ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTH AFRICA

TYDSKRIF VAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA

NO. 39 SEPTEMBER 1994 ISSN 1012-9987

CYCAD SOCIETY OF SOUTH AFRICA

BROODBOOM VERENIGING VAN SUID-AFRIKA

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COVER / VOORBLAD : *Dioon edule* female cone, approximately life-size.

When receptive, the cone scales separate at the bottom of the cone, making it extremely difficult to pollinate artificially. Indications are that in nature these orifices admit specialized pollen-laden beetles, which crawl upwards into the cone and affect pollination.

Photo: Piet Vorster

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FROM THE PRESIDENT

In the September 1992 issue of "*Encephalartos*" an increase in membership fees had been announced. Due to escalating printing and mailing costs, it was no longer possibie to cope with the present income. The Board unanimously decided to increase membership fees as from the beginning of *1995*. Full details about the new fees will be found on the coloured renewal form enclosed at the back of this issue. Please note that membership fees for 1995 are due before the end of December 1994.

On page 25 of this issue a letter from Mr. A.N. Pelzer appears. Before commenting on this I would like to thank Mr. Pelzer for the letter and express my hope that it would inspire other members to write to us about similar actual matters.

- Regarding membership numbers, I believe that the main problem is not a lack of efforts recruiting new members, since 80 new members joined the Society during the first six months of 1994. The problem lies in those members who do not renew their membership. Branches may be able to help to address *this problem*. The Natal branch already suggested that it might be easier for members in certain areas to pay *their fees* at a central collecting point instead of each paying separately to the secretary. The Board has already accepted a resolution that a printed pamphlet, containing a summary of the main activities of the Society, will be supplied to the branches.

- The question whether the leading article should be published in both Afrikaans and English was taken to the Board without reaching an agreement. The matter will be referred back to the Board.

- With one ballot paper still outstanding, the Board unanimously voted against Mr. Pelzer's proposal that leading articles should from time to time be compiled in separate volumes.

You might have noticed that our editor, Dr. Isabella Claassen, is doing all she can to give a professional appearance to "*Encephalartos*". Up to now she has used her personal computer for setting the text. The Board unanimously decided to buy computer equipment for the use of the editor and we hope that by taking this step, her difficult task will be eased to some extend.

Up to now only one application for research funding has been received. Persons who at this very late stage may still would like to apply for funding must please let me know as soon as possible.

Hannes Robbertse

VAN DIE PRESIDENT

In die September 1992-uitgawe van "*Encephalartos*" is aangekondig dat die ledegeld verhoog gaan word. As gevolg van stygende druk- en versendingskoste van "*Encephalartos*" het die Raad eenparig besluit dat ons weer eens die lidmaatskapgeld sal moet verhoog. Volledige besonderhede oor die ledegeld wat vir 1995 betaalbaar sal wees, verskyn in die gekleurde hernuwingsvorm wat agter in hierdie uitgawe van die tydskrif ingesluit is. Ek wil graag die aandag daarop vestig dat ledegeld voor die einde van Desember 1994 betaal moet word om te verseker dat u wel die Maart 1995-uitgawe van die tydskrif sal ontvang.

Op bladsy 25 van hierdie uitgawe verskyn 'n brief wat van mnr A.N. Pelzer ontvang is. Voordat ek kommentaar op die brief lewer, wil ek vir mnr Pelzer hartlik bedank vir die brief en die hoop uitspreek dat dit ander lede sal aanmoedig om oor soortgelyke aktuele sake aan die bestuur te skryf.

- Wat die daling in die ledetal betref, glo ek dat die grootste probleem nie by die werwing van nuwe lede lê nie, daar het gedurende die eerste helfte van 1994 reeds 80 nuwe lede aangesluit. Die probleem lê by die lede wat nie hul lidmaatskap hernieu nie. Die takke kan dalk help om hierdie probleem aan te spreek. 'n Voorstel het reeds van die Natalse tak gekom dat lede van 'n bepaalde streek moontlik hul ledegeld op een sentrale punt kan betaal. Die Raad het ook reeds 'n voorstel aanvaar dat 'n gedrukte pamflet waarin die aktiwiteite van die Vereniging saamgevat is, aan die die takke voorsien sal word.

- Die vraag of die hoofartikel in beide Engels en Afrikaans gedruk moet word, is aan die Raad voorgelê, maar daar kon nie eenstemmigheid bereik word nie. Die saak sal weer na die Raad terugverwys word.

- Met een stembrief nog uitstaande, het die Raad eenparig teen mnr Pelzer se voorstel gestem dat die hoofartikels van tyd tot tyd in 'n bundel saamgevat word.

U het seker reeds opgemerk dat ons redaktrise, dr Isabella Claassen, baie moeite doen om aan die tydskrif 'n professionele voorkoms te gee. Tot nou toe het sy van haar persoonlike rekenaar gebruik gemaak om die tydskrif te set. Die Raad het eenparig besluit om vir die Vereniging rekenaartoerusting aan te koop vir die gebruik van die redakteur en ons hoop dat ons met hierdie stap die taak van die redakteur in 'n mate sal vergemaklik.

Daar is tot dusver slegs een aansoek vir die ondersteuning van navorsing ontvang. Persone wat op hierdie laat stadium dalk nog oorweeg om vir befondsing aansoek te doen, moet asseblief so gou as moontlik van hulle laat hoor.

Hannes Robbertse

FOCUS ON ... FOKUS OP ...

In each edition of ENCEPHALARTOS, we focus on one southern African species, in the form of an in-depth article in layman's language. In this edition the spotlight falls on:

In elke uitgawe van ENCEPHALARTOS fokus ons op een suider-Afrikaanse broodboomsoort, in die vorm van 'n in-diepte-artikel in leketaal. In hierdie uitgawe val die kollig op:

ENCEPHALARTOS KISAMBO Faden & Beentje

Johan Hurter
P.O. Box 1024, 1200 Nelspruit

INTRODUCTION

The Taita and Maungu Hills form part of the most northern foothills of what is known as the great East African Arch ranges, with their incredibly rich floral composition (Slabbert & Hurter 1994). These ranges are floristically one of Kenya's richest areas of floral heritage and the location of one of Africa's most majestic cycads.

This beautiful cycad has been known to plant collectors and a few botanists since the late 1960's. It is reputed to have been discovered by Robert Archer and for many years it was known as the Voi or Archer's cycad. The first published account on *Encephalartos kisambo* appears to be that of Heenan (1977), in which he describes the species as his *Encephalartos* sp. "B" ("Voi"). Since then this species has been known under several unpublished names. The species is noted as *E. archeri* by Lavranos and Goode (1985) in their publication on *E. turneri*. The publication of the name *Encephalartos voiensis* (Moretti *et al.* 1989) was anticipated by that of Faden and Beentje (1989). Thus the name *E. kisambo* is the only legal published name of this species.

The specific epithet (Kisambo) is the local name in the Taita language for cycad and is also applied as Kisapo for *E. hildebrandtii* in the Giriyama language of the Malindi area in Kenya.

DESCRIPTION

This species can be considered to be the most impressive cycad yet to be described from east Africa.

1. STEM

Well-developed, suckering or branching from the base. Mature trunks are up to 4 metres long, erect or leaning and up to 600 mm in diameter. Leaf-base scars are rhomboidal in shape, 100-150 mm wide and up to 80 mm high.

Figure 1 The leaflets of *E. kisambo* are lanceolate-oblong and falcate in shape.

2. LEAVES

The leaves are strongly coriaceous, straight and rigid, but often slightly arched, up to 4 metres long and 980 mm wide. Leaflets (Figure 1) are lanceolate-oblong, falcate, 240-425 mm long, 20-40 mm wide, coriaceous, with the apex pungent, margins slightly revolute, anterior (upper) margin with 3-10 spines (Figure 2), posterior (lower) margin usually unarmed or with 1-3 spines. The lower leaflets decrease in size from spinous-palmate, to bifurcate to simple spines at the base of the rachis (Figure 3). The petiole has a large swollen base (Figure

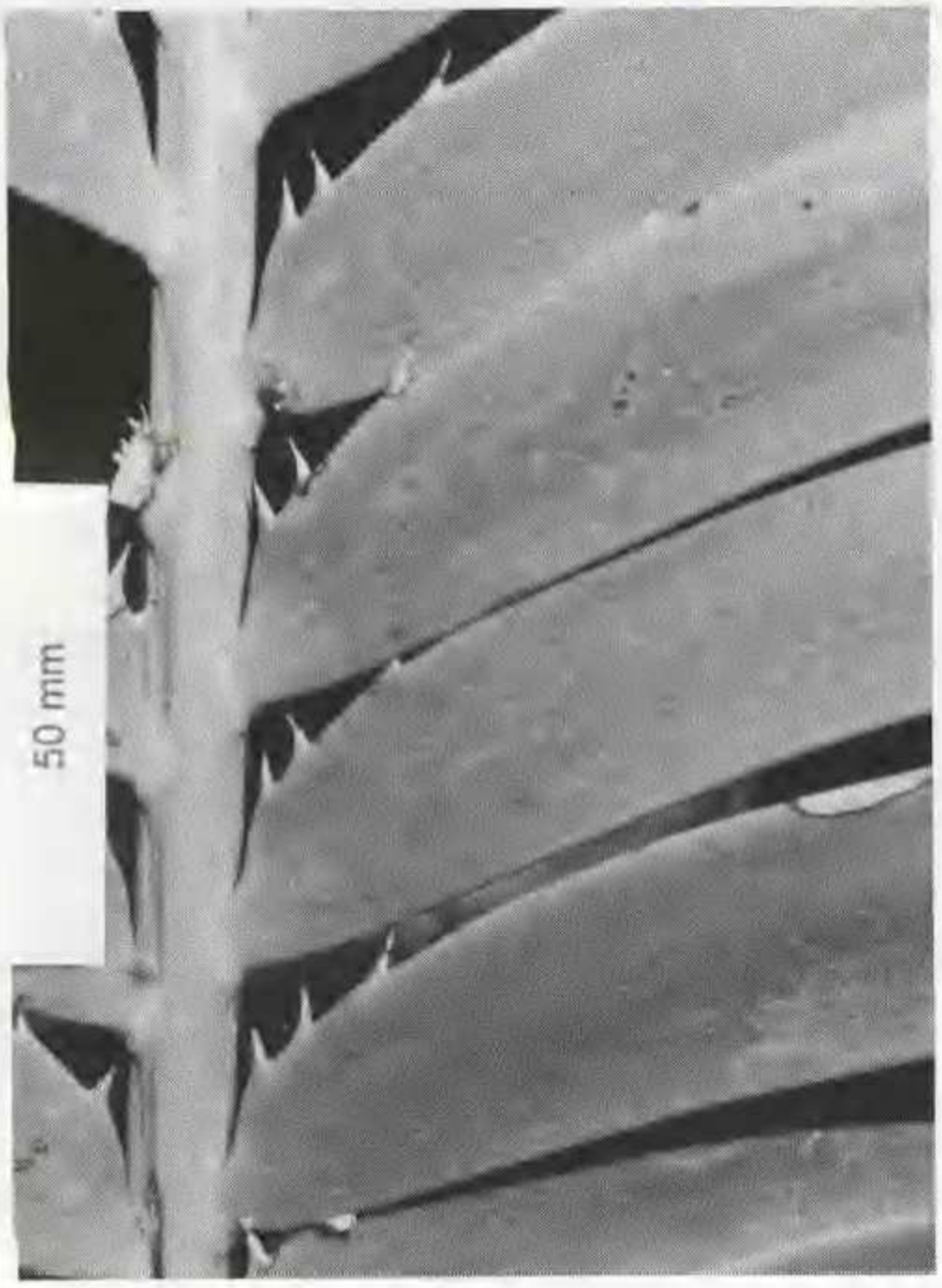

Figure 2 The leaflets of *E. kisambo* usually have 3-10 spines on the upper margin.

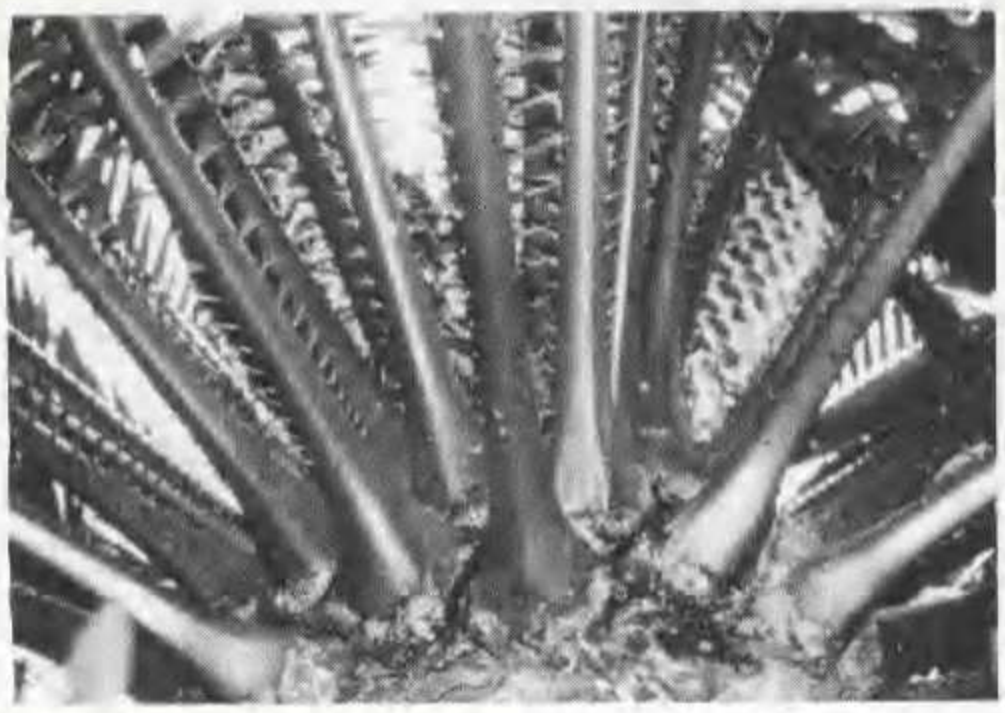

Figure 3 The trunk apex of *E. kisambo*, showing the large swollen leaf-base and leaflets decreasing in size towards the base.

3) which is sometimes pubescent with matted brown hairs. New leaves are a light soap green and covered with whitish hairs, becoming a glaucous dark green at maturity. Mature leaves are often covered densely by epiphytic lichens and moss, making photosynthesis improbable. Old leaves hang as a "skirt" at the base of the following leaf whorl.

Figure 4 The male cones of *E. kisambo* are borne in groups and are often in different stages of development. Photo: Ian Turner.

Figure 5 The relative shape and size of an *E. kisambo* male cone.

3. CONES

Male cones (Figures 4, 5) are borne in groups of 3-10 and are cylindrical, 490-900 mm long and 150-300 mm in diameter, creamy yellow to orange yellow at maturity with a peduncle 150-320 mm long and is frequently covered by dense tomentum at the base.

Figure 6 The female cones of *E. kisambo* are borne in groups of 3-5.

Female cones (Figure 6) are borne in groups of 3-5 and are cylindrical, 420-550 mm long and 200-350 mm in diameter, pale yellow or orange at maturity with a peduncle 50-150 mm long, often with pubescens as in the male cone.

Pollination takes place from December onwards and seed is shed from June to August. Seed-coats are a light vermilion colour.

AFFINITIES

The affinities of *E. kisambo* appear to lie between *E. hildebrandtii* and *E. tegulaneus*. It differs remarkably from both species though and may be closer related to other Arch range species, such as *E. sclavoi*. Specimens, such as that of Pòcs' from Kanga Mountain in Tanzania and other specimens from the Morogoro area must be investigated to shed further light as to its affinities. Specimens from Kanga Mountain appear to be very similar to *E. kisambo*, but the leaflets do not overlap and are not falcate (Faden & Beentje 1989).

DISTRIBUTION

This species is known with certainty from a very small area in the Taita-Tavetta district of Kenya.

Figure 7 *E. kisambo* in its forest habitat on Mt. Kasigau, Kenya.

Figure 8 *E. kisambo* in the relatively dry *Euphorbia* bush on the western side of Mliyoni Hill, Kenya.

ECOLOGY

E. kisambo occurs as infrequent populations or individuals on steep, moist, well-wooded slopes of inselbergs and hills, surrounded by dry savanna (Figures 7-12). Although most plants occur in a moist forest situation, some plants are found hugging cliffs and drier rocky promontories in the open. Rainfall is high, with

frequent morning and late afternoon mist.

Figure 9 *E. kisambo* in its forest habitat, showing the stiff and straight leaves of this species.

Figure 10 A gigantic *E. kisambo* with leaves towering out above the forest canopy.

Fires are infrequent, although a recent fire caused by military manoeuvres, caused a lot of damage to plants in the Mt. Kasigau area.

Figure 11 *E. kisambo* specimens growing in an area cleared of forest have markedly shorter leaves.

Figure 12 An *E. kisambo* seedling in its forest habitat.

No insect or animal damage has been observed. Pollination appears to take place through an insect vector and seed is distributed mainly by monkeys. Seeds germinate in profusion and plants of all age classes are common on the moister east facing slopes, while no observable recruitment occurs in degraded forest.

CONSERVATION

Judging from the many *E. kisambo* plants in private collections across the world, wild plants must have been collected in large numbers in the past. The collecting or disturbing of these plants are now prohibited by law in Kenya. The hills on which the plants occur are also important water catchment areas and access is restricted by the local authorities.

Nevertheless, the hills on which this cycad occurs are systematically being denuded of natural vegetation by the local population, trees being cut for the lucrative charcoal trade. Some of the hills listed by Heenan (1977) as localities are now completely denuded of their once lush vegetation and subsequently no cycads occur there any more. Within a six month period half the forest on Mliyoni Hill has disappeared. The greatest thread to the species must be considered as being human encroachment.

The long lasting foliage and to a lesser extent the whole plants, are also infrequently used by villagers in the area as decoration. In the past plants were also utilized as a starch rich food and one old inhabitant of the area remarked that the plants were once much more common, but that during a great famine most were removed and used as food.

From recent thorough field work conducted in the area a conservation status of **rare** should be assigned to this species. Rare status is assigned to species which are not presently endangered or vulnerable, but which are potentially at risk. These taxa are usually only seldom recorded but may be more common than supposed, although there is evidence that their numbers are low. There is considerable evidence to suggest that this species may occur elsewhere, in hills east and west of the Taita Hills.

CULTIVATION

E. kisambo is not uncommon in cultivation, public and private. There are several plants in the collection of the Lowveld National Botanical Garden and it is hoped that an *ex situ* conservation project can be started soon.

Plants require ample moisture and feeding in cultivation. It is also important to remember the great leaf span of the species when planting. Although plants tolerate *full* sun, afternoon shade is preferred. This species is not frost-hardy and plants prefer tropical to subtropical areas. Seedlings are extremely fast growing with second year leaves attaining nearly 1 m in length under optimum conditions. Plants resent frequent transplanting, often only pushing leaves in the third year after transplanting.

ACKNOWLEDGEMENT

The author wishes to thank Nat Grobbelaar for critically reading the first draft of this text.

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[Unless otherwise stated, all photographs were taken by the author.]

MOGOTE - THE STORY OF *ZAMIA CREMNOPHILA*

Guy Wrinkle
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Received 8 April 1994

One of the most interesting and elusive of the Mexican Zamias is *Zamia cremnophila*. This species was described in 1988 by Schutzman, Vovides and Dehgan. The type collection was made after first examining an unusual and undescribed *Zamia* in the collection of the *Mexican research* institute, INEREB. The specific epithet "*cremnophila*" was chosen because of the unusual, cliff (cremnos) loving habit of this species.

During the month of January, 1994 I set off to see and photograph this species in habitat. I was already familiar with this species as I have specimens in my research and propagation collection but as yet had not seen it in habitat. This species has a rather limited distribution in the Mexican state of Tabasco and to my knowledge is the only *Zamia* species found there other than the ubiquitous *Zamia loddigesii*. It is interesting to note, that the distribution map for the genus *Zamia* found in the book "Cycads of the world" by David Jones places this species in Guatemala and southern Chiapas which is a long distance from where it actually grows.

This species is found in the "selva alta perennifolia" of *Rzedowski* which is the evergreen tropical rain forest. Even in January which is part of the "dryer" season this area is very wet. When I was there it rained very heavily and the habitat was not only very wet but there was a great deal of algal growth on the rocks.

Zamia cremnophila is only found on what the Mexicans call mogotes. They are limestone outcrops or calcareous hills. These mogotes, which are rather common throughout southern Mexico, sometimes form biologically isolated islands. This phenomenon is also found in other areas such as Borneo and Madagascar. This is even more apparent in Tabasco, which in general has a rather flat topography. These particular mogotes have very sheer cliffs, which in combination with the fact that the limestone is very rough and wet makes it very dangerous to climb. The cliff faces are pocked with many fist-sized holes making them look like giant pieces of Swiss cheese. I say climb because I think that it is a general truth throughout the world, that any thing worth seeing is usually not found at the bottom of the hill. Figure 1 is presented to illustrate the concept of a mogote. This particular mogote is not the one that *Zamia cremnophila* grows on but does a very good job of illustrating the concept. This figure is somewhat misleading, however, in that the mogote is much higher than it appears.

Figure 1 A typical mogote.

The drive through Tabasco from the north is a rather boring trip as the topography of Tabasco, as stated above, is rather flat and uninteresting. It is also a very hot and humid area with lots of banana and pineapple fields. The roadside stands which sell fresh pressed pineapple juice are a welcome sight. The hotel I stayed in was typical of the type of hotel you find in rural Mexico. Characteristics such as no hot water, lots of noise at night and bothersome insects are part of the game. This is in stark contrast to the city of Villa Hermosa which is the capital of Tabasco. This is a very clean and beautiful city, that even has a McDonalds restaurant!

Seeing *Zamia cremnophila* and the mogote that it grows on was more than worth the trouble. As stated above, this is a very tropical area and even though it was the middle of winter there were many interesting things to see. These included a lesser ant-eater, a beautiful large metallic blue morpho butterfly (*Morpho peleides*), frogs and many interesting plant and bird species. Plants that grow with *Zamia cremnophila* include a beautiful large-

Figure 2 *Zamia cremnophila* on a vertical cliff at the type locality. The tuber is completely incased in the rock.

flowered *Aristolochia*, several palms species, caudiciform Dioscorias, the Panama hat plant (Cyclanthaceae), many colourful gesneriads, etc. Orchids were not very abundant but there was a species of *Catasetum* present. *Ceratozamia miqueliana* is also reported to be found in very limited numbers in this area but I did not see any. The *Zamia* is found with its tuber almost completely hidden in the small holes that cover the face of the mogote. Some animal (possibly rats) must deposit the seeds down in these holes and as the plant grows it often becomes very tightly wedged in its hole. Figure 2 illustrates this unique species in habitat.

In the original description of this species the exact locality was withheld to help protect the plant from commercial collecting. Because of the fact that the plants grow on such sheer cliffs and are wedged so tightly in their holes one would not think that this species is in much danger. The fact is that they are, not from collectors but from the destruction of their habitat to make cement! There are many limestone mountains in Mexico that are being blasted apart to be used in the manufacture of cement. In fact on the way back from this trip, I stopped at a location in Veracruz to see a population of the giant and spectacular bromeliad, *Tillandsia grandis*, only to find that a large portion had been destroyed by dynamite. The mogote that *Zamia cremnophila* grows on is suffering a similar fate. I climbed the area that was being blasted and found several plants of *Zamia cremnophila* right on the line of demarcation between the forest and the bare rock. In other words, these plants would go with the next blasting.

How many other mogotes are there that will be levelled before we know how many new and interesting species are found there?

FERAL CYCADS

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Received 6 May 1994

INTRODUCTION

Cycads have the reputation of being slow growing, both in cultivation and in the wild. They are not the kind of plants that we expect to grow out of control in our garden and become weedy. Over the years, however, I have observed two species of cycad at Fairchild Tropical Garden (FTG) escape from domestication. One of these has become a weed and taken root in many places where it has been necessary to actively remove it. The concept of an aggressive, weedy cycad, I'm sure, is a strange one to most readers. Many of us have trouble just keeping our plants alive and coaxing them to produce one or two leaves! Below, I discuss what has enabled two species of cycad, *Encephalartos hildebrandtii* and *Zamia furfuracea*, to escape from cultivation and become a "feral". The results may shed light on how cycads achieve success, both in their native habitats and in the artificial ones given them by human beings.

SEED DISPERSAL

Before a cycad species can escape from captivity it must be able to move. Mature cycads, like most plants, are firmly anchored to the ground and cannot walk! To travel even a short distance they must first transform themselves into a form that allows them to be moved. Cycads do this from relatively early in their life by producing seeds that are easily transported. Furthermore, these seeds come complete with their postage attached, so to speak. Their outer region consist of a fleshy edible tissue that some animals find irresistible. These animals serve as the "postmen" who deliver the centrally located kernel of the seed to their new homes. It is important to note that animals often

do not disperse seeds randomly, but may tend to move them to places that are favourable for the establishment of the seedling. For example, the author has observed that seeds of the Florida cycad (*Zamia pumila* or *Z. integrifolia*), tend to be moved under shrubs, by the animals that eat its fleshy outer layer, where they receive shade and have a higher chance of establishment (6).

A domesticated cycad growing far from its wild habitat must attract substitute seed dispersers. At FTG I have observed grey squirrels (*Sciurus carolinensis*) and other rodents avidly eat and move seeds of *Encephalartos* (see Figures 1 and 2). Mockingbirds (*Mimus polyglottos*) have been observed to move the seeds of *Zamia furfuracea* (a Mexican species) (2). These substitute dispersers have been effective in dispersing seeds of both these cycad taxa.

Figure 1 A cache of *Encephalartos hildebrandtii* seeds hidden between a clump of grass and the wall of a building. These seeds had been placed in the central courtyard of the FTG lab to dry. A rodent, most likely a rat living in a drain pipe, moved these seeds 5 m to a hiding spot to nibble on the fleshy outer seedlayer.

Figure 2 Two seeds of *Encephalartos hildebrandtii* on the grounds at FTG. These had been moved several metres from the mother to the shade of a tree. Notice the teeth marks on the seeds left by squirrels.

POLLINATION

Before fertile seeds can be produced, there must be effective pollination. Cycads are wind and/or insect pollinated and experiments in recent years by Norstog *et al.* (3) and the author (5) have identified several insects that pollinate certain *Zamia* species. Experiments by Donaldson (1) have clearly demonstrated that some *Encephalartos* species are also dependent on beetles for pollination. Norstog *et al.* (4) have carefully revealed how, in the case of *Zamia furfuracea*, the natural pollinator, a weevil, was probably introduced into cultivated habitats in cone debris with imported plants. These weevil pollinators have become firmly established in South Florida and can be found with cultivated plants planted throughout the city. This species now produces abundant fertile seeds wherever it is planted in numbers.

I have observed that *Encephalartos hildebrandtii* will occasionally produce fertile seeds in cultivation at FTG without hand-pollination. I have sampled many male and some female cones of this species and of other *Encephalartos* at FTG and have found no insects in abundance in them. No beetles, even in small numbers, of the kind found to be associated with *Encephalartos* in the wild by Donaldson (1) have been observed on any of these cultivated plants. The possibility exists that an insect native to South Florida may have taken up the role as pollinator and occasionally pollinate this species, although not efficiently. Wind may also help to bring pollen to female cones. There is also the possibility of apomixis, or the production of fertile seed without fertilization. This possibility has only been examined carefully in one species (*Z. pumila*) and does not appear to occur in that species (5).

PATTERN OF COLONIZATION

I have found seedlings of *Encephalartos hildebrandtii* sprouting up more than 25 metres from the nearest possible mother. Some of thse plants have taken root in beds set aside for other cycads, while others have colonized the hardwood hammocks that form part of the natural vegetation. In the hammocks, I have observed them persisting as small plants in shade for over ten years, with leaves up to 400 mm long. In the beds one plant became well established, with leaves more than 600 mm long. However, the majority have either fallen victim to careless grounds crewmen who view them as weeds or have been dug up by myself for distribution to cycad enthusiasts.

Seedlings of *Zamia furfuracea* are found almost everywhere in the vicinity of parent plants. The majority do not survive the seedling stage, but quite a number become established and begin to cone within only a few years. This species, like many of the Mexican *Zamia*, is fast growing and may mature in as little as two years in cultivation. I have noticed that plants of this species often become established at the base of other cycads. One reason for this may be that the birds (and perhaps rodents) that feed on the seeds appear to have a tendency to drop them at the base of cycads and other plants that are convenient places to perch while feeding. Another reason may be that the area below established cycads are very favourable for seedlings. These large mature plants may provide a source of inoculum of blue-green bacteria that infect the coralloid roots of cycads and enable them to fix nitrogen from the atmosphere. Also the large plants may be a source of inoculum for vesicular-arbuscular (V-A) mycorrhizae, symbiotic fungi that may enable cycad roots to dramatically increase their ability to uptake water and phosphorous (7).

Perhaps the most important reason why these two species of cycad are such good colonists at FTG is because the climate and soils are similar to that of their native habitats. *Encephalartos hildebrandtii* occurs naturally in seasonally dry coastal forests in Kenya and Tanzania on limestone soils. Miami is coastal subtropical with seasonal rainfall and has limestone soils. Similarly *Zamia furfuracea* inhabits stabilized sand dunes in tropical coastal Veracruz, Mexico.

One final factor must be taken into account. In their natural habitat most plants have a number of natural predators that prey on their leaves and seeds and also pathogens which attack them or their pollinators, thereby lowering their fecundity. For instance, the Florida cycad, *Zamia pumila*, which is native to Miami, has a butterfly, *Eumaeus atala*, which attacks its leaves, and there is a fungus which preys on the beetles that pollinate them (4), thereby reducing pollination success. An introduced species like *E. hildebrandtii* and *Z. furfuracea*, removed from their natural habitats, may be freed from the predators and pathogens that normally attack them. Released from these burdens, these exotic species may show a vigour that may not be exhibited in the wild.

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THE ROME BOTANICAL GARDEN

Roy Osborne
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Received 6 June 1994

Associated with the University of Rome, the Rome Botanical Garden (l'Orto Botanico dell'Università di Roma "La Sapienza") is situated on a 12 ha site on the lower slopes of Gianicolo, of the seven hills of Rome, and near the historical centre of the city. The garden is comparatively recent by European terms, being founded in 1883 by Romualdo Pirotta after acquisition of the property from the Corsini estate. It provides a very welcome respite from the busy commerce of the city and is frequented daily by parties of schoolchildren, students

Figure 1 Old established palm plantings are a special feature at the Rome Botanical Gardens.

Figure 2 Curator Dr. Guiseppe Fabrini, local cycad enthusiast Michele Ruocco and gardener Angelo Riti with a 200-year old specimen of *Encephalartos altensteinii* at the Rome Botanical Gardens. The specimen is kept under glass during winter.

of botany and horticulture and by those who simply enjoy its quiet beauty. Features in the garden are the extensive collection of conifers and palms (Figure 1), the geneological species rose collection, the herb garden (including marijuana plantings!), the fern and orchid

Figure 3 *Ceratozamia mexicana* with vigorous new leaf growth.

Figure 4 *Cycas rumphii*(?) specimens in one of the garden's large display houses.

collections, and the succulent and cactus collections in the display houses.

Dr. Guiseppe Fabrini (Figure 2), present Curator of the garden, reports that their cycad collection comprises some 30 plants representing six genera, namely *Encephalartos* (Figure 2), *Ceratozamia* (Figure 3), *Dioon, Zamia, Macrozamia* and *Cycas* (Figures 4, 5).

Figure 5 An impressive planting of *Cycas revoluta* alongside historical steps leading up the slopes of Mount Gianicolo.

Visitors to the garden are welcome. The garden is located 1.5 km to the south-west of Saint Peter's Square (Piazza San Pietro): proceed along the west bank of the Tiber River in a southerly direction and head into the Via della Lungara. Turn right into Via Corsini and you will be facing the Garden's main entrance. The garden is closed on Sundays.

The address for correspondence is: Dr. Franco Bruno (Director), l'Orto Botanico di Roma, Largo Cristina di Svezia 24, Roma 00165, Italia.

ACKNOWLEDGEMENT

I thank Dr. Guiseppe Fabrini and Michele Ruocco for their assistance in preparation of this text.

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SHORT COMMUNICATIONS / KORT MEDEDELINGS

CORALLOID ROOTS AND WHITE TUBERCLES ON SECONDARY ROOTS

Helmut Schlegel
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Received 22 April 1994

Since I always try to grow my cycads conventionally as well as soilless (i.e., hydroponically), I am well acquainted with their roots. But recently I noticed that there were not only several forms of the typical **coralloid roots** (Figures 1, 2) near the surface of the substratum, but also solitary, white tubercles on secondary roots (Figure 3), much like those of legumes.

The photographs show coralloid roots or the aforementioned root tubercles, respectively, protruding out of the slits near the bottom of the insert of the hydroponical container, but I found the latter, and these only, also in the midst of the substratum of conventionally potted cycads.

May I ask for a comment on these observations from one of the botanical experts among the readers?

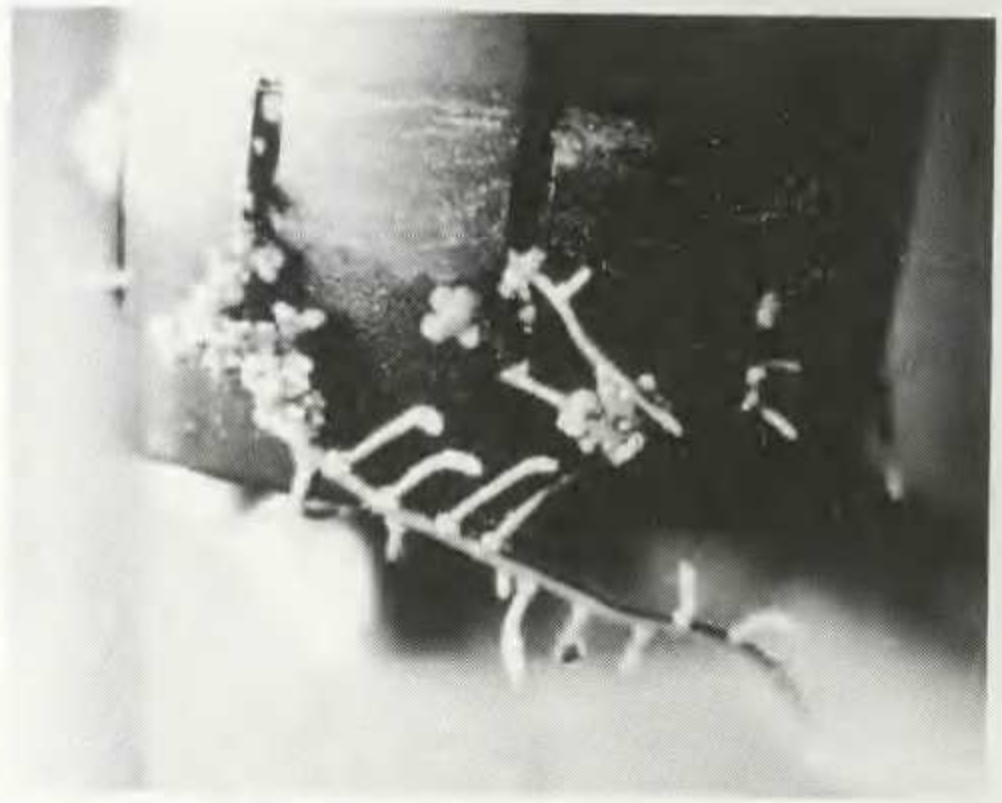

Figure 1 *Lepidozamia hopei*.

Figure 2 *Macrozamia communis.*

Figure 3 *Zamia fairchildiana.*

[**Comment:** The white tubercles on the roots of *Zamia fairchildiana* of Figure 3 are most interesting. They are not coralloid roots but also do not resemble the *Rhizobium* root nodules of legumes. They seem to occur at the points at which lateral roots emerge from other roots. In fact, it seems as if the white tubercles are parenchymatous wound calluses that developed from the pierced tissue of the parent root. Microscopic anatomical studies of sections of the tubercles should reveal their nature and origin. - **Nat Grobbelaar**.]

NEWS FROM THE NATAL REGIONAL BRANCH

Avis Meresman
P.O. Box 4726, 4000 Durban

Received 29 April 1994

A very successful meeting was held at the Queensburgh municipal library on the 25th March 1994, with approximately 30 members attending the evening. The purpose of this meeting was to make a presentation of the Conservation Award to Roy Osborne. The speech was given by Edgar Wohlberg who has been a member since the inception and knows Roy Osborne well.

PRESENTATION OF THE CONSERVATION AWARD TO ROY OSBORNE

Roy was the founder and first President of the Cycad Society of South Africa in 1984, and contracted as President till 1989.

In March 1985 the first edition of "*Encephalartos*" appeared and in the 37 issues to date Roy has written 17 "FOCUS ON ... " features. For the *Encephalartos concinnus* article he visited various sites in Zimbabwe.

Roy has contributed a number of scientific publications and at present is involved in research on Tissue Culture, on the genus *Encephalartos*, at Natal University.

The CYCAD 93 conference in Pretoria in July 1993 was considered to have been the most successful conference to date. Roy was a member of that organizing committee.

Assistance has been given by Roy at the Cycad Society's stall at the WILDLIFE EXPO on a number of occasions. A number of members have been signed on at this stall.

The Durban Botanical Gardens advisory committee is another body to which Roy contributes. This committee has been involved with the rearrangement of cycads into geographical areas. Roy also wrote "The cycad collection of the Durban Botanic Gardens" which has received very complimentary reviews.

He has recently also written an article for "Visions on cycads".

We have all appreciated Roy's willingness to help anybody with advice, information, pollen and anything peculiar to cycads.

It is therefore fitting that he be awarded this trophy (Figure 1).

Figure 1 Edgar Wohlberg (left) presenting the Conservation Award Trophy to Roy Osborne (right). Photo: Danie Nel.

PACSOA POSTER

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Received 16 May 1994

The Palm and Cycad Societies of Australia (PACSOA) have recently published the first of a series of posters depicting Australian cycads. Elegantly and accurately drawn and coloured by Margaret Saul, the first poster shows *Macrozamia moorei, Lepidozamia peroffskyana* and *Bowenia serrulata*. The posters are available in a matt finish (592 x 420 mm) or a gloss finish with border (611 x 439 mm).

Posters are available from PACSOA Bookstore (P.O. Box 271, Bribie Island, Queensland 4507, Australia, Phone 07-408-2331) at Au$15.00 each plus postage or may be obtained in South Africa through the CYCAD CENTRE (P.O. Box 4726, Durban 4000, Phone 031-442505).

Right: Photograph showing part of the first poster of Australian cycads.

CRESTED *STANGERIA* CONES

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Received 16 May 1994

While each cycad cone is usually borne on its own cone stalk (peduncle), the peduncle is occasionally crested so that multiple cones are carried on a single cone stalk.

This phenomenon was seen in a female *Stangeria eriopus* plant (Figures 1, 2) in Michael Perry's collection, Englewood, Florida, U.S.A. in April 1994.

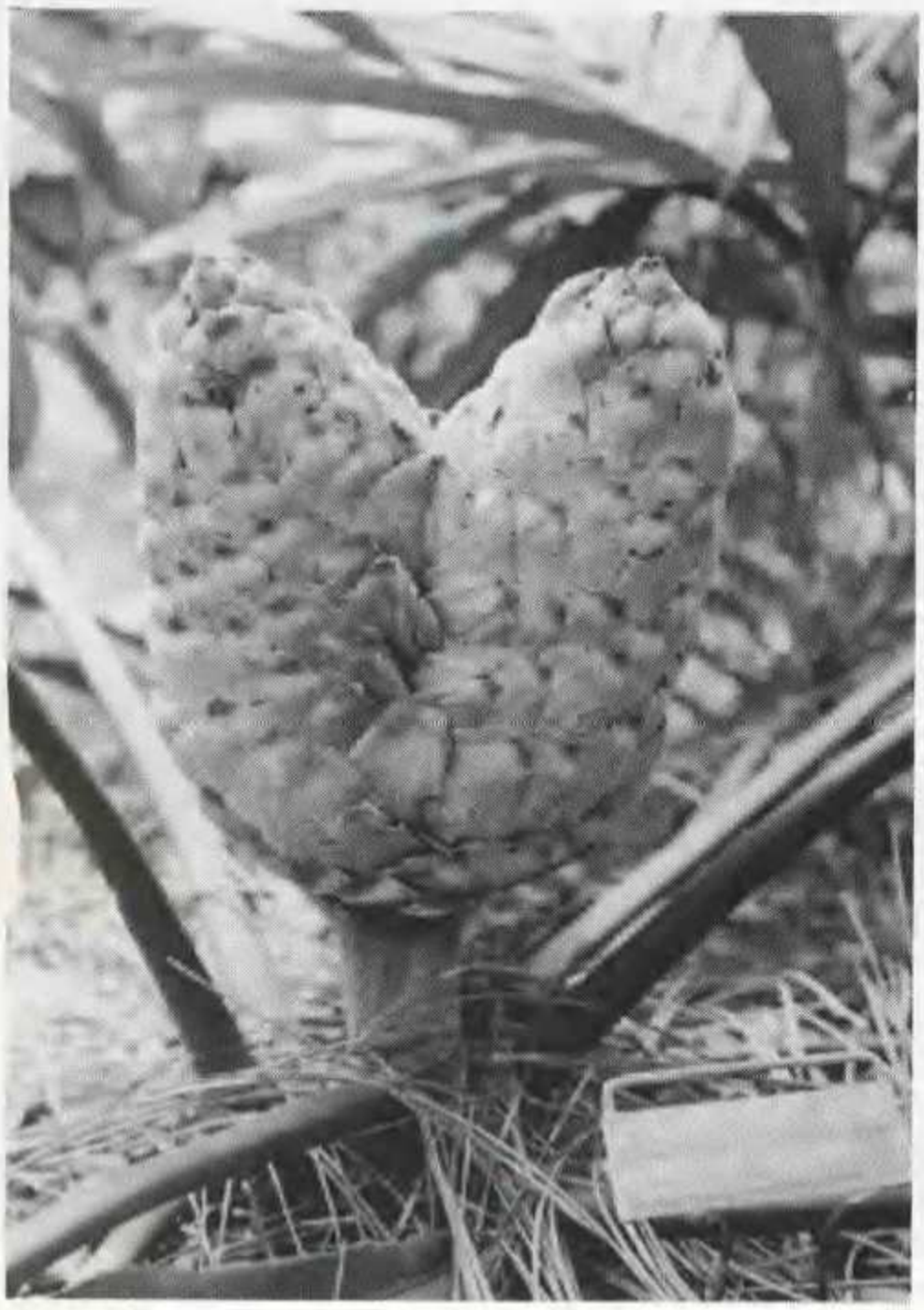

Figure 1 Side-view of the cones. Photo: R. Osborne.

Figure 2 The cones as seen from above. Photo: R. Osborne.

ACTIVITIES IN THE AMERICAN CYCAD SOCIETY

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

Received 20 June 1994

Our correspondent in the United States of America, Dr. William Tang, of Fairchild Tropical Garden, Miami, U.S.A. was elected president of the Cycad Society of that country last year. Under his guidance, a vigorous and

most successful drive was set in motion to recruit additional members for the Society and to revise its publications.

Until the end of 1993, "The Cycad Newsletter" which appeared three times per year was the main publication of the Society. Although it contained far fewer pages than our "*Encephalartos*", it had the same format and also did not normally make use of coloured figures. At the beginning of this year, the "Cycad Newsletter" was reduced to a two page publication whilst a new publication, called the "Journal of the Cycad Society" was initiated - both with William Tang as editor. Although the Newsletter will apparently continue to appear three times per year, it is not clear whether this will also be the case with the Journal. The first issue of the Journal is boldly labelled "The Cycads of China" with a less conspicuous subtitle "Journal of the Cycad Society Volume 1". This tends to suggest that it is not planned to publish the Journal at regular intervals and that each issue of the Journal will constitute a separate volume. All paid-up members of the Society will receive copies of both publications as part of the benefits of their membership to the Society.

The "Journal of the Cycad Society" is of A-5 format and one of its most attractive features is the inclusion of several coloured illustrations in addition to black and white ones, all on glossy paper. Although the creation of the Journal is an obvious move towards the creation of a more formal scientific publication, the contents of the first issue is still written very much for the layman which should make it popular with the average member of the Society and I would like to wish the Society every success with the venture. Volume 1 of the Journal is devoted entirely to aspects of the cycads of China and reports mainly on two recent excursions that attempted to establish the conservation status of the cycads of mainland China.

Although "The Cycad Society" was the first cycad society in the world, it is rather unfortunate that the name of the society, its journal and newsletter does not bring out its American affiliation now that several other similar societies and publications have been launched in different countries.

A GIANT *ENCEPHALARTOS CYCADIFOLIUS*

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Received 6 June 1994

Exceptionally large cycads always seem to attract attention and there have been frequent reports of large specimens of various taxa in previous issues of "*Encephalartos*". On a recent field trip we came across an immense specimen of *Encephalartos cycadifolius*. In most cycads, size is measured in terms of height and girth, but in *E. cycadifolius*, a more appropriate measure of greatness is the number of basal suckers. The plant we discovered had 63 suckers that could be clearly seen as belonging to the same plant. The veld had recently been burnt and the soil had eroded away from one side of the plant making it possible to trace many of the suckers back to their origin. Additional clusters

Figure 1 A cluster of *E. cycadifolius*, with 63 suckers.

Figure 2 An additional cluster of 28 suckers.

comprising 7, 24 and 28 stems were possibly part of the same plant but this could not be ascertained without digging to expose their subterranean stems.

Extensive basal suckering is typical of *E. cycadifolius* and it is not uncommon to find plants with between 10 and 20 suckers. However, the average number of suckers in the population where this monster was found was nine, which gives some indication of just how big this one plant was.

THE YELLOW LEAF PHENOMENON

Nat Grobbelaar
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Received 16 June 1994

Considerable interest was shown in my letter on the subject of yellow leaves in cycads which appeared in "*Encephalartos*" No. 36. In response to some of the points raised, I feel obliged to make a few comments:

There are various types of yellow leaves that can appear on cycads. The commonest is probably the result of aging. When leaves age, they commonly turn yellow before they die. Severe infestations of certain insect pests such as certain types of scale also causes mature leaves to become yellow. A nitrogen or magnesium deficiency will also result in yellow leaves. Too much or too strong light will also cause the yellowing of most cycads. The phenomenon that I dealt with is a completely different case. Initially, the plant has normal green leaves which remain green. When it produces new leaves, it is only the new leaves that are yellow if not completely white. These new leaves do not enlarge to their normal size and will usually remain yellow. Completely white leaves often soon perish. Unless the problem is rectified soon, all subsequent leaves will be yellow or white and the plant will eventually die. In such cases, the cause of the abnormal growth is usually due to a deficiency in the plant of the trace element zinc although it can also be the result of an iron deficiency.

The green colour of a normal leaf is due to the presence of pigments called chlorophylls which are essential for a process called photosynthesis. During photosynthesis, the plant utilizes light, water and carbon dioxide to manufacture sugars and other organic compounds essential for life.

During aging various components of a leaf, such as its chlorophylls, are broken down and the building blocks are transported to other parts of the plant. As a consequence the leaf loses its green colour. Parasitism by insects can also cause the local aging or even death of leaf tissue. A severe insect infestation will therefore cause the leaf to turn yellow prior to its premature death.

Of the essential mineral elements that plants require for normal growth and reproduction, nitrogen and magnesium are constituents of the chlorophylls. A deficiency of one or both of these elements will therefore result in a lower chlorophyll content of the plant. Both nitrogen and magnesium can, however, readily be mobilized from older parts of the plant to the newly formed leaves. In the case of a nitrogen deficiency, all the leaves of the plant but especially the older leaves therefore tend to become uniformly yellowish green. In the case of a magnesium deficiency, it is mainly the areas inbetween the leaflet veins that become yellowish and affected leaves tends to take on a mottled appearance.

Plants differ in their tolerance to strong light because they differ in their ability to protect their chlorophylls from being oxidized by light. Many cycads, especially in the seedling stage, can't tolerate strong light for extended periods each day. When the light is too strong for too long, the leaves become yellow permanently.

Iron and zinc are not constituents of the chlorophylls but they are constituents of the plant's "tools" with which it synthesizes the chlorophylls. A deficiency of iron or zinc therefore results in a lack of the "tools" required for the synthesis of the chlorophylls and therefore chlorophyll cannot be formed in young leaves if the leaves experience a deficiency in iron or zinc. The fact that the older leaves can be quite green whilst the new leaves are white is due to the fact that the last available iron or zinc that was taken up from the soil and is now housed in the older leaves, unlike nitrogen and magnesium, can't be mobilized to the young leaves to alleviate the deficiency there.

Due to the waxy surface of young cycad leaves, it is difficult for them to absorb mineral elements directly from water solutions that have been sprayed on them and unless the required elements reaches the leaves early during their development, it will not rectify the situation.

The addition of iron or zinc to the soil usually takes some time to have the desired effect because one must be careful in fertilizing the soil with trace elements. Although these elements are essential for normal growth, they are required in very small amounts. High concentrations of those very same nutrients generally are quite toxic. One therefore has to apply the trace element in small doses at intervals until the desired effect is obtained. This is further complicated by the fact that it is usually the root tips that are mainly responsible for the absorption of mineral elements. When a mineral element such as iron or zinc is added to the soil, it is largely adsorbed in the upper soil layer due to the positive electrical charge of its ions. Only after the addition of sufficient iron or zinc will it penetrate deep enough into the undisturbed soil to be readily absorbed by the root tips of seedlings which normally have relatively few lateral roots branching from the thick tap root.

Recently I had extreme cases of zinc deficiency in seedlings of *Encephalartos altensteinii* and *E. longifolius* which were grown in a very sandy, nutrient-poor soil. Only after the repeated addition of a solution of 0.005g zinc sulphate per liter water at the rate of 250 ml per litre soil did I manage to cure the plants. Indeed, it appears to be better in such cases to transfer the plant to fertile soil after removing most of the original soil from the plant's root system.

CYCAS TAITUNGENSIS - A NEW NAME FOR THE WIDELY KNOWN CYCAD SPECIES ENDEMIC TO TAIWAN

Nat Grobbelaar
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Received 16 June 1994

Two independent taxonomic studies of the *Cycas taiwaniana* plants which occur in mainland China and Taiwan revealed that they are decidedly different and that the type specimen to which the name *Cycas taiwaniana* was allocated corresponds to the plants growing in mainland China. Consequently, the only indigenous cycad species occurring in Taiwan is not *C. taiwaniana* and has now been given the name *Cycas taitungensis*.

K.D. Hill from Australia and C.J. Chen from mainland China completed a manuscript on the taxonomy and morphology of the Chinese native species of *Cycas* in which they proposed a new name for the cycad that is a native of Taiwan. The research of Shen and Tsou, both from Taiwan, also prompted them to propose a new name for the Taiwan cycad in a manuscript they prepared for publication. The two parties learned of one anothers work during January of this year and decided to publish a joint paper to clarify the longstanding mistakes in the taxonomy of the two cycad species. The paper by Chung-Fu Shen, Kenneth D. Hill, Chih-Hua Tsou and Chia-Jui Chen is entitled "*Cycas taitungensis* C.F. Shen, K.D. Hill, C.H. Tsou & C.J. Chen, sp. nov. (Cycadaceae), a new name for the widely known cycad species endemic in Taiwan". It appeared in the Botanical Bulletin of Academia Sinica, volume 35, pages 133-140, 1994. Reprints can be requested from C.F. Shen, Dept of Forestry, National Taiwan University, Taipei, Taiwan 107, Republic of China.

The species *Cycas taiwaniana* was described by William Carruthers in 1893 and was based on a single specimen in the Herbarium of Dr Henry F. Hance. According to the label on the specimen, which is not in Swinhoe's handwriting, the specimen was collected by Swinhoe on Formosa (the present Taiwan). Nowhere, however, is there an indication from Swinhoe himself of the locality from which the type specimen was collected and it is quite conceivable that it was collected in mainland China or from a garden plant grown in Taiwan. Because there is only one cycad species known to be indigenous to Taiwan and the taxonomists in Taiwan do not have ready access to the type specimen of *C. taiwaniana* which is housed in England and because the taxonomists in mainland China at best have a few specimens of the Taiwanese cycad, the two species have, ever since the description of *C. taiwaniana* by Carruthers, both been referred to as *C. taiwaniana*.

Apparently the real *C. taiwaniana* is a member of a species group that embraces *inter alia* *C. szechuanensis* and *C. hainanensis* whilst *C. taitungensis* is more closely related to *C. revoluta*. The proud owners of a "*C. taiwaniana*" will now have the interesting task of ascertaining whether their plant(s) are indeed *C. taiwaniana* or *C. taitungensis* both of which can be considered to be very rare.

ENCEPHALARTOS MIDDELBURGENSIS SPECIMEN DECLARED A NATIONAL MONUMENT

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

Received 16 June 1994

As the result of a suggestion by Harry Gerber, former Chairman of the Natal Branch of our Society, the author applied to the National Monuments Council to have a particularly old specimen of *Encephalartos middelburgensis* Robbertse, Vorster & Van der Westhuizen declared a national monument. After nearly two years of deliberations and several motivations, the Council has kindly acceded to the request and the plant has been declared a national monument in Government Notice number 672 (3) which appeared in the Government Gazette of 5th April 1994.

The plant occurs on the farm Bankfontein 264, Middelburg (Transvaal) district along a well-known Cycad Trail which spans several farms and offers magnificent views of part of the Olifants River gorge. Apart from the majestic few remaining specimens of *E. middelburgensis*, many specimens of *E. lanatus* can be viewed along the trail. The specimen of *E. middelburgensis* which has been declared a national monument, is a female individual and its main stem produces five branches at soil level. Of these, one is unbranched and about 7.8 metres long. A second stem branches into three stems a little above soil level and each of these are about 6.7 metres long. The third stem branches at about 2 metres above soil level to give rise to three stems of which the tallest is about 2.5 metres long. In 1992 this branched stem produced a female cone. The fourth and fifth branches of the main stem are 3 and 1.8 metres long respectively. It is difficult to photograph the whole plant because its tallest stems have arched over huge boulders to rise again at some distance with a beautiful crown of healthy leaves.

Plans are under way to unveil the emblem of the National Monuments Council and an additional plaque at the site on Saturday 15th October 1994 at 10h00 and all interested persons are urged to attend the ceremony which will be organized by the Transvaal Regional Committee of our Society (Secretary is Mr Ruan Harris, Telephone 012-641828 after hours) in conjunction with the owner of Bankfontein 254, Mr A.P. Prinsloo of Middelburg, Transvaal who promised to waive the admission fee for persons arriving on the day of the ceremony before 10h00.

To reach the Cycad Trail, proceed along the road from Middelburg towards Groblersdal for approximately 14 km and turn left into the dirt road that leads to Slaghoek. After about 10 km a signpost indicates the turnoff to the Cycad Trail.

Members might also be interested in visiting the Botshabelo Nature Reserve whose turnoff from the Middelburg-Groblersdal road is situated about 7 km from Middelburg on the western side of the road. Apart from numerous specimens of *E. lanatus* this Reserve has several interesting attractions to offer. Buildings such as the church and fort that date from the time when the Reserve was a thriving Berlin Mission Station are open to the public. A visit to the old cemetery near the cycad hiking trail as well as a visit to some colourful Mapoch huts where native handicraft items are on sale, are additional attractions.

NATAL NATURE CONSERVATION ORDINANCE

Nat Grobbelaar
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Received 16 June 1994

In the Official Gazette of the Province of Natal of 23rd December 1993, several amendments to the Nature Conservation Ordinance of Natal No. 15 of 1974 were proclaimed. Cynthia Giddy kindly explained the amendments in laymans language to us in "*Encephalartos*" No. 38 of June 1994 (pp. 37-40).

All true cycad lovers will welcome the drastic increases in the penalties that have been approved for the illegal removal of cycad material from the wild. The

conservation of our indigenous cycads is a serious matter and offences pertaining to them deserve stiff penalties. In addition, the Nature Conservation authorities have a very difficult task in successfully prosecuting culprits and therefore it is gratifying that their efforts should be rewarded with a punishment to the culprits that will serve as an effective deterrent to prospective culprits.

Despite the above, I have serious misgivings about the fact that the relevant ordinance of the different provinces all fail to distinguish between cycad material from the wild and legitimate garden material. It has always been my contention that such a distinction should be made and that legitimate garden material should be exempted from the legislation. The fact that the conservation authorities are not able to readily distinguish between material from the wild and legitimate garden material should not entitle the lawmakers to infringe on the reasonable rights of the individual as regards the possession and "trade" in cycads.

The primary aim of the Nature Conservation bodies and its ordinances should be to prevent the untimely extinction of members of our indigenous flora and fauna as a result of man's activities. This should be accomplished mainly through the creation and maintenance of suitable nature reserves. There seems to be no reason why this objective cannot be accomplished by the establishment, if needs be, of suitable populations of the various indigenous cycads in nature reserves to ensure the conservation of their germ pools for posterity. The present tendency to impose harsher strictures on the private possession and "trade" in cycads is counter productive and unwarranted. Apart from its infringement on the reasonable rights of the individual, the present legislation will go a long way to dampen the enthusiasm of genuine cycad lovers to propagate cycads in their gardens for exchange purposes and/or for financial gain - both of which should be regarded as legitimate and praiseworthy activities which should considerably decrease the pressure on the plants in the wild.

With the considerable change in our legal system, the question can rightly be asked whether the legal strictures that have been imposed on the right of the individual to own and exchange cycad material will be upheld in a court of law. After the adoption of the Bill on Human Rights, all legislation must in future be reconcilable with its provisions. To me it would seem that the present ordinance unnecessarily interferes with Section 36 of this charter.

SAVING A *CYCAS*

Roy Osborne[1] and Aldo Moretti[2]
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[2]Dipartimento di Biologia Vegetale, Università di Napoli Federico II, Via Foria 223, 80139 Napoli, Italia

Received 27 June 1994

A 3-metre female specimen of *Cycas rumphii*(?) at the Naples Botanical Garden was successfully saved recently in a carefully managed horticultural operation. The specimen had been damaged in transit to the CYCAD 87 exhibition in France and a portion of the central trunk developed a large cavity. The necrotic tissue was removed and the damaged tissue sealed. In July 1992, the affected area was wrapped in *Sphagnum* moss and peat within a plastic sleeve (Figure 1). After about one year, both coralloid and normal roots had developed in the moss/peat mixture (Figure 2). In April 1994 the trunk was cut (Figure 3), the upper section lifted away from the lower trunk (Figure 4) and the new plant re-established in a separate container (Figure 5). It is anticipated that both "halves" of the specimen will recover from this operation. The gardeners who performed the task were (Figure 5) Salvatore Fioretti, Agostino Formisano and Eduardo Giordano.

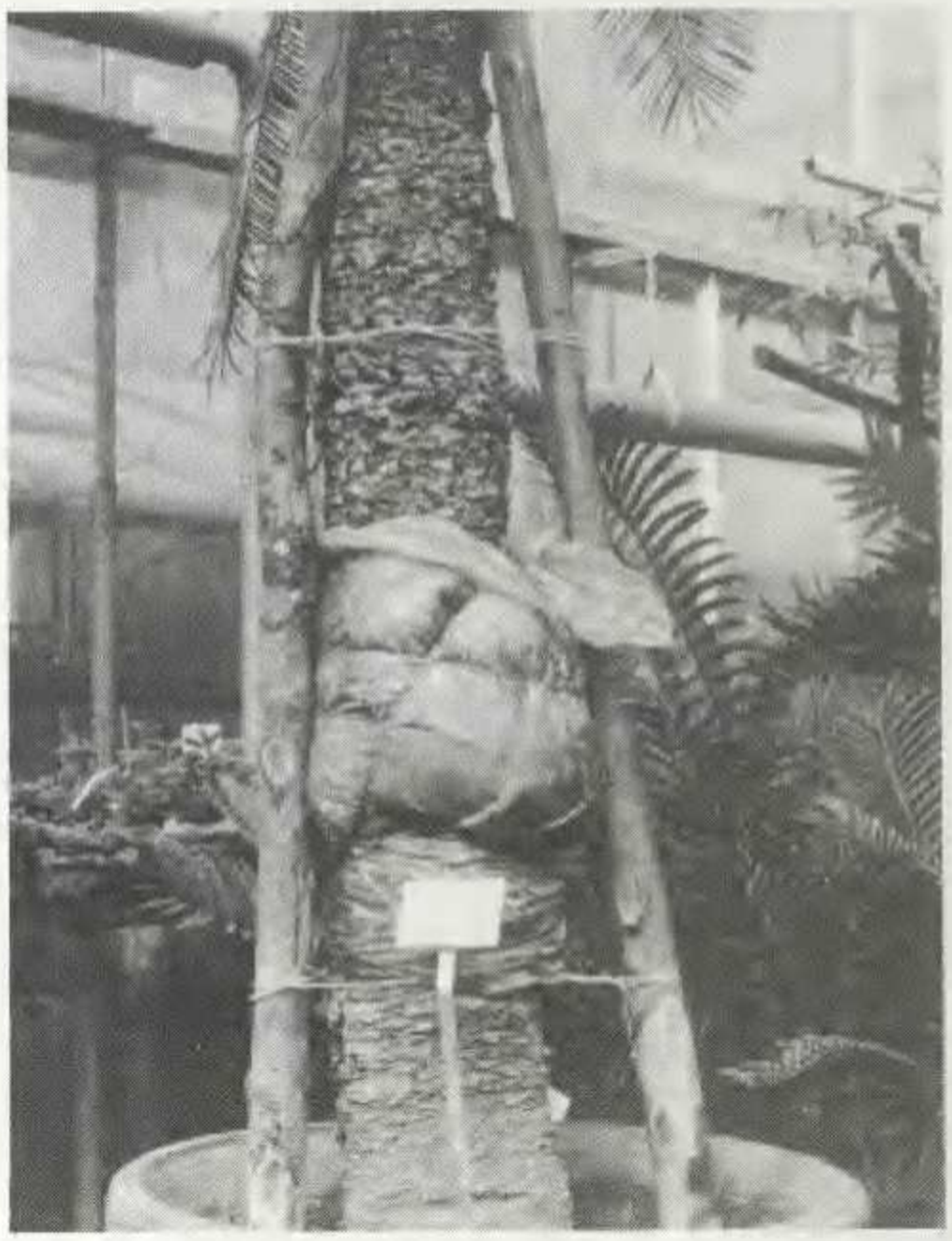

Figure 1 Plastic sleeve around the stem.

Figure 2 A new root system has developed.

Figure 3 Cutting the trunk.

Figure 4 Lifting the upper part of the trunk.

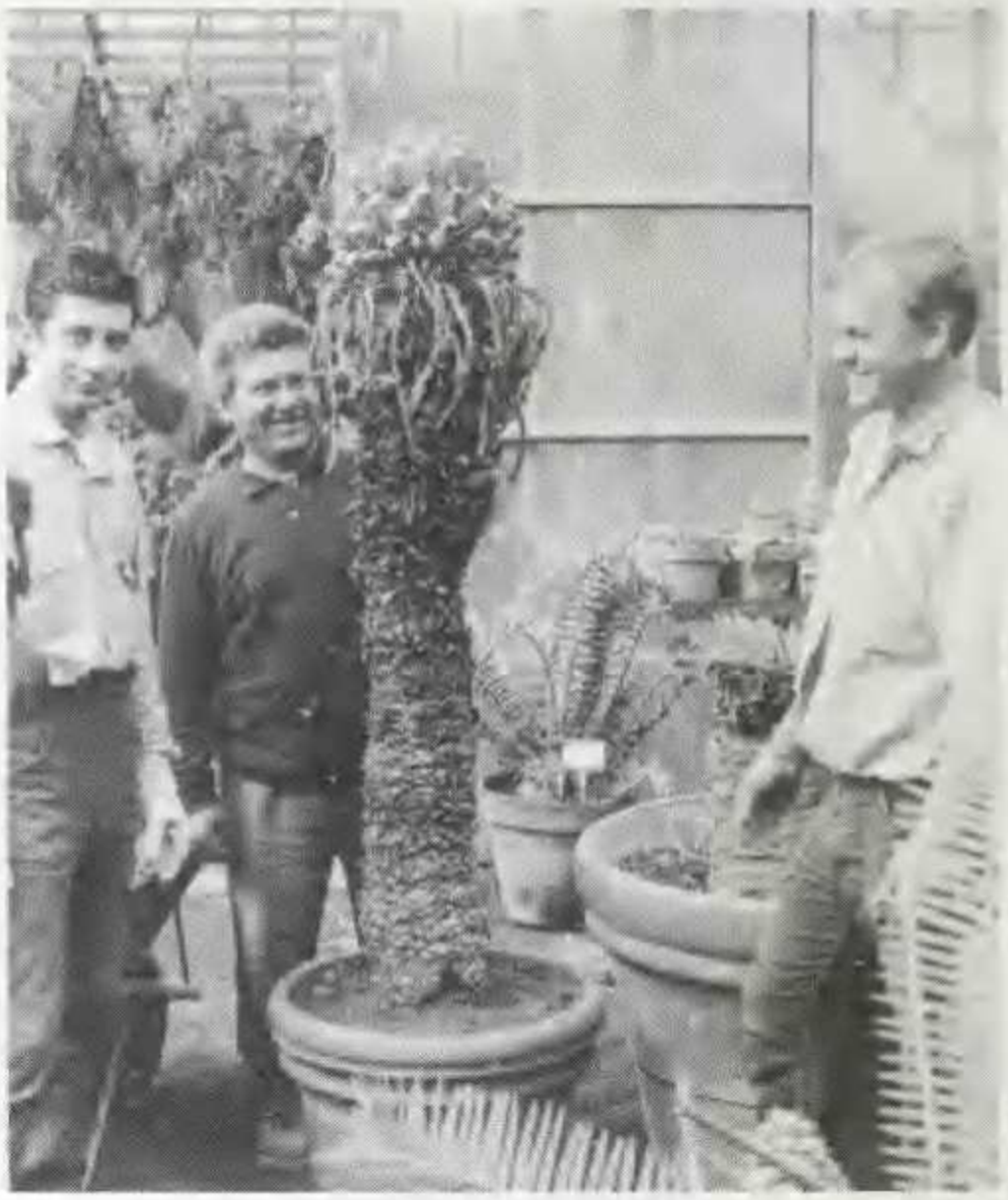

Figure 5 Eduardo Giordano (left), Agostino Formisano (centre) and Salvatore Fioretti (right).

CONE SCULPTURES IN SOUTHERN ITALY

Roy Osborne
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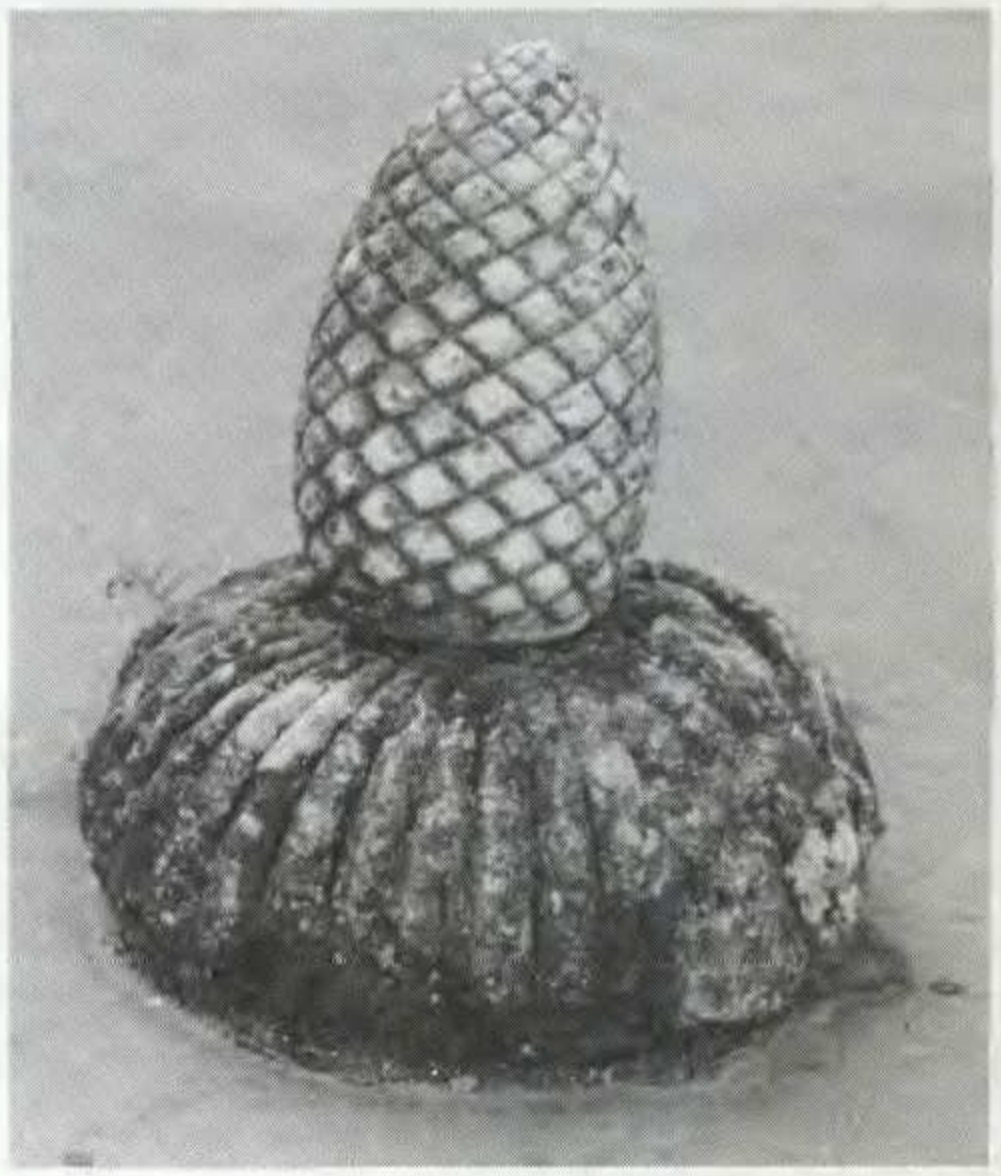
Received 8 June 1994

Travelling in the south of Italy one frequently comes across carved stone objects looking remarkably like *Encephalartos* cones. More recent examples are of fired terracotta clay and are popular home and garden ornaments. The local people believe that the objects are representations based on pine cones and may have been regarded as a fertility symbol in past ages. [Can anyone shed further light on these objects? - **Editor.**]



Right: An example of one of the older carved stone cones, as seen at Villa Floridiana, Naples.

CYCAD '94, THE FIRST NATIONAL CYCAD SYMPOSIUM OF CHINA

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Received 22 June 1994

Under the sponsorship of the Chinese Society of Botany, Institute of Botany, Chinese Academy of Science and Panzhihua Municipality, the First National Cycad Symposium was held on April 21-23, 1994, at the beautiful city of Panzhihua, Sichuan Province, Peoples Republic of China.

Fifty representatives (Figure 1) from Peking, Sichuan, Guizhou, Yunnan, Guangdong, Guangxi, as well as Taiwan were present at the meeting. Most of them were professors, researchers, postgraduates, horticultural engineers and cycad enthusiasts. An officer from IUCN-CNPPA, Professor Xu Guoshi from Taiwan, also attended the conference. The meeting received congratulation letters from Roy Osborne, Terrence Walters and William Tang.

The Chinese senior researcher of gymnosperms, Professor Li-Kuo Fu made an opening speech on the morning of April 21. The governor, Wan-Xiang Qin,

Figure 1 Delegates in session at the First National Cycad Symposium, Panzhihua City, China, April 1994.

came specially to present a lecture. He introduced the young history of the wonderful immigration city, the finding of the large habitat stands of *Cycas panzhihuaensis* and thus the establishment of Panzhihua Cycad Natural Conservation site, and expressed the intention that the government would try its best to support CYCAD 96, the Fourth International Conference on Cycad Biology.

More than 15 people read 20 theses about cycad resources, distribution, ecology, systematics, morphology, anatomy, embryology, palaeobotany, cultivation and *ex situ* cultivation of Chinese cycads during the meeting. There were also four video shows about cycads.

During the conference, representatives visited the Panzhihua Cycad Natural Conservation site and a cycad collection at the Panzhihua Park. They discussed the constitution of the Chinese Cycad Society, a branch organization of the Chinese Society of Botany. At the end, Governor W.X. Qin and Professor L.K. Fu were elected as Honorary Chairmen; Professor Jiarui Chen, Chairman; Professor Lin Zhou (also secretary) and Professor Tanqing Chen (Director of SFL) as Vice Chairmen; Dr. Si-Lin Yang, Professor Si-Yuan Yang and Dingyue Wang as Vice Secretaries. The meeting decided to publish a symposium on Chinese cycads later this year.

LETTERS TO THE EDITOR / BRIEWE AAN DIE REDAKTEUR

Geagte Redaktrise

AFNEMENDE LEDETALLE

In die Maart 1994 uitgawe van "*Encephalartos*" (bl. 29) gee prof. Nat Grobbelaar statistieke oor ledetalle wat sorgwekkend is. Hy vra dan ook vir voorstelle om die probleem hok te slaan. Ek wil u die versekering gee dat ek, ten spyte van wat ek nou gaan sê, steeds 'n ingetekende lid is en dat ek elke uitgawe van ons tydskrif besit. Die stel beklee 'n ereplek in my huis. Die doel van hierdie brief is nie om sommige lede die harnas in te jaag nie maar is suiwer om die probleem van ledetalle aan die kaak te probeer stel, terwille van broodbome en ons tydskrif "*Encephalartos*".

Tot op datum het ek nog geen bydrae gemaak nie en dit is maklik om op die wal te staan en te kritiseer. Die hoogste bome kry die meeste wind. Dit is die persone wat reeds groot bydraes gelewer het en steeds hard werk om "*Encephalartos*" 'n sukses te maak. Die gehalte van die artikels is en was nog altyd uit die boonste rakke. Nie almal gaan met my saamstem nie en ek vra mooi om my nie te stenig indien u van my verskil nie.

Die eerste en laaste hoofartikel ("Fokus op ... ") wat in Afrikaans gepubliseer is was in uitgawe Nr 1. Dit is daarna genoem dat die hoofartikel altyd in Engels sal wees terwille van ons buitelandse lede. Meeste mense verkies om in sy/haar moedertaal te lees. Die Engelse hoofartikel het onmiddelik 'n Engelse stempel op "*Encephalartos*" geplaas.

Kyk ek na die ledetal statistieke dan is dit duidelik dat die buitelanders 'n geringe bydrae lewer - tog mag ons hulle nie verloor nie. Die grootste getal lede kom uit Transvaal. Ek raai dat in die PWV-gebied meer broodbome is as in die res van ons land.

Kyk ek na die artikels en na die name van die skrywers, is dit duidelik dat meeste Afrikaanssprekendes artikels in Engels skryf. Daarmee is sekerlik nie fout te vind nie aangesien ons in 'n tweetalige land woon. Die gevolg is egter na my mening, dat die gewone Afrikaanssprekende, soos ek, huiwerig is om 'n bydrae te maak uit vrees dat sy/haar brief moontlik die enigste in Afrikaans sal wees.

Ek doen aan die hand dat u die ledegelde verhoog maar die hoofartikel in beide Engels en Afrikaans plaas. Ek glo u sal verras wees oor die uitslag wat ongelukkig nie onmiddelik waarneembaar sal wees nie.

Die tweede probleem, soos ek dit sien, is dat ek op die oomblik nie seker is of ek wél my betaling vir 1994 aangestuur het nie. Omdat ek die Maart-uitgawe ontvang het, aanvaar ek dat ek wel betaal het. Sou ek nie die Maart-uitgawe ontvang het nie sou ek dit eers heelwat later uitgevind het.

Is dit dalk moontlik om op die koevert se rekenaar uitgedrukte naamstrokie ook te druk watter uitgawes ek nog sal ontvang? Met ander woorde indien ek tot Desember 1994 se uitgawes sal ontvang, moet daar op elke uitgawe van 1994 by my naam en adres die syfers 12/94 verskyn.

'n Laaste versoek. Is dit nie moontlik om so elke vyf jaar 'n bundel uit te gee met alle hoofartikels saamgevat in een nie? Indien dit boonop in Afrikaans kan verskyn sal ek, en ek glo baie ander, bereid wees om 'n stewige prys daarvoor te betaal.

A.N. Pelzer, Posbus 644, 2350 Ermelo.

Ontvang 11 April 1994

[Mnr. Pelzer se brief is nie in die Junie-uitgawe van "*Encephalartos*" geplaas nie omdat dit eers aan die Raadslede voorgelê is om oor die voorstelle wat daarin vervat is te stem. Kyk "Van die President" op bladsy 3 van hierdie uitgawe. - **Redaktrise.**]

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Dear Editor

OCCASIONAL PARTHENOCARPY AS A GENERAL RULE IN CYCADS

I would like to add the following to the above topic in "*Encephalartos*" No. 38:

ADDENDUM Sixty years earlier than Le Goc, the then scientific director of the imperial Botanic Garden of St. Petersburg Dr. E. Regel (editor of the German, Russian and Swiss periodical "*Gartenflora*", perhaps better known as author of the genus *Lepidozamia*) mentioned the frequent occurence of apparently developed cycad seeds which contained no embryo. (*Gartenflora* 6: 9; Erlangen 1857.)

***Dr. Helmut Schlegel**, Wilhelm-Haspel Straße 30/2, 71065 Sindelfingen, Germany.*

Received 22 April 1994

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Dear Editor

PARTHENOCARPY IN CYCADS

My question about "parthenocarpy" in cycads ("*Encephalartos*" No. 38, p. 40) was most clearly answered, not by the two experts whose comments you published, but by Nancy Gardiner who wrote (presumably inspired by Cynthia Giddy) on p. 44 of the same number: "... cycad seeds are mature before they are pollinated, unlike ordinary garden plants whose seeds only swell and mature after pollination."

This is exactly the kind of statement which serves the needs of the curious layman. Nevertheless, I hope there will be more scientific discussion about this topic in the near future.

***Dr. Helmut Schlegel**, Wilhelm-Haspel Straße 30/2, D-71065 Sindelfingen, Germany.*

Received 7 July 1994

NEW SCIENTIFIC REPORTS

Hill, K. 1994. Three new species of *Cycas* (Cycadaceae) from the Northern Territory, Australia. *Telopea* 5: 693-702. [In his continuing work on the genus *Cycas* in Australia, Ken Hill describes three new species from the Arnhem Land area of Australia's Northern Territory. The first is *Cycas arnhemica*, a robust plant which is locally abundant in savanna forests around the Goyder River. The second is *Cycas canalis*, a glaucous plant locally abundant near coastal sites at Channel point. An inland population with keeled leaves is named as *C. canalis* subsp. *carinata*. The third new taxon is *Cycas orientis*, also locally abundant and found in the eastern area of Arnhem Land. The latter species is similar to *C. armstrongii* but has a more prominent midrib when pinnae are viewed from below.]
Author's address: Royal Botanic Gardens, Mrs Macquaries

Road, Sydney, NSW 2000, Australia.

Moretti, A.*, Caputo, P., Cozzolino, S., DeLuca, P., Gaudio, L., Siniscalco Gigliano G. & Stevenson, D.W. 1993. A phylogenetic analysis of *Dioon* (Zamiaceae). *American Journal of Botany* 80: 204-214. [Using field-collected leaf samples from all species and varieties of *Dioon*, the Italian workers used the method of chloroplast DNA restriction fragment length polymorphism analysis to provide data for cladistic and phenetic analyses. These techniques show that the genus comprises two groups; one comprising *Dioon mejiae, D. rzedowskii* and *D. spinulosum* and the other with *D. califanoi, D. caputoi*, the two varieties of *D. edule, D. holmgrenii, D. merolae, D. purpusii* and the two varieties of *D. tomasellii*. The results from the molecular studies are broadly consistent with morphological and biogeographic data. The evolutionary implications of the results are that modern species of *Dioon* may have evolved as a consequence of a very fast succession of vicariance events that occurred during the Cenozoic Era.]

**Author's address: Dipartimento di Biologia Vegetale, Università di Napoli Frederico II, Via Foria 223, 80139 Napoli, Italia.*

Compiled by ***Roy Osborne****, Department of Chemistry, University of Natal, 4001 Durban.*

NEWSPAPER CLIPPINGS / KOERANTUITKNIPSELS

THE DAILY NEWS,

THURSDAY, FEBRUARY 24, 1994

News

Arrest as police find 42 stolen cycads

Daily News Reporter

THE KwaZulu Department of Nature Conservation's crack six-man special support unit has arrested a man and confiscated 42 rare cycads in the Nongoma area of northern KwaZulu.

This follows the unit's success at the end of last year when they recovered one of the biggest collections of stolen cycads ever in Natal from the Ngoye forest outside Eshowe.

Vaughan Smith, regional conservator for the KwaZulu Department of Nature Conservation (previously the Bureau of Natural Resources), said the decision last year to establish the small support unit, working undercover in a law enforcement role mainly outside reserves to combat illegal trade in wildlife, flora and fauna, was starting to pay significant dividends.

"This is a very important breakthrough as we feel these rare cycads, the Encephalartos Ngoyanus, were probably earmarked for commercial trade and not simply for muti. The fact that we recovered these cycads in good condition and with all their roots intact suggests they were specifically uprooted for business purposes," said Mr Smith.

His comments come hot on the heels of previous warnings from the KwaZulu Department of Nature Conservation that cycad trade syndicates are on the increase.

The main cycad trade in Zululand, said Mr Smith, is being conducted between local blacks and various Empangeni and Richards Bay people where some of the cycads are being sold to Johannesburg dealers and even sent overseas.

The Ngoyanus cycad is found only in Natal and its small size makes it both distinctive and easy to hide, which probably goes some way towards explaining why the cycad has largely been wiped out in the Ubombo and Mkuze areas of Zululand.

High-tech plan to save cycads

Daily Dispatch Correspondent

CAPE TOWN — Cape Nature Conservation is theft-proofing 40 endangered and valuable cycads that are believed to be the last remaining examples of the species in the world.

The prehistoric trees will have microchips installed in their stems.

Cycad thieves had better beware as they can be traced by satellite within the country and overseas with the help of the microchips, according to Mr Jaap Pienaar, a control converservationist at Cape Nature Conservation in Port Elizabeth.

Last year, 17 of these rare cycads valued at a total of R250 000 were stolen from private farms in the Eastern Cape. But all the cycads have since been recovered, he said.

The project — only taking place in the Eastern Cape — to foil the cycad theft syndicates operating in South Africa project would be completed next week, Mr Pienaar said.

Cape Nature Conservation was concentrating on the cycads that are the most endangered species before marking the other species, he said.

EAST LONDON

DAILY DISPATCH

20 April 1994

REKORD-OOS *Vrydag 13 MEI 1994*

Strawwer boetes nou opgelê

OORTREDERS wat onwettig handeldryf met spesiaal beskermde broodbome in Transvaal, sal voortaan 'n boete van tot R200 000 en/of 10 jaar tronkstraf opgelê word.

En dis nie al nie. Sulke oortreders sal 'n *verdere* boete van drie maal die handelswaarde van die plante waarmee misdryf is, opgelê word.

Dié gewysigde strafbepalings, wat onmiddellik van krag word, is onlangs deur die Administrateur-in-Uitvoerende Komitee van Transvaal afgekondig.

Die vorige strafmaatreëls het nie as voldoende afskrikmiddel gedien nie, ten spyte van verskerpte wetstoepassing. So sê mnr GP Visagie, Direkteur: Spesialiteitsdienste van die Hoofdirektoraat Natuur- en Omgewingsbewaring van die Transvaalse Provinsiale Administrasie.

Hy sê natuurlike broodboombevolkings, wat internasionaal as bedreig beskou word, word toenemend blootgestel aan onwettige ontginning en verskeie skaars soorte het reeds uit hul natuur-like omgewing verdwyn.

Die rede hiervoor is dat broodbome wêreldwyd as die mees gesogte groep plante onder versamelaars beskou word, met die gevolg dat buitensporige pryse in die handel van dié plante betaal word.

KNYSNA-PLETT HERALD
23 June 1994

CYCAD SANCTUARY ESTABLISHED

For all those who wonder what they are doing on the land next to Lightleys, they are establishing a Cycad sanctuary, tearoom, and replanting the plot with indegenous trees.

Mark Richter and his partner, Mike Pautz, a well-known Springbok angler, who is moving to Knysna to retire, bought the plot in 1992 and since then has done a lot of research for the project.

They wanted to transfer their Cycad collections from King Williams Town to Knysna.

Prof Roy Osborne did all the research for their project.

Their collection of 700 cycads, consisting of 37 different African cycad species, will be planted on the plot to establish a promulgating area and gene pool of different cycad colonies.

The company which is called Cycads for Africa, is registered as growers of cycad seedlings and sellers of cycads, with Cape Nature Conservation.

Some of these cycads are a few hundred years old.

This will be one of the largest private sanctuariess of Encephalartos cycads in the world.

Because they are such good transplanters, five of the cycads planted there, have already sprouted new leaves.

Cycads are rare and therefore extremely expensive and valuable.

To prevent even further theft of cycads, a new microchip device will soon be inserted into these cycads, which is linked to a satelite, this will enable authorities to find stolen trees.

As part of the sanctuary cycad seedlings from R20 to R400 will be sold.

They will also stock Australian cycads.

A tearoom and mountain trail will also be established at a later stage.

The cycad nursery will be open to the public.

Future planning also include a few log cabin chalets in the sanctuary.

LETTERS TO THE EDITOR (continued)

Dear Editor

PLANTS INSPECTED

In the June issue of "*Encephalartos*" in the section "Newspaper clippings" one of the items refers to a court case in East London in which a City Councillor was charged with the illegal possession of cycads. The item mentions that the Defence had stated that an expert witness, Mrs C. Giddy, who was called by the State had not made a physical inspection of the cycads.

As I have had several telephone calls from readers of "*Encephalartos*" about this and about the outcome of the case, I would like to place on record that I not only inspected the plants that had been confiscated by the Conservation authorities and replanted in a protected area but also the plants remaining in the garden of the accused. Both these inspections occurred prior to giving evidence.

Cynthia Giddy, P.O. Box 45, P.O. Umlaas Road, 3730.

Received 16 July 1994