialists Group meeting. (Open to all participants)
12:30–13:30 Lunch at NNTBG
13:30–14:00 Proposals for the 7th International Conference on Cycad Biology
15:00 Thai Cultural Dance show and Elephant performance.

Below are impressions by some of those who attended. Anything to add? Perhaps the unreal experience of travelling and having lunch on a huge raft on the River Kwae and landing at a storybook hotel on the shores with an indescribably beautiful garden, designed by (of course) Kampon Tansacha; of being welcomed at Nong Nooch by a bevy of the prettiest Thai girls with a couple of little elephants, but above all by the efficient but relaxed atmosfere.

VIRGINIA HAYES: "Although this is only the second time I have attended the International Conference on Cycad Biology (the 5th Conference in Miami being my first), I have participated in numerous other such gatherings of the scientific and horticultural community focusing on other plant groups and botanical topics. This Conference had much to recommend it including excellent facilities, technical, and organized support. While all of the presentations were of good quality, there were several that could have benefited by an extension of the alloted 20 minute time limit. It is an admirable and necessary duty of the organizing body to conceive and construct the structure within which ideas and developments can be equally shared. However, it should have been possible to devise a mixed program that allowed more time for thorough coverage of some of the larger research projects. In all, though, I have to congratulate the presenters and organizers for a well-run and informative meeting."

ROY OSBORNE: "From the time of arriving at Bangkok International Airport, where we were waived through the diplomatic entry gate, my impression was one of superb planning and royal treatment. The lavish banquets, the rich cultural experiences and the meticulous horticultural displays at Nong Nooch Tropical Garden, all added to this impression. Furthermore, the Thai dancing displays, the exotic animals (e.g. trained monkeys harvesting coconuts) and the spectacular closing fireworks show made the event a most memorable one.

Academically, the number of Conference presentations was a little disappointing although some of the papers were top quality."

ROLF OBERPRIELER: "For me as an entomologist, attendances of botanical conferences are essentially culinary experiences, as they connect me to the world of the food my weevils eat. A slanted view perhaps, but no less so than a purely botanical or horticultural one, I would agree. Or, alas, a narrow commercial one.

So I went to Thailand and wonderful Nong Nooch Tropical Garden (Colour Figure 41) primarily to learn more about cycads and what research is being done on them. I was not disappointed, enjoying particularly Dennis Stevenson's and Ken Hill's overview presentations in this regard. I was fascinated also by Peter Lindblad's and Jose Costa's revelation of the hidden world of cyanobacteria, and impressed by the various conservation projects in Africa, China and Australia. It was especially heartening to see so many posters and oral presentations from researchers and students in Thailand and China, a testimony to the relevance and impact of these cycad conferences and boding well for the future of cycad research in Asia.

Cutting-edge science of understanding the world around us tends to happen mostly at the interface between different scientific disciplines, and so the session on pollination biology was the most insightful to me. John Donaldson's talk about differential survival of generalist and specialist pollinators among species of *Encephalartos*, and Irene Terry's on differentiation in thermogenesis and volatiles in *Macrozamia* in correlation to different pollinators, were my "official" highlights of the conference. They showed what research needs to be done most critically to promote the conservation and survival of cycads. Unofficially there were the numerous valuable opportunities to meet old and new friends and chat about cycads, their biology and their evolution. The animated debate about the merits of Willie

Tang's fledgeling "cycad hotel hypothesis" sticks to my mind, en route by bus somewhere in Thailand and in total oblivion of our surroundings.

Talking about busses (buses to some), the absolutely magnificent organization of the conference logistics needs mentioning. Police escort for our busses [to by-pass the notorious traffic jams], smooth receptions in superb hotels, Nancy's never-failing smile, Ohm's patient correction of our pronuciation of the River Kwae (easy for all South Africans past and present: it's not "kwaai" as the Afrikaans word for angry, but the kwê-sound of the Grey Loerie of the African Bushveld), and the wonderful lunch on that same river, are the prominent images in my mind. A big Thankyou for Sea Tours on such a superb effort!

Last but certainly not least there was Nong Nooch (Nong Nut, to be correct) itself. The unassuming but so energetic Kampon Tansacha, the busy Anders Lindstrom, the beautiful girls in their traditional costumes, the obliging elephants, the innumerable cycads and palms, the magnificent setting of the gardens, the unforgettable opening and farewell dinners, our candles on the lake. A truly remarkable experience for an Australian, who once found himself passing on feathered greetings from distant austral relatives to the the emu's and cassowaries in their small enclosures, hoping that they, too, may someday enjoy a larger part of the spacious garden.

A most successful conference, and what an introduction to Nong Nooch and to Thailand!"

CHRISTO AND ALETTA PAGE: "We, as relatively new hobbyist cycad growers, had the wonderful opportunity to attend the 6th International Conference on Cycad Biology from 27th July to 3rd August 2002 held at the Nong Nooch Tropical Gardens in Thailand.

What made the event so memorable?

One can start by mentioning that Thailand is probably one of the few remaining tourist destinations where South Africans do not have to cringe due to the exchange rate. The Thai's are also friendly and helpful toward strangers, which was amply illustrated by the V.I.P. reception we received on arrival at Bangkok airport and throughout our stay.

Official activities started on the Sunday 28 July with a memorable sightseeing tour in and around Bangkok, visiting the week-end market and gem cutting works and the historical Grand Palace via a boat ride through the Bangkok Canals. A welcome drink and a presentation by Mr. Kampon Tansacha, patron of the Conference and owner of Nong Nooch Tropical Gardens, was followed by an excellent meal and a very interesting talk on Colombian cycads by Alvaro Calonje. This was a fitting close to a very long and varied day.

The Monday we left Bangkok under traffic police escort for an overnight pre-conference tour to the Kanchanaburi area near the Myanmar (Burma) border and site of the historically famous (or actually notorious) bridge over the River Kwai. The JEATH museum and WW II cemetery at the site brought the reality of this event of 60 years ago in sharp focus.

After having lunch on riverboats and booking in at our hotel, we visited a population of *Cycas siamensis* (Colour Figure 40) on the slope of a steep limestone hill nearby. The population consists of quite a number of mature plants, a few with lengths in excess of 3 m, and many seedlings. The plants grow scattered over a few hectares in cracks and fissures in the limestone outcrops. This seems to be a rather specialized habitat - full sun, perfect drainage, alkaline substrate and probably with a cool root run.

According to our new "The Cycads" by Loran Whitelock, bought at the conference, *Cycas siamensis* once occurred widespread in Thailand but its numbers is drastically reduced through agriculture and by plant collectors (sounds familiar doesn't it?). This cycad seems to be difficult to cultivate requiring, amongst others, excellent drainage. It is, however, a beautiful, compact cycad. This was, unfortunately, the only visit to cycads in habitat.

The following day en route to Pattaya, we paid a visit to two of Mr. Kampon Tansacha's farms where plants are cultivated for landscaping operations - the scale of which is mind boggling and this was but a taste of what was to come.

The evening's activities started off with a welcoming and orientation drive through the Nong Nooch Gardens and, due to a sudden tropical downpour, a rather brief sun downer. A buffet dinner, fit for royalty was served, followed by a review of the IUCN action plan for Cycad Survival, presented by John Donaldson of Kirstenbosch.

He gave information on the status of cycads as one of the most threatened group of plants and presented a series of actions to promote their conservation. The next day was spent on a tour of the Nong Nooch Tropical garden and its different plant collections, including the cycad collection (Colour Figure 42). It is not possible to bring across the magnitude of this 562 acres facility in this brief account. Suffice to say that facilities include a very large formal garden open to the public, a small zoo also, offering elephant rides, restaurants, daily presentations of traditional Thai folk dancing and music, and elephant performances. There are also excellent conference facilities and limited overnight accommodation for visitors.

In separate sections of the garden there are collections of many different plant groups (cycads, palms, succulents, cacti, etc.), propagation and growing-on facilities for thousands of landscaping plants, large and small. The comprehensive cycad collection is continuously being updated.

Most of the daylight hours of the next three days were spent in the conference centre overlooking a large manmade lake. The formal conference started after lunch on day five with a session on the systematics of a few cycad groups and a

session on conservation. The rest of the conference programme included sessions on cycad related issues regarding physiology, biochemistry, toxicology, biogeography, ecology and horticulture. Formal sessions on the last day were concluded with reports from the *Cycad Classification Concepts Workshop* and the *IUCN Cycad Specialist Group* Meeting and with proposals for the venue of the next (7th) conference - to the delight of most / all, Mexico was chosen as the hosting country.

The talks on the conference were varied and informative and all of high standard. At times some were totally above our heads. The fact that so many cycad species are critically endangered, was a common thread to most talks. South African delegates also made their contribution on various topics: John Donaldson on the cycad survival plan, Steve Trollip on a conservation project in the Limpopo Province, Chris Dalzell on the *Stangeria* conservation project and our President, Dr. Piet Vorster on growth forms and habitat preference of cycads.

A presentation on *Macrozamia moorei* for use in landscaping had many of us in utter dismay. It showed the wholesale uprooting of many huge *M. moorei* specimens from their habitat in Queensland, Australia, their defoliation and removal of roots by chainsaw and loading of them in ship containers for export. Only when the project was put into perspective, were we mollified. This cycad occurs in huge numbers with exclusion of other vegetation in certain areas in Queensland. They pose a threat to livestock due to toxin in their leaves and many thousands have been destroyed. This particular project has the objective of the commercial harvesting of plants and in that way thinning them out for re-establishment of grass and other vegetaion in between the remaining cycads. The owner of the property, in fact, received a presentation for the excellent conservation project.

It was good to see many of these very plants (Colour Figure 42) much recovered and apparently well established and landscaped in Nong Nooch Tropical Garden, as well as in large plant containers in the nursery.

The conference not only afforded us the opportunity to meet many of the cycad gurus of the world, but also to learn much about this group of plants. Furthermore it provided us with an opportunity to get to know Thailand and its friendly people a little bit better. We are looking forward to the next conference in Mexico!

A Thai cultural Dance show and elephant performance on the last afternoon and a wonderful closing ceremony, fireworks display and farewell banquet in the evening, was a fitting end to a very enjoyable conference."

Our final memory is not something which can be conveyed by words. It concerns the ceremony of letting your personal candle float away on a lake, and of illuminated hot air balloons vanishing into the velvet tropical night, as you say good-bye to your hosts and friends.

Kampon, thank you for inviting us to this conference. You are lucky indeed to have staff of the calibre of Anders Lindstrom and his helpers, not to mention all those behind the scenes who only appeared at one's elbow when they sensed a need.

MEMBER SUSPENDED

In recent times much has been said and written about people caught by the U.S. Department of Fish & Wildlife, for illegally importing cycads into the U.S.A. Some of these people are members of our Society, and these allegations reflected badly on our Society.

Mr. Peter Heibloem, member of our Society, has now been found guilty on some of the charges, while admitting his involvement in others. The Council of the Cycad Society of South Africa has decided to terminate his membership of this Society.

There have been charges against other members of our Society, and Mr. Heibloem implicated some of them in his testimony. As these people have not been brought to trial, they remain innocent until proven guilty, and we are not taking any steps against them.

Once again we urge our members not to transgress national and international laws, even if these appear unfair or senseless to you.

PIET VORSTER
PRESIDENT: THE CYCAD SOCIETY OF SOUTH AFRICA.

2002_06_13-heibloem

U.S. Department of Justice

United States Attorney
Northern District of California

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FOR IMMEDIATE RELEASE

June 13, 2002

The United States Attorney's Office for the Northern District of California announced that Peter Heibloem and Ernest Bouwer were sentenced yesterday for conspiracy to smuggle cycads, an exotic Australian plant, into the United States. The sentence was handed down by U.S. District Court Judge Charles R. Breyer following a guilty plea to one count of conspiracy in violation of 18 U.S.C. § 371.

Mr. Heibloem, age 48, of Eudlo, Queensland, Australia, and Mr. Bouwer, age 57, of Woodmead, Sandton, South Africa, were indicted by a federal grand jury on July 26, 2001. They were charged with conspiracy, smuggling, and making false statements regarding the importation of protected cycads to the United States from South Africa and Australia in violation of the Convention on International Trade in Endangered Species ("CITES").

Cycads, which resemble palms or tree ferns, are a small group of primitive-looking plants whose ancestors date back more than 200 million years. Certain cycad species face threats in the wild from habitat loss and over-collection. Cycads are protected under CITES – a treaty through which the United States and more than 150 other countries regulate global commerce in imperiled animals and plants. charged in the indictment are threatened with extinction and may be traded only in exceptional circumstances, and then only with required permits.

According to his plea agreement, Mr. Heibloem admitted that beginning in August 1999, and continuing to July 2001, he conspired with Mr. Bouwer, Ian Turner, Rolf Kyburz, and others to ship protected cycads to the United States from South Africa and Australia to buyers in California, including Donald Wiener. Mr. Bouwer also admitted that he conspired with Mr. Heibloem and others to ship cycads from South Africa to buyers in the United States, including Mr. Wiener. (Mr. Wiener previously pled guilty and was sentenced on March 15, 2002, to knowingly trading in protected cycads in violation of CITES, in violation of 16 U.S.C. § 1538(c)(1), a Class A misdemeanor.)

In their plea agreements, both Mr. Heibloem and Mr. Bouwer admitted that they obtained CITES permits for certain cycads, but that they shipped different cycads that were not authorized for export by the CITES permits. They admitted that they falsely labeled the cycads in the shipments and on the accompanying shipping documents (such as invoices) to cover up the fact that the cycads were not authorized for export by the CITES permits that accompanied the cycads. They admitted that they did this in order to ship cycads into the United States that they knew were not authorized for export by the CITES permits.

Judge Breyer sentenced Mr. Heibloem to time served, three years' supervised release, and a $25,000 fine. Judge Breyer sentenced Mr. Bouwer to two years' probation and a $5,000 fine.

The prosecution was the result of an investigation by agents of the United States Fish & Wildlife Service. Laurel Beeler is the Assistant U.S. Attorney who prosecuted the case with the assistance of Joseph Keefe.

A copy of this press release and related court documents may be found on the U.S. Attorney's Office's website at .

All press inquiries to the U.S. Attorney's Office should be directed to Assistant U.S. Attorney Matthew J. Jacobs at (415)436-7181.

The Courier-Mail

QUEENSLAND NEWS

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Gardening guru fined for plant smuggling

Darrell Giles in Los Angeles
15jun02

HIGH-profile Queensland gardening identity Peter Heibloem has been fined $US25,000 ($A43,700) – but escaped jail time – for his involvement in a million-dollar rare flower and plant smuggling ring.

PLEA bargain ... gardening identity Peter Heibloem yesterday. Fined for involvement in rare flower and plant smuggling ring.

The Sunshine Coast businessman, who after months of denials changed his plea to guilty on one federal charge of conspiracy to smuggle merchandise into the US, also got three years' probation.

Heibloem, 48, faced up to five years in jail and a $US250,000 ($A437,800) fine when he appeared in the US District Court in San Francisco yesterday.

But, in a plea bargain with US Attorney David Shapiro, Heibloem, who runs the world-famous Eudlo Cycad Gardens near Nambour, on the Sunshine Coast, was let off relatively lightly.

"This dollar value does not reflect the entire harm from Heibloem's activities," Joseph Keefe, from the US Attorney's Office, said in his sentencing report.

"Heibloem, a self-proclaimed cycad expert, ignored those protections and imported hundreds of plants to the United States," he said.

Heibloem flew into Northern California for sentencing and returned home almost immediately, without comment. His Los Angeles-based attorney, Donald Randolph, also declined to talk about the case.

Heibloem was one of 10 men arrested by US Customs and Federal Bureau of Investigation agents last July after a combined Australia-US investigation into the million-dollar rare plant racket.

In a court appearance in Los Angeles soon after his arrest last July, Heibloem strenuously denied all allegations against him.

"I am innocent . . . all will be revealed in the fullness of time," Heibloem said.

But, in a five-page plea agreement, dated February 20, Heibloem admitted his involvement in exchange for 11 other charges against him being dropped.

Investigators alleged that Heibloem was a key member of the ring responsible for removing orchids on the brink of extinction from Australia's national parks and Africa.

As well as a gardening expert, who has written a book titled *The Cycads of Central Africa*, Heibloem is a motivational speaker who offers seminars to businessmen around the world.

He and other members of the ring were caught when federal agents hatched an elaborate trap at the Cycad '99 conference in Miami, Florida.

Posing as buyers, agents recorded dozens of conversations and e-mails detailing smuggling operations, which involved Heibloem.

In his plea agreement, Heibloem confirmed the smuggling took place over a two-year period and involved his Queensland gardening colleague Rolf Kyburz, who, according to US investigators, remains a fugitive.

"I conspired with Ernest Bouwer, Ian Turner and Rolf Kyburz, and others, to ship cycads (a primitive plant) from South Africa and Australia to the northern district of California for delivery to buyers, including Donald Weiner," Heibloem said.

Weiner, 64, has had several brushes with the law in his bid to build an adults-only entertainment empire in San Diego. Investigators believe Weiner bought $US200,000 worth of cycads from Heibloem.

The plea agreement stated that the plants were worth between $US2000 and $US10,000 each.

Heibloem agreed to hand back the plants and seeds smuggled out of Australia and forfeit all money he made from the illegal venture.

Judge Charles Breyer yesterday sentenced Heibloem's co-accused, 57-year-old Bouwer, of South Africa, to two years' probation and a $US5000 fine.

EAST LONDON DAILY DESPATCH, 29 May 2002

CONFISCATED FORTUNE: From left, kneeling, inspector Eldred Boswell and behind, chief nature conservator Mike Fryer, nature conservator Rob Stegmann, inspector Luphumlo Lwana, police media spokesperson inspector Stephen Marais, Organised Crime head Superintendent Pat Oates and inspector Joseph Hoorn with some of the 104 confiscated cycads at the Berlin police station yesterday. Picture by Denver Donlan

Cycads worth R800 000 seized at butcher Krause's business

Report and picture by Denver Donlan

EAST LONDON — Berlin businessman, Colin Krause, 44, was arrested at the weekend after 104 cycads worth about R800 000 were found planted on his business premises.

There were no permits for the cycads, which are listed as an endangered species.

Krause, who owns the Berlin Butchery was arrested at his business by the local organised crime unit and members of the special investigations unit of Eastern Cape Nature Conservation last Friday.

He was charged with the illegal possession of cycads and after giving a statement at the Berlin police station, released on bail of R1 000.

Krause appeared in the King William's Town Magistrate's Court on Monday.

No evidence was led and the case was postponed to June 20 for further investigation.

Inspector Stephen Marais said if found guilty, Krause faces a maximum fine of R100 000, or 10 years' jail, or both.

Krause's arrest follows a four-month investigation by the special investigations unit of Nature Conservation following a tip-off.

Chief nature conservator Mike Fryer said once the investigation had been completed the organised crime unit was approached for assistance.

A raid was conducted at Krause's business premises and 104 Encephalartos-Altensteinii cycads, common to this area, were found loosely planted at the back of the building.

"This indicates that they were probably only planted there recently, and in most cases of this nature it is assumed that the purpose is to sell the plants for commercial gain," Fryer said.

"Krause claimed that the plants were from a farm he owns and this will be investigated.

"He also admitted to not having a permit."

Nature Conservation had built up an excellent relationship with police with regards to organised crime against the environment.

"And the co-operation from police has resulted in a number of recent successes," Fryer said.

The cycads will be replanted at the Mtiza Nature Reserve.

A "Royal Cycad"?

Queen Elizabeth II, British monarch and titular head of the Commonwealth of Australia, was presented a bouquet of local orchids with *Bowenia* foliage during her recent visit to Queensland.

Photo: The *Courier Mail*, 2 March 2002.

[Sent in by Roy Osborne.]

Beeld, Dinsdag 21 Mei 2002

Broodbome in tronk; en Grootboom?

Thinus Ferreira

Somerset-Wes. – Die diefstal van broodbome en ander plante en toerusting by kwekerye in die Boland het van die eienaars gedwing om drastiese stappe te doen om hul plante te beskerm.

Die 48 oorblywende broodbome van mev. Astrid Scheidereiter van die Astrid Plant-kwekery in Firgrove word deesdae in "Cell C" by die Macassar-polisiekantoor toegesluit – en sy het boonop Saterdag self 'n man in hegtenis geneem nadat meer as 70 broodbome die afgelope twee weke by haar kwekery gesteel is.

Mnr. Johannes Grootboom het gister in die landdroshof verskyn op aanklag van diefstal.

Scheidereiter, wat ook Vrydag 'n klag teen 'n skrootwerf ingedien het waar sy van haar gesteelde plante gevind het, gaan nou daagliks na "Cell C" om haar broodbome nat te spuit.

"Van potte tot saailinge, grond en houtbruggies verdwyn oornag uit die kwekery. Dié goed kan nie net deur iemand weggedra word nie en dit laat my vermoed dat sindikate hier bedrywig is," sê sy.

Mnr. Pieter Breugemvan die Weltevrede-kwekery het gesê ook dié kwekery het al onder 'n georganiseerde sindikaat deurgeloop.

"Twee jaar gelede het ons 'n sindikaat onder die kwekery se werkers blootgelê nadat meer as R250 000 se plante gesteel is."

Summary: CYCADS IN GAOL. Somerset West (Western Cape). – Because of poaching of cycads and other plants the remaining 48 cycads of Mrs. Astrid Scheidereiter, of the Astrid Nursery in Firgrove, are nowadays locked up in "Cell C" at the Macassar Police Station where she visits them every day. Furthermore she herself arrested a man on Saturday after more than 70 cycads were stolen from her nursery during the past two weeks. Mr. Johannes Grootboom appeared in Court on a charge of theft.

THE CYCAD ENTHUSIAST AND CONSERVATION AUTHORITIES continued

In the previous issue, pages 26 to 32, we reproduced lengthy correspondence between member Maurice Levin and the Department of Agriculture, Conservation, Environment and Land Affairs (responsible for issuing CITES permits) as well as the Gauteng Directorate of Nature Conservation. It seemed to sum up what so many members experienced when trying to export a few seeds or garden-grown plants to other countries.

Below follows the official reply of the Gauteng Directorate of Nature Conservation. It is clear that a whole new set of rules apply; and whether they are fair or not, we have to abide to them. Please make sure of all the rules before you attempt sending a few seeds or suckers to a friend abroad.

Much of what we are experiencing now, is a result of recent large scale illegal export of cycads. The authorities simply had no choice but to clamp down. We also know that, apart from exporting, too many of our members hold the laws in utter contempt. The time has long since passed for removing a single cycad from nature, and we simply must accept that some species are just too valuable to be in private hands. It is really shocking how much trading, locally and internationally, still goes on in field-collected plants of such profoundly rare species as *Encephalartos inopinus, E. heenanii*, and even *E. hirsutus*, and how often poached consignments of these are confiscated. It is particularly sad that there are members claiming to have, or striving to get, *E. brevifoliolatus*, which is known from only five clumps.

This matter is now considered closed, and we will not publish further correspondence between the above parties.

AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS

Directorate of Nature Conservation

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Facsimile transmission

To	Piet Vorster Botany Department University of Stellenbosch	5 pages (including this cover sheet)
Fax N°	(021) 808-3607	
From	Michèle Ptab	
Date	23 August 2002	
Subject	Publication in *Encephalartos* No 70	

The article and letter written by Mr Maurice Levin published in *Encephalartos* No 70 has been discussed with the Deputy Director of Resource Protection and the Director of Nature Conservation. In response it was decided to supply you with the attached information:

1. A letter written by the Head of Department to Mr Maurice Levin in response to his letter, dated 14 April 2002 and addressed to Ms Yawitch of this Department and subsequently published in *Encephalartos* No 70.

2. A copy of the relevant pages of the current national policy with regard to the regulation of the cycad trade. Please note that this policy has been approved by the Acting Director-General of the National Department of Environmental Affairs and Tourism.

Please use this information as required for any future publications in *Encephalartos*.

MPPG.

SENIOR NATURE CONSERVATION SCIENTIST: SCIENTIFIC SERVICES

AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS

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A&A Cycads
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For attention: Mr. Maurice Levin

Dear Mr. Levin

APPLICATION FOR CITES PERMITS

Thank you very much for your e-mail of 14 April 2002.

Please be informed that the letter which was sent to you dated 4 April 2002 is regarded as an official Departmental letter and the question of who actually drafted the letter is not relevant. The contents of the letter are in fact endorsed by this Department. The official you mention specifically throughout denies that he leveled accusations against yourself.

I am indeed satisfied to see that you and other traders of cycads are fully in support of the Department in its efforts to clean up the smuggling in cycads.

It is indeed the case that a meeting was held between the provinces and the National Department during November 2001 and that the proposals of this meeting have been forwarded to Working Group 1 for further approval. I can now report that a follow up meeting has been held by the National Department and the provinces on the issue of export of cycads and that the National Department should be issuing a letter relating to national policy to the provinces on this issue within the next few weeks. We are indeed now waiting for this communication from the National Department of Environmental Affairs and Tourism.

We are confident that the matter is close to resolution and we should be able to finalise this by end May. Finally, I should reiterate that any action that Gauteng is taking has been and will continue to be done in liaison with national government and the other provinces and will be fully reported on to the CITES Secretariat.

The moment we receive the communication from the National Department the new policy on the export of artificially propagated cycads will be made known to all applicants, so that applications can be made in line with the new nationally agreed policy.

Any inconvenience in the above regard is regretted.

Yours sincerely

Dr PE Hanekom
HEAD OF DEPARTMENT: AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS
Date:

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GAUTENG PROVINCIALE REGERING

Fax: (011) 333 0867

Dear Dr Hanekom

RECOMMENDATIONS FROM PERMIT AND ENFORCEMENT WORKSHOP ACCEPTED BY WORKING GROUP ON 25 APRIL 2002

I refer to a decision of Working Group 1 to accept recommendations made by the Interprovincial Permit and Enforcement Work Group.

On a request from permit officers for a workshop between permit and enforcement officers from the different provinces to discuss common problems. Working Group 1 approved that such a workshop take place. The workshop took place on 28 and 29 November 2001, and the resultant recommendations were submitted to Working Group 1 for approval. They approved, amongst others, that this work group should meet at least twice a year.

The attached recommendations were approved at the meeting of Working Group 1 on 25 April 2002 and should be implemented by all provincial conservation permit offices.

CYCADS

1. No export of wild plants will be allowed for commercial purposes.
2. All nurseries / individuals artificially propagating cycads for commercial purposes must register with the **relevant province**. Registration will be done according to Resolution Conf. 9.19 – Guidelines for the registration of nurseries exporting artificially propagated specimens of Appendix I species.
3. No export of artificially propagated plants larger than 15 cm in diameter will be allowed for commercial purposes before 31 August 2002. For permits issued for plants bigger than 15cm before 1 May 2002, the export can go ahead. Norms and standards for the export of cycads will be included in the draft strategy on cycads for discussion at the next meeting of Working Group 1 in August 2002.
4. For the following species: *Encephalartos caffer, Encephalartos humilis, Encephalartos cupidus, Encephalartos cerinus, Encephalartos umbeluziensis* and *Encephalartos ngoyanus* no export of artificially propagated plants larger than 7cm in diameter will be allowed before 31 August 2002.
5. Adult plants exported must be micro chipped.
6. Export of seeds from valid sources, which can be verified by provincial nature conservation authority, can be allowed. Consignments (seeds and plants) must be inspected and sealed in the presence of a nature conservation officer / enforcement officer.
7. A Certificate containing the seal numbers must accompany the consignment and CITES permit.
8. If seals have to be broken, a nature conservation officer / enforcement officer must fill in the new seal numbers on the certificate.
9. The national department (DEAT) will acquire seals and distribute it to the provinces – applicants can then purchase seals from provinces.
10. The national department (DEAT) will keep records of the seal numbers and changed seal numbers. If the seals have been tampered with, the consignment will be confiscated and the relevant province will be contacted to collect the consignment.
11. DEAT will draft a guideline document / inspection report that will assist the officer doing the inspection. This guideline document / inspection report will contain specific criteria that have to be met for the inspection to be approved. (Gauteng's existing Inspection report will be used to develop an inspection report for the whole country).
12. The officer performing the inspection and the owner of the plants must sign the inspection report.

PORTS OF ENTRY AND EXIT

The following ports of entry and exit will be the only ports for import/export of wildlife (Airport, Harbour & International borders)

KwaZulu Natal
- Durban Harbour
- Durban International Airport
- Golela border post
- Farazel border post
- Sani Pass border post

North West
- Johannesburg International Airport (JIA)
- Ramathlabara border post

Free State
- JIA
- Maseru Bridge border post

Mpumalanga
- Nelspruit Airport
- Lebombo border post

I trust that the above recommendations will further facilitate the uniform implementation of wildlife issues in South Africa.

Yours sincerely

Patrick Matlou
DIRECTOR-GENERAL (Acting)
DATE: 16 May 2002