ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTH AFRICA

TYDSKRIF VAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA

NO. 57 MARCH / MAART 1999 ISSN 1012-9987

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COVER / VOORBLAD : ***Dioon edule*: the inards of an unfertilized female cone, revealed when falling apart. Note the undeveloped ovules. Approximately life-size.**

Photo: Piet Vorster

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CONTENTS / INHOUD (continued / vervolg)

FROM THE PRESIDENT

In the previous edition of *Encephalartos* I had to interrupt my discussion of ***S v Rabson*** to report urgently on certain financial matters of the Society. In the

VAN DIE PRESIDENT

In die vorige uitgawe van *Encephalartos* moes ek my bespreking van ***S v Rabson*** onderbreek om dringend oor sekere finansiële sake van die Vereniging te berig. In

Rabson case, the question was whether one can lawfully and *successfully* defend oneself with the statement: "I didn't know I wasn't allowed to do that" or, in other words "I didn't know that what I did is forbidden by law - to tell the truth I was (incorrectly) under the impression that the transportation of cycads is covered by my permits". The magistrate was not impressed with this defence because Mr Rabson's misconception and "ignorance of the law" offers no excuse.

Fortunately, that was not the end of the case. Mr Rabson was not satisfied with the outcome of the case in the Magistrate's Court and appealed to the Supreme Court.

At the appeal Judge Galgut showed far more insight into the law and the principle of fairness of the law. He emphasised that Mr Rabson had reasonably believed that his action was lawful and legitimate. He had *wanted* to comply with the rules and it would not be consistent with the principle of justice to find him guilty of criminal behaviour when he had not wanted to act as a criminal. The following quotation from the verdict of Judge-President Solomon in ***R v Smith*** clarifies this legal position. *"If he did a thing without knowing he was doing wrong, or had reasonable grounds for believing that certain facts existed which justified his doing a thing, he would be excused on the gounds that there was no guilty knowledge on his part*". Based on this, the Judge found Mr Rabson not guilty of the statutory offence of which he had been accused.

In subsequent decisions, the legal position was further confirmed and clarified. Awareness of unlawfulness or knowledge that what you do or fail to do is unlawful, is part of the requirement of fault. Fault is nowadays an aspect of all crimes. Thus, if one believes one's conduct to be lawful or justifiable because of a factual misconception (one thinks the plant being transported is a palm tree and not a cycad) or because of a legal misconception (one does not realise that one needs a permit to cover possession of *Encephalartos humilis*), then one does not have knowledge of the unlawfulness of one's conduct, so one cannot be held criminally liable. Thus, dear collector: "Ignorance of law is indeed an excuse".

But be warned: the law requires everyone to acquaint themselves with the rules and standards pertaining to their specific profession or field. Thus, medical practitioners, lawyers and building contractors are expected to know the law pertaining to their respective professions. Therefore, every cycad collector or dealer is also expected to know the regulations pertaining to the acquisition, possession, transportation and sale of cycads.

Frederick de Jager

die Rabson saak was die vraag of 'n mens jouself regtens suksesvol kan verweer met die stelling: "Ek het nie geweet nie". Of, anders gestel, ek het nie geweet dat wat ek gedoen het regtens verbode is nie - om die waarheid te sê, ek was onder die indruk (verkeerdelik) dat die vervoer van broodbome deur my permitte gedek word. Die landdros was nie met hierdie verweer beïndruk nie omdat mnr Rabson se dwaling 'n regsdwaling was en "ignorance of the law" geen verskoning *bied nie*.

Gelukkig was dit nie die einde van die saak nie. Mnr Rabson was nie tevrede met die uitslag van die saak in die Landdroshof nie en het na die Hooggeregshof geappelleer.

Op appèl toon regter Galgut veel meer insig in die reg en die billikheidsbeginsel van die reg. Hy beklemtoon dat mnr Rabson redelikerwys geglo het dat sy optrede regmatig en geoorloof was. Hy *wou* die reëls nakom en dit sou nie met die beginsel van geregtigheid strook om hom aan kriminele gedrag skuldig te bevind terwyl hy juis nie krimineel wou optree nie. Die volgende aanhaling uit die uitspraak van regterpresident Solomon in ***R v Smith*** maak die regsposisie duidelik: *"If he did a thing wrong without knowing he was doing wrong, or had reasonable gounds for believing that certain facts existed which justified his doing a thing, he would be excused on the ground that there was no guilty knowledge on his part."* Steunende hierop vind die regter mnr Rabson onskuldig aan die statutêre oortreding waarvan hy aangekla was.

In latere regspraak is die regsposisie bevestig en verhelder. Wederregtelikheidsbewussyn oftewel kennis dat dit wat jy doen of nalaat om te doen ongeoorloof is, is 'n deel van die skuldvereiste. Skuld weer is deesdae 'n element van alle misdrywe. Daarom, as 'n mens dink jou gedrag is geoorloof as gevolg van 'n feitedwaling (jy dink die plant wat jy vervoer is 'n palm en nie 'n broodboom nie) of as gevolg van 'n regsdwaling (jy besef nie dat jy 'n permit moet hê wat jou besit van *Encephalartos humilis* dek nie) dan het jy nie wederregtelikheidsbewussyn (knowledge of unlawfulness) nie en daarom kan jy ook nie strafregtelik aanspreeklik gehou word nie. Gevolglik, geagte broodboomversamelaar: "Ignorance of the law is indeed an excuse".

Maar wees gewaarsku: Die reg verlang van elke persoon om hom van die reëls wat op sy besondere beroep of gebied van toepassing te vergewis. Daarom word daar van geneeshere, prokureurs en bou-aannemers verwag om die reg wat op hulle onderskeie beroepe van toepassing is, te ken. En daarom sal daar ook van elke broodboomversamelaar en broodboomhandelaar verwag word om die reëls wat op die verkryging, die besit, die vervoer en die verkoop van broodbome van toepassing is te ken.

Frederick de Jager

FOCUS ON ... FOKUS OP ...

In each edition of ENCEPHALARTOS, we focus on one cycad 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 broodboomsoort, in die vorm van 'n in-diepte-artikel in leketaal. In hierdie uitgawe val die kollig op:**

"THE COONTIE OF FLORIDA"

Tom Broome
The Cycad Jungle, 9128 Golden Gate Blvd, Polk City, FL 33868, U.S.A.

Figure 1 The south Florida Coontie in a natural stand at the Montgomery Botanical Center.

INTRODUCTION

When I first started researching this article, I did not know what I was getting into as far as the taxonomic problems this plant has. All I wanted to do was show everyone the different forms of *Zamia* that inhabit my home state of Florida. The more I dug, the more I found out that most people can not agree with what this plant, or these plants should be called. I will get into some details later. I am not the person to sort out and

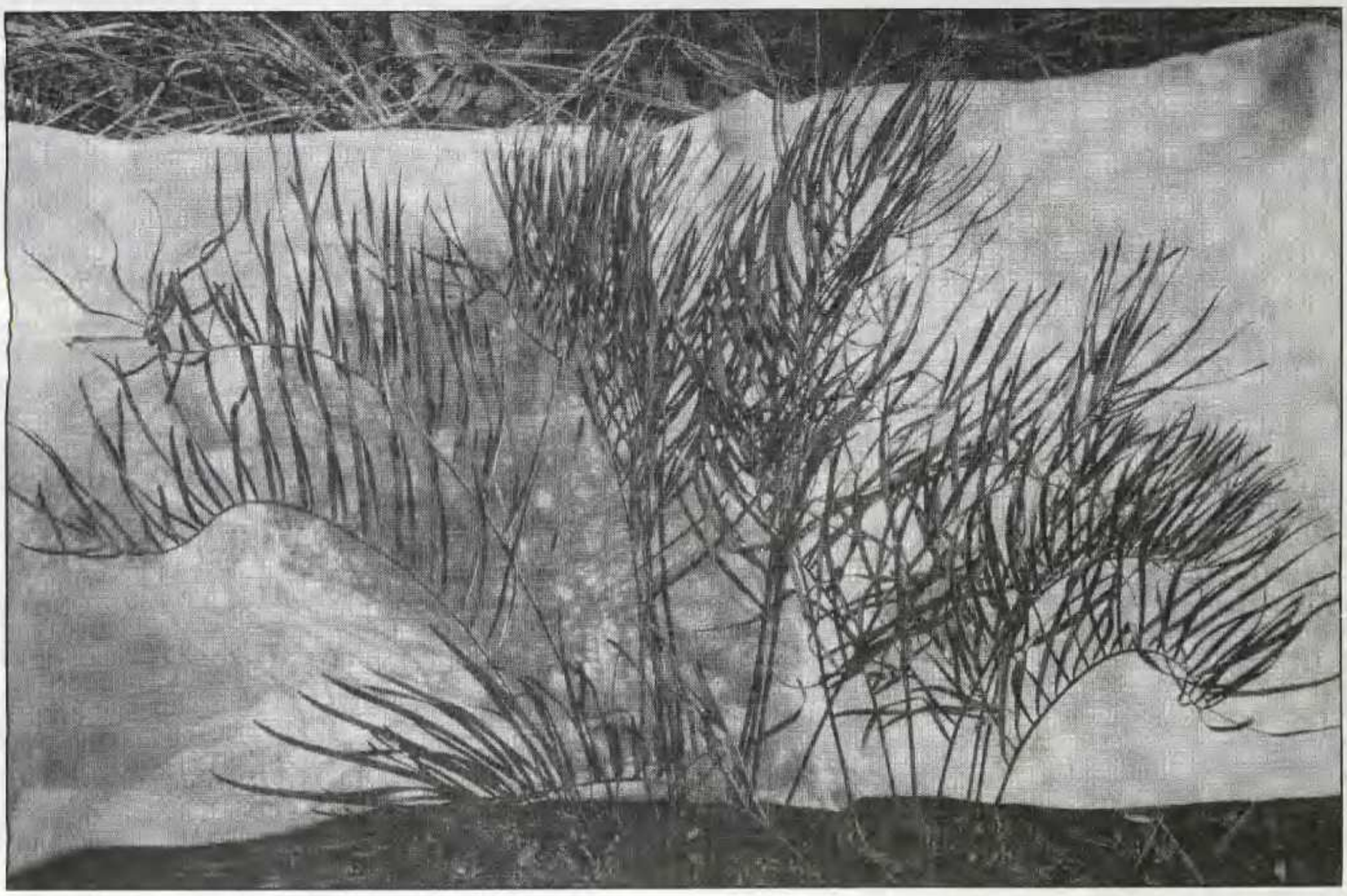

Figure 2 Coontie from Fanning springs. This has the thinnest leaflets of any Coontie that I have seen.

define what species these plants are. Instead of having a "focus on" article on *Zamia integrifolia*, or whatever the name should be, I felt that I was safe with "The Coontie of Florida" and let the taxonomists battle with the names.

HISTORY

There have been tribes of native people in Florida for the last 10,000 years. As new tribes came down from the main part of North America, these tribes changed. It is hard to say how long these plants have been used for food, but the first people known to eat this plant are the Calusa, and Timucua Indians. When the Seminoles moved into Florida in the mid-18th century, they picked up on this very important food source. "Coontie" is one of the names the Seminoles had for this plant, and roughly means "flour root". In certain areas there were vast colonies of these plants, mainly in south Florida, near Miami and Ft. Lauderdale. There is a reference to the mass quantities of plants around New River in Ft. Lauderdale. The native Indians called this place "Coonte Hatchee". I grew up in this area and I am afraid to say with all the building going on, there may only be a few isolated plants in this area. The Indians would cut up pieces of the stems, and pound them out into a powder as much as possible. They would then wash this in water several times and then let the starch sink to the bottom. The paste was taken and fermented, and then dried to a powder. When the white men came to Florida they also used the stems for food. Their name for this plant was "Arrow Root".

Around 1845 several factories sprung up all over south Florida to produce starch from the Coontie. One of the mills along the Miami River is said to have processed 10–15 tons of product per day, at peak production. In south Florida a natural population would grow very slow. It can take thirty years to grow a plant that might weigh five pounds. These factories produced starch until 1925. Between the starch factories, and the building in south Florida, only small remnants of these vast populations remain.

DISTRIBUTION

There are several forms of Coontie in Florida. There is a very thin leaf form that grows in St. Lucie county. This is in southern, central Florida, on the eastern coast. The distribution of this plant goes all the way to the southern tip of Florida, and into the keys. The plant

picks up again on the western coast in Everglades National Park. From there it runs north all the way up the coast to Taylor County, near the panhandle. There are old references that mention these plants growing half way into the panhandle, but I do not know anyone who has seen them this far to the west. In most cases, these plants live in pine hammocks on sandy soils. As the distribution area heads north, the plants grow under turkey oaks as well. In Miami, and along some parts of the western coast, plants can be seen imbedded in coral rock. These plants show that Coontie can be grown in very alkaline soils, and have great tolerance to salt. All along the western coast small plants can be seen growing on small outlying islands. The plants that grow in coral rock grow very slow, and are usually not very big. The plants that grow in sand can get much bigger. Figure 1 shows a plant growing at the Montgomery Botanical Center, in an area that has been kept natural. Many of the plants that grow on rock, or in semi wet areas will have their stem apex exposed. When I went to the habitat in Steinhatchee, a very xeric area, the tops of the tubers were at least thirty centimetres above the soil surface. Even though all these plants are called "the thin leaf form", there are a lot of variations in certain areas. There is one unique plant that grows from the western side of Gainesville to Fanning Springs, which has the thinnest leaflets of all the forms (Figure 2). The leaflets are also longer than the other thin leaf forms. It reminds me a lot of *Zamia portoricensis* as far as leaflet size is concerned. I had to put a white background in the picture just so that the plant could be seen on film. In certain areas of the western coast, plants that have leaflets of moderate width can be seen. These plants grow in pockets, and do not have large distributions. There is a lot of controversy on whether many of these populations are natural, or whether these plants were brought in and cultivated by the Indians. It is interesting to note that many of these populations are alongside rivers, growing in sand. Figure 3 shows the distribution of the thin leaf forms. Even though I agree with this map for the most part, I have heard of plants growing south and north of the shaded areas on the western coast.

The "wide leaf" forms grow mainly in the northeastern part of Florida. The south part of this distribution starts in Brevard County, and goes north into an area close to Jacksonville. This distribution moves west into Marion, and Alachua Counties. This plant grows mainly in sand, and usually grows under pines and oaks. There again in certain areas, plants can be seen growing where salt water can flood for short periods of time. These plants will usually grow to be much larger, and I think they are much nicer looking for ornamental use. Figure 4 shows a plant growing in Ocala National Forest. Again, within this area there are different-looking plants. The most noteworthy plant has been called "the Palatka giant", by local people. This is truly an incredible plant. It grows more upright than most of the other forms. The leaflets

PREPARED BY: Daniel B. Ward and Kent D. Perkins.

Florida Coontie (*Zamia floridana*)

Figure 3 Distribution of the thin leaf form in Florida.

Figure 4 Plants growing in habitat in the Ocala National Forest.

are wider, the cones are larger, and the leaves have been said to reach 2.3 metres in length. Figure 5 shows a "Palatka giant" growing in Gainesville. This is a cultivated plant. Figure 6 shows the distribution of the wide leaf forms.

TAXONOMY

In 1763 Linnaeus described *Zamia pumila* as coming from the Dominican Republic, Puerto Rico, and Cuba. This was the first *Zamia* to be described. James

Figure 5 Russell Adams standing beside a Palatka giant plant, that is in cultivation in Gainesville.

PREPARED BY: Daniel B. Ward.

East-coast Coontie (*Zamia umbrosa*)

Figure 6 Distribution of the wide leaf form in Florida.

Eckenwalder feels that all the zamias from the Caribbean, including the plants from Florida, should all be *Zamia pumila*. There are many people who go along with this outlook on the Florida plants. In 1789, William Aiton described *Zamia integrifolia* from a plant found in the Halifax River region. This is in the distribution of the wide leaf form. According to Dan Ward, who works for the University of Florida in the botany department, the description of *Zamia integrifolia* is invalid. He says that in a certain area of the text, it is written that *Z. integrifolia* = *Z. pumila*, making these names synonymous, and voiding the description. I could not find a copy of the original description to check this out for myself. The next description of a Florida *Zamia* was in 1868, by Alphonse De Candolle, and was named *Zamia floridana*. This was one of the thin leaf forms from an area north of Tampa. In 1921 John Small described *Zamia umbrosa*, the wide leaf form around the Saint Johns water shed. So what does this all mean? If you believe Eckenwalder, all the plants from Florida are *Z. pumila*. If not then they are *Z. integrifolia*. If this species is invalid, then *Z. floridana* should be what they are called. If you believe that there are two separate species in Florida, the thin leaf and wide leaf plants, then the thin leaf form should be called *Z. floridana*, and the wide leaf form should be called *Z. umbrosa*. To confuse matters further, there are some people that feel that there are more than two species in Florida. I have noticed a considerable difference in leaflet shape, cone size, and cone colour on the different forms in Florida. The big question is what determines a difference enough in two plants to make them separately described species?

DESCRIPTION

1. STEM

The stem of a single headed plant can be 10 cm in diameter. Many times after a plant has produced a cone, the apex will split into two separate heads. After years of this, a stem can get to be very large. Also, large plants in the ground will push new tubers from the main stem, ending up in clumps up to 2 m in diameter. Stems are almost always subterranean unless the plants are growing on coral rock.

2. LEAVES

Leaves can vary from 30 cm in length for the Fanning Springs plant, to more than 2 m in length for the Palatka giant. Leaflets vary in width from 2 mm for the Fanning Springs plant, to 3 cm for the Palatka giant. Most of the leaflets on the thin leaf forms will curl up and twist, where most of the wide leaf forms stay flat. I have noticed that the leaflets of these plants will flatten out more if they are grown in shade, where if you put them in full sun the leaflets will reduce in width and curl up sometimes. This appears to be a way to decrease the amount of moisture lost from the plant, by reducing the amount of surface facing the sun. When my cultivated plants are pushing new leaves I will water them more. These plants will flatten out more than the same plants that I water less often. The typical habitats of the wide leaf forms usually are shaded more than the habitats of the thin leaf forms. This may have been the way that these plants have evolved over time. Figure 7 shows some of the leaflets from the different plants I have talked about.

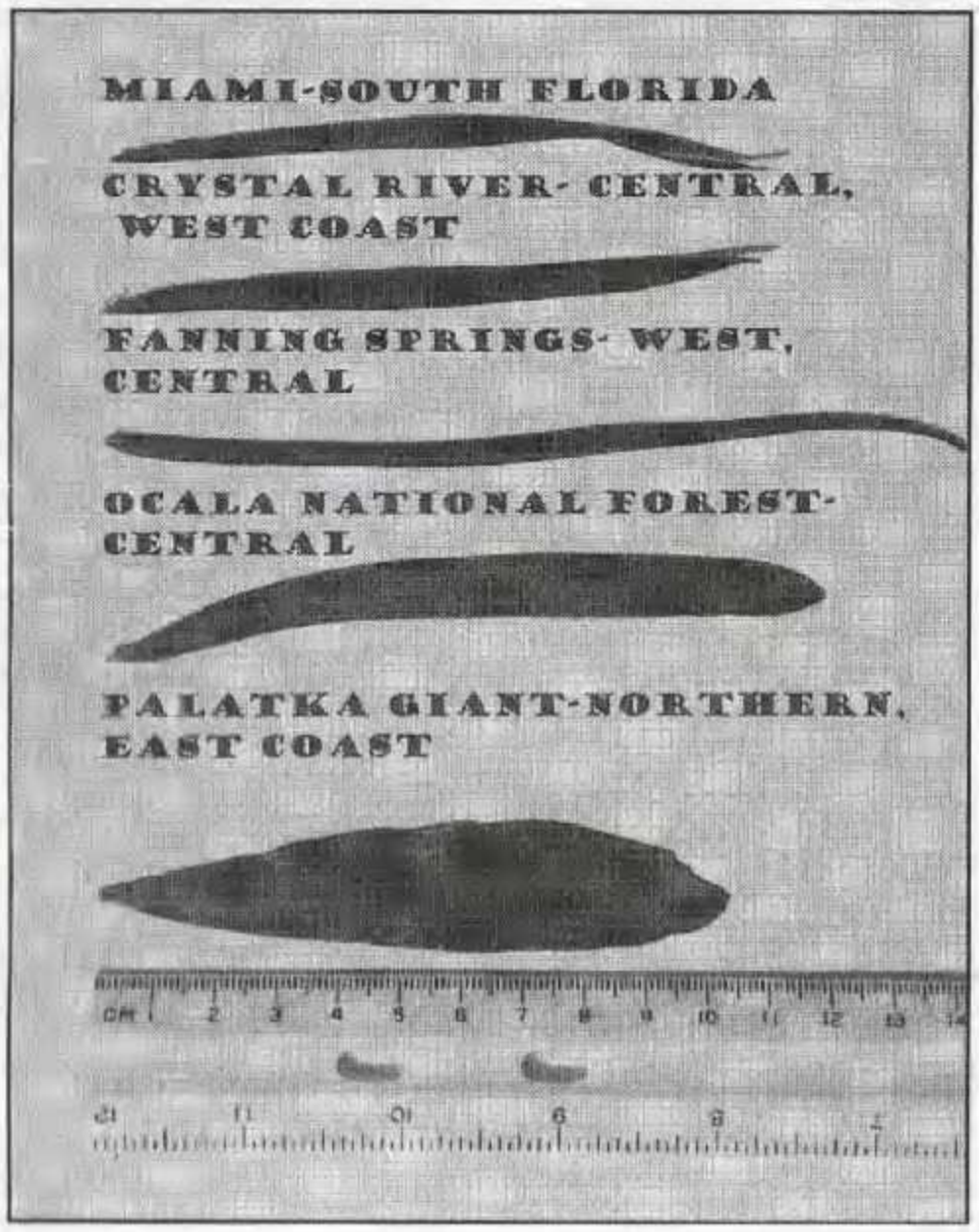

Figure 7 Leaflets taken from some of the different forms in Florida.

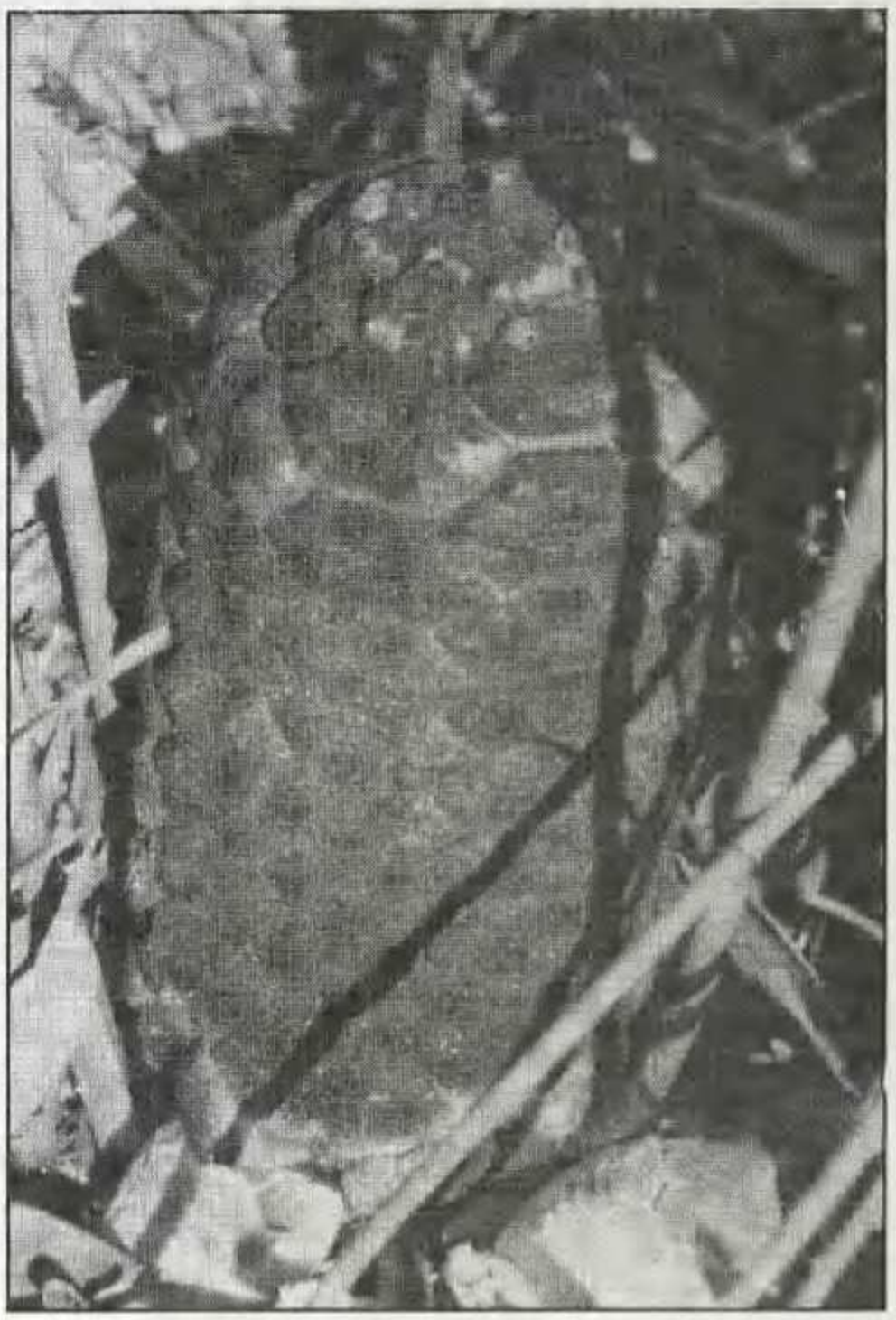

Figure 8 Older female cone with seeds, and the new emerging female cones at the bottom.

3. CONES

Male cones can be 16 cm or more in length. They will be usually around 3 cm in diameter. Depending on the form, the cones can be black, brown, or even dark orange. Figure 9 shows newly emerging male cones on a wide leaf form.

Female cones can be only 6 cm long for a dwarf type from the west coast, to almost 30 cm long for a Palatka giant that is full of seeds. The width of the cone on the dwarf type can be as narrow as 4 cm, and the Palatka plant can have cones around 14 cm in diameter when they are filled with seeds. The colours of the female cones match the colours of the male cones. There are a lot of minor differences in the female cones from different areas. The nipple on top of the cone will vary from tall to almost flat. The female cone scales can vary as to the pattern and size. Usually, cones emerge around August and are receptive in January. Figure 8 shows an old cone, and newly emerging cones on a wide leaf form.

ANIMAL RELATIONSHIPS

There are two beetles that pollinate the zamias in Florida, *Pharaxonotha zamiae*, and *Rhopalotria slossoni*. They will feed on the starch-rich male cones and are attracted to the female cones from what appears to be a change in colour and temperature of the female cones. I have not noticed any particular odour from the female cones but it is likely that these cones do emit some sort of odour not obvious to humans. The larvae of the Atala butterfly feeds on the leaves of the Coontie in south Florida, whilst the larvae of the Echo moth will eat the leaves of Coontie in north Florida. There are many animals that aid in seed dispersal. Mockingbirds, grackles and blue jays seem to be the best dispersal agents. Rats and mice to a lesser extent will move seeds, but they will eat most of them. When the seed coat starts getting soft around April or May, many of these animals will carry off the seeds. Pill bugs will clean the seeds that are left around the mother plant. It is interesting to note that when the seeds drop off the plant, there is a waiting time before the seeds are ready to germinate. Right about the time that these animals start moving the seeds is when they should start germinating.

CULTIVATION

Most of the habitats have sandy soils. When growing

Figure 9 Male cones emerging on a cultivated wide leaf form.

these plants they should have good drainage. Most of the habitats are considerably shaded. The plants look their best when grown in partial shade, but when grown in full sun they have the extra energy to produce more cones and leaves. Fertilizer should be applied on a regular basis, but the most significant time for producing leaves is in late spring. Cones emerge around August, so a high nitrogen fertilizer applied around June should help produce more cones. This is at least the timing for Florida. It would be interesting to see how these times change in the different parts of the world.

ACKNOWLEDGEMENTS

I would like to thank Daniel Ward for a lot of information on the taxonomy of the Coontie, as well as letting me use his maps of Florida. I would also like to thank Knut Norstog, and Bart Schutzman for helping me understand all of these taxonomic problems. Also, I would like to thank Frank Brandt, and Russell Adams for showing me around their areas to look at plants. And to Terrence Walters, Executive Director of The Montgomery Botanical Center, for letting me photograph their plants in habitat situation.

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Figure 9 Male cones emerging on a cultivated wide leaf form.

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CALLING ALL EASTERN CAPE MEMBERS OF THE CYCAD SOCIETY OF SOUTH AFRICA

Marius Helm
P.O. Box 9612, 5320 Queenstown, R.S.A.

Received 29 October 1998

What is wrong in our Province? Just look at all the activities of Regional Branches of the other Provinces, especially the Transvaal Regional Branch. How about let's get together and do something!

Our Province is rich in cycads, 14 of the 37 cycad species indigenous to South Africa occur in the Eastern Cape, that's almost 40%. Included in this is highly sought after species such as *Encephalartos latifrons* and *E. arenarius*, not to mention our beautiful blue leaved species and *E. friderici guilielmi*, the representative species for *Encephalartos*.

We have wide diversity of species ranging from the wide leaved species such as *E. latifrons* and *E. arenarius*, which are not very frost hardy, to the narrow leaved *E. ghellinckii* and *E. cycadifolius* which are very frost hardy.

What do you think of the following ideas?:

1. Guided tours to various cycad localities. (I live in Queenstown and will be more than happy to show *E. friderici-guilielmi* localities in my area, as I am sure you will be in your area.)
2. Get together to swop seedlings and seed.
3. A Web-site on Internet where we can swop ideas.
4. What about a yearly seedling auction (seedlings under 5 cm only), profit to be used to fund tours and projects such as microchipping of endangered and rare cycads, and to pollinate plants in their natural habitat.
5. Visits to big collectors throughout South Africa.
6. Lectures by cycad experts.
7. I am sure you will have some ideas of your own.

Please fax, e-mail or call me if you are interested (Cell: 082 807 1029; Phone: 0451 5728; Fax: 0451 81424; E-mail: bartsch6@eci.co.za).

REUNION OF CYCAD ENTHUSIASTS

Charles and May de Kock
P.O. Box 7222, 0855 Tzaneng Mall, R.S.A.

Received 24 December 1998

During the 1996 World Cycad Congress in China (CYCAD 96), people from various walks of life were brought together by the mutual fascination, interest and love of cycads with subsequent interesting and lasting friendships developing.

During November of 1998 a reunion of four families, who met in China, took place in Zimbabwe at the lovely and comfortable home of Dennis an Liz Lapham (boasting a most magnificent garden that can only be described as a park) on their neat and well-developed farm "Devonia" some 40 km east of Harare. First to arrive were Ed and Dot Wohlberg, retired electrical engineer from Durban, followed by Charles and May de Kock, farmers from Tzaneen in the Northern Province, and then Nat and Hanneke Grobbelaar from Pretoria - each couple travelling individually (Figure 1).

As a special treat, the Laphams arranged a visit to the Eastern Highlands where we spent three wonderful nights in the very exclusive private guest house "The Castle", tucked away in the fog/mist shrouded Vumba mountains 35 km southeast of Mutare, very close to the Mozambique border.

During our stay in Zimbabwe, Dennis and Liz arranged outings to some very interseting gardens where ***cycad talk*** was the order of the day.

Brian and Mandy Schlachter, on the outskirts of Harare, received and showed us around their lovely garden where we admired some beautiful specimens of

Figure 1 From left to right: Back row: Nat Grobbelaar, Edgar Wohlberg, Dennis Lapham, Charles de Kock; Front row: Hanneke Grobbelaar, Dot Wohlberg, Liz Lapham, May de Kock.

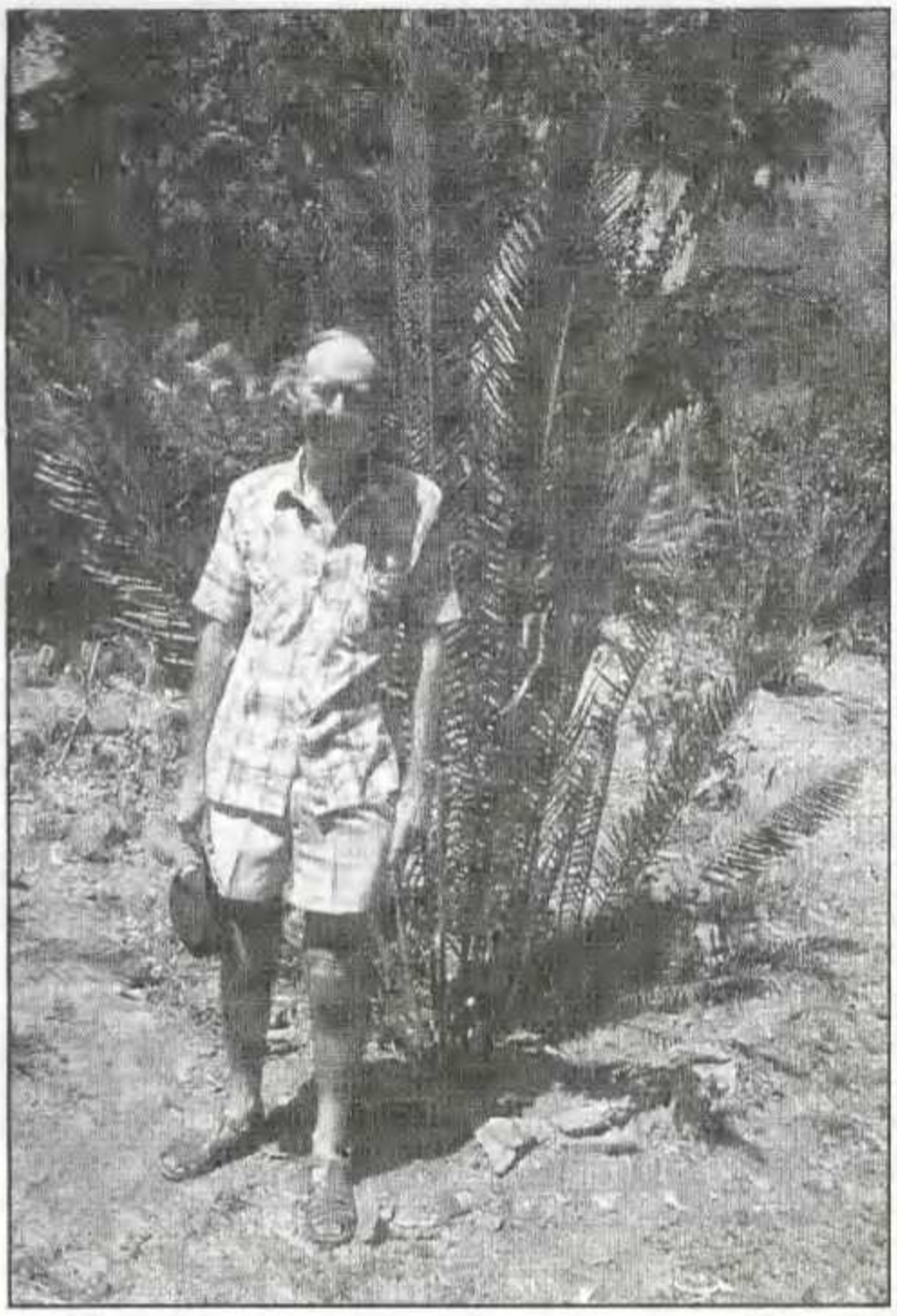


Figure 2 Ian Turner in his garden with *E. equatorialis*. Photo: Nat Grobbelaar.

Encephalartos manikensis, some very interesting *E. woodii* hybrids and an exceptionally striking specimen of *E. altensteinii*. (I am still chewing on the ***plant energy field*** bit Brian.)

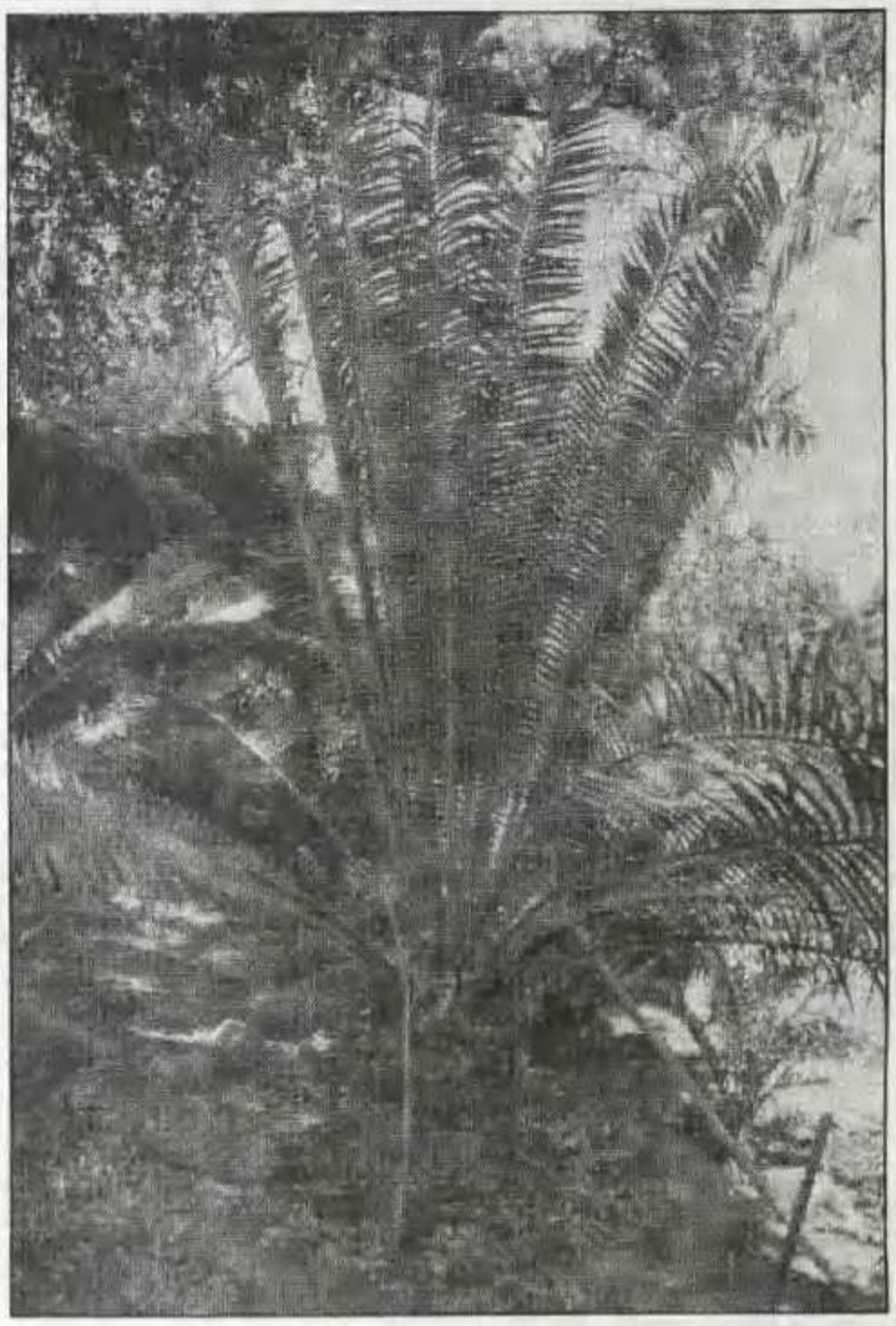


Figure 3 A magnificent specimen of a female *E. whitelockii* in cone (one cone has fallen off) in Ian Turner's garden. Photo: Nat Grobbelaar.

While in the Vumba mountains we also visited the Manchester Botanical Gardens and enjoyed their lovely water features and tree ferns - also their rather young but quite extensive cycad collection.

On the way to the Lapham's lovely weekend cottage at Enchanga, we dropped in at the home of John Weeks of "Trout Beck" where he has growing in his garden, at an altitude of some 7,000 feet, some specimens of *E. manikensis* which seem to have adapted quite well despite originating from Mozambique at much lower altitudes.

One of the highlights (there were so many) was the visit to Ian Turner's garden with that most magnificent collection of cycads around his home on the "klip koppie" (stony hillock) (Figure 2). What a privilege to slowly meander through the groves of cycads, listening to him answering questions, explaining, describing and imparting the valuable knowledge he has acquired over decades. One of the most striking specimens in his garden is *E. whitelockii* (Figure 3) with its leaves reaching up to 2.5–3 metres from the crown. As a novice I found the masses of cycad species quite

Figure 4 Cycad collection, Ewanrigg Botanical Garden, Harare.

Figure 5 Nat Grobbelaar and Dennis Lapham admiring *E. woodii* at Ewanrigg Botanical Garden.

overwhelming, but later felt somewhat better when I overheard a mumbled remark from Nat Grobbelaar "*One can take in so much and no more!*". May I repeat an urgent request that Nat directed to Ian. "Please Ian, document the knowledge and history of the various plants in your garden to ensure that the data will be preserved for posterity. Your collection is so very valuable and your knowledge about each plant so vitally important."

Next we visited the Ewanrigg Botanical Gardens, situated a couple of kilometres northeast of Harare, comprising a large tract of land donated from a deceased estate, of which approximately 40 ha have to date been developed and laid out into a magnificent park, boasting a very impressive collection of cycads (Figure 4) with beautiful specimens of some rare South African species such as *E. woodii* (Figure 5), *E. latifrons*, *E. inopinus* and *E. cupidus* (Figures 6, 7). A very sad and disturbing fact, however, is that of the four *E. woodii* suckers which the supervisors have removed from the single parent plant in the past, not even one has survived.

Figure 6 Female *E. cupidus* in cone at Ewanrigg Botanical Garden. Photo: Nat Grobbelaar.

Figure 7 Close-up of the *E. cupidus* female cone. Photo: Nat Grobbelaar.

As South Africans we found very interesting the general tendency of the much reduced European population of Zimbabwe, to have get-togethers over weekends which people attend from far and wide. We had the privilege to attend just such a garden tea-party/come cycad

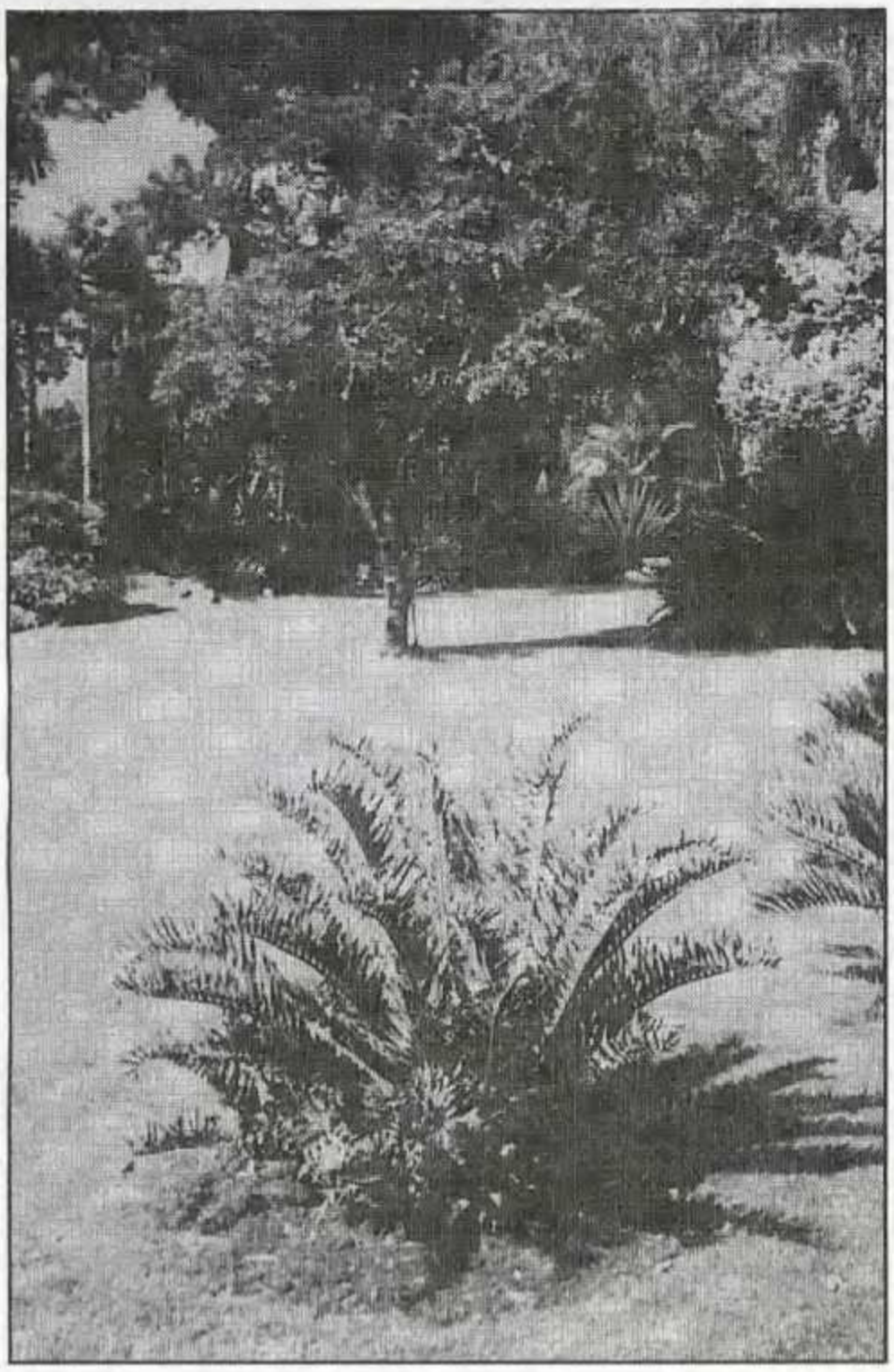


Figure 8 The lovely garden of the Rivrons of Harare, with *E. trispinosus* in the foreground.

meeting on the Saturday afternoon in the beautifully manicured garden of the gracious couple Barry and Bev Rivron of Harare. With exquisite examples of mature specimens of *E. equatorialis, E. gratus, E. transvenosus, E. dolomiticus, E. trispinosus* (Figure 8) and various of the *E. manikensis* types, it took quite an effort to get the meandering enthusiasts together under the lovely cool shade trees for tea and a short talk by Nat Grobbelaar on the very interesting, but controversial, subject of cycad sex change (Note, says Nat "**not gender change**").

This, however, was not yet the last item, by a long shot, on that Saturday's agenda. We were next whisked off to the beautiful garden of Advocate Eric and Mahdu Morris in a different part of Harare. As dusk fell, we were taken on a most informative tour in their lovely garden with it's extensive and rare palm collection. The correct identification of each palm on neat name tags was impressive and most helpful.

By this time most of the local cycad and palm enthusiasts had arrived and were gathering around the pool where fires were being lit for the braai. A wonderful spread was laid on by Mahdu and with some excellent local wines flowing, it was good to renew old acqaintances such as the Harveys, the Kimberleys, the Schlachters, and also meeting many more delightful Zimbabweans.

Thank you, all you dear folks, for making our reunion in Zimbabwe such a memorable occasion. I repeat my invitation - do look us up when next you are down South. The Modjadji cycad forest (*E. transvenosus*) is close by and a visit can be arranged.

NUUS OOR DIE TRANSVAALSE STREEKTAK VAN DIE VERENIGING

Hanneke Grobbelaar
Posbus 15357, 0039 Lynn-oos, R.S.A

Ontvang 13 Januarie 1999

PROGRAM VIR 1999

SATERDAG 6 FEBRUARIE 1999: Ons besoek die tuin van **dr Martin Bruwer** in Montana Park, Pretoria. Vergader asseblief om 14h00 by "Cycad Kwekery" in Besembessieweg, Montana Park. Bring asseblief u eie versnaperinge.

SATERDAG 6 MAART 1999: Ons vergader om 14h00 by die hoofgebou van die Nasionale Botaniese Instituut, Pretoria. **Dr Heidi Anderson** van die Nasionale Botaniese Instituut, Pretoria, sal ons toespreek oor:

"Cycads as living fossils".

Na die praatjie sal belangstellendes die herbarium waarin die fossiele geberg word kan besoek.

SATERDAG 15 MEI 1999: Ons vergader om 12h00 (**let op die tyd**) by die hoofgebou van die Nasionale Botaniese Instituut, Pretoria. **Dr Terrence Walters** van die Montgomery Botanical Center, Florida, V.S.A. sal ons toespreek oor:

"**Cycads of the Montgomery Botanical Center**".

VERSLAE OOR ONLANGSE VERGADERINGS

Op 7 November 1998 was ons gelukkig om vir Tommie Steyn en Gerhard Strydom van die Mpumalanga Parkeraad by ons te hê. Tommie het vir ons vertel van hul stryd teen broodboomdiewe en die metodes wat hulle aanwend om dit te probeer bekamp. Kyk na meegaande artikel deur Tommie oor "Conserving Mpumalanga's cycads (*Encephalartos* species) using transponders". Gerhard het ons ingelig oor die projek wat hulle in samewerking en tot voordeel van die Mhambo gemeenskap aangepak het om broodboom-saailinge (*E. lebomboensis*) op groot skaal te kweek en te bemark. Kyk na die artikel van Kay Montgomery: "Marketing the spirit of Africa" ('n tydskrifuitknipsel in *Encephalartos* **56**: 31–32). Kyk ook "Broodbome uit Mananga in Nederland bemark" en "Dié bome gesteel as vigsmiddel" onder die koerantuitknipsels op bl. 36–38 in hierdie uitgawe van ons tydskrif.

Ons hartlike dank aan die twee here wat hul Saterdag opgeoffer het om ons te kom toespreek.

Derek en Lynette Minnar het ingewillig om hierdie jaar as voorsitter en ondervoorsitter van die Streektak oor te neem nadat ek besluit het om vroeg uit te tree. Ek het reeds byeenkomste vir die eerste helfte van die jaar gereël en ek weet dat twee sulke entoesiastiese jongmense ook vir die res van die jaar interessante byeenkomste sal reël. Baie dankie vir die ondersteuning wat ek van ons lede gehad het en ek hoop dat u met nog meer entoesiasme ons Vereniging sal steun. 'n Vereniging is trouens net so sterk en goed as wat sy lede hom wil maak! Sterkte aan Derek en Lynette.

CONSERVING MPUMALANGA'S CYCADS (*ENCEPHALARTOS* SPECIES) USING TRANSPONDERS

Tommie Steyn
Mpumalanga Parks Board, 1201 Nelspruit, R.S.A.

The genus *Encephalartos* is the second largest genus of the cycads consisting of approximately fifty species all endemic to the African continent. Eight of these cycad species occur mainly or exclusively in the Mpumalanga province. The greatest threat to these plants is illegal removal from their habitat. A major obstacle to successful law enforcement is (especially if the accused was not caught in the act) the inability of law enforcers to prove that a plant was illegally removed from its natural habitat.

To solve this problem, in 1991 different possibilities were explored by conservation agencies in South Africa. This problem was solved when an American electronic transponder manufacturer in Minnesota, **Destron Fearing** developed a unique system for **Identipet**, a South African company.

The system is known as **Idcycad** and has been tested and approved by the SAPS forensic laboratory. Each transponder has its own serial number making it possible to link data like the ecology, locality, threats and biology to each plant. The system is not compatible with any of the other transponder systems like "Identipet" or "Identicar" giving the advantage that conservation agencies can exercise full control over the system.

In 1995 a project was launched by the Mpumalanga Parks Board to implant all field cycads with the Idcycad transponder system. The goal of this project is to implant all cycad species in Mpumalanga with transponders over time. This will improve law enforcement and also act as a deterrent to illegal cycad removers.

The first phase of this project was a planning phase where most of the time was spent collecting information. During this phase the number of cycads that needs to be marked was determined. This was done by locating the population size, numbers and species which was then documented on 1:50 000 scale maps. To determine the approximate time needed to mark the cycads, the time needed to perform the implanting procedures were determined. Furthermore it was also necessary to ascertain the habitat accessibility and the population distribution as this have a big influence on the time needed to mark a population. To determine the priority species, cycad species were evaluated on the basis of population size, poaching threat and accessibility. Once the number of cycads that needs to be marked was determined and priorities were set, the funding needed could be determined.

It was decided that Heenan's cycad (*E. heenanii*) was the most threatened followed by the Kaapsehoop cycad (*E. laevifolius*) and the Middelburg cycad (*E. middelburgensis*). The funds needed to implant the three priority species was approximately R54,644.00.

The next phase was to execute the implantation. The implanting techniques was first tested and then staff was trained to use the scanners and the implanting techniques. Although the cycad populations were mapped each individual plant needed to be located before implanting. To save time and money a helicopter was used to cover the single plants and small populations in inaccessible mountainous areas. This was done by dropping the marking teams (consisting of one to two people depending on the size of the population) at

different sites and picking them up for the next site. The latitude and longitude degree of each site was programmed into the helicopter's GPS to ensure fast and effective transport to populations in inaccessible mountainous areas. By using a helicopter lots of time was saved as plants could easily be located from the air and marked in one day which otherwise would have taken weeks. With each transponder implanted, information was collected. The information dealt with the plant's exact locality, size, species and sex. This information was then computerized for easy access during law enforcement exercises.

The last phase is to implement the system by handing the computerized database over to the Mpumalanga Parks Board's special investigations unit. The advantage of all marked (implanted) cycads found anywhere else than its natural habitat is that its legality, precise locality in its habitat and what species it is, can be traced within seconds via a phone call.

The planning phase has been concluded. During the executing phase, sponsored by Ingwe Coal Corporation and EWT, 2876 transponders were implanted at a cost of R54,644.00. The implementing phase has been partly concluded as the scanners and computerized database have been handed over to law enforcers.

This system has already paid off in various cases. In Mpumalanga, Kaapsehoop cycad (*E. laevifolius*) poachers were caught locally as well as in Pretoria in a combined effort by the Mpumalanga Parks Board's Special Investigations Unit and the SAPS Endangered Species Unit. From August 1996 to February 1997 in four separate cases 22 people were caught with 70 *E. laevifolius* cycads. In all the above cases transponders played an essential role. No known plants have disappeared since February 1998 and it seems as if the poachers have been deterred from this population.

THE MANANGA CYCAD PROJECT

Gerhard Strydom
Mpumalanga Parks Board, 1201, Nelspruit, R.S.A.

See the magazine clipping of Kay Montgomery's article "Marketing the spirit of Africa" in *Encephalartos* **56**: 31–32, and the newspaper clippings "Mananga cycads to be marketed in the Netherlands" and "These cycads stolen as a remedy against aids" on p. 36–38 of this issue of our journal.

BOTANICAL TERMS OFTEN ENCOUNTERED IN CYCAD PUBLICATIONS
Part 2

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

Received 13 January 1999

ecology (ekologie) - The study of the interaction between living organisms and between them and their inanimate environment.

ecotype (ekotipe) - A locally adapted population of a widespread species, usually with small but recognisable differences in form (shape) or behaviour from other ecotypes of the same species.

ellipsoidal (ellipties) - Having the outline of an ellips. (Oval and flat and narrowed to each end which is rounded.)

elliptic or elliptical (ellipties) - As for "ellipsoidal" above.

elongate (verleng) - Drawn-out in length.

emarginate (uitgerand) - Having a notch at the apex.

embryo (embrio) - Dormant or developing plant contained within a seed.

emergent (verrysend) - Said of a trunk when it extends above ground level.

endemic (endemies, inheems) - Restricted in distribution to a particular area.

endosperm (endosperm) - The energy storage tissue of the seed which is used by the developing embryo and seedling. It is the remains of the female gametophyte (megagametophyte) and is haploid, unlike the endosperm of flowering plants which is triploid.

ensiform (swaardvormig) - Sword-shaped as in the leaflets of many cycads.

entire (gaaf, gaafrandig) - Having a smooth margin unbroken by teeth or other irregularities.

eophyll (eofil) - First seedling leaf.

epidermis (epidermis) - The outermost cell layer of a non-woody plant organ.

epithet (epiteton) - Second part of a plant's name.

erect (orent, regop) - Upright.

exotic (eksoties, uitheems) - A plant, belonging by nature or origin, to another part of the world.

facet (gesigsvlak) - One of the flat surfaces into which the outer face of a cone-scale is usually divided. The middle facet is called the terminal facet.

falcate (sekelvormig) - With one margin longer than

the other; sickle-shaped.

farinaceous (styselhoudend, styselagtig, amiloïed) - Containing starch, as in the trunks of cycads used for sago; also appearing as if dusted or coated with flour.

fasciculate (gefassikuleer) - Arranged in tufts at the apices of branches.

ferruginous (roeskleurig) - Rusty brown colour.

fibrose (veselagtig) - Containing fibres.

fimbriate (gefimbrieer) - Fringed with fine hairs.

flabellate (waaiervormig) - Fan-shaped.

flaccid (verlep, verwelk) - soft, limp, lax.

flexuose (golwend) - Having a zig-zag form.

floccose (vlokkig) - Having tufts of woolly hairs.

foetid (onwelriekend) - Having an offensive odour.

forked (gevurk) - Divided into equal or nearly equal parts.

form (vorm) - A botanical division below a species.

free (los, vry) - Not joined to any other part.

frond (varingblaar) - A fern leaf; vegetative leaf bearing spores. Unfortunately sometimes also used for vegetative leaf of a palm and a cycad.

fused (vergroei) - Joined or growing together.

fynbos (fynbos) - Name applied to the macchia-type, low-growing and woody vegetation of the south-western and southern part of South Africa, physiologically adapted to a Mediterranean climate of wet winters and hot, dry summers.

geniculate (geknie) - Bent like a knee.

genus (genus) - The usual major subdivision of a family or subfamily, usually consisting of more than one species. The species which make up the genus are very similar to one another and are considered very closely related. The genus designation is the first part of the scientific name of a species (plural: genera).

germination (kieming) - The active growth of the embryo in a seed resulting in the development of a young plant.

glabrous (onbehaard) - Smooth-surfaced, hairless.

glacous (glousien, blougroen) - Grey or bluish-grey in colour, often imparted by a waxy or powdery bloom.

globose (bolrond) - Globular, almost spherical.

gymnosperms (gimnosperme) - A group of plants which in most cases bear seeds in cones where they are attached to a modified leaf but not enclosed in a fruit; the cycads and pines are gymnosperms.

habitat (habitat) - The environment in which a plant grows.

hastula (hastula) - An outgrowth or flap of tissue at the insertion of the blade on the petiole in palmate leaves.

hirsute (ruharig) - Covered with short white hairs or wool, giving the surface a greyish appearance.

homogenous (homogeen) - Said of seed endosperm that is uniform throughout, without interruptions of the seed coat into the endosperm.

hybrid (hibried, baster) - Progeny resulting from the cross-fertilisation of unlike parents.

hypogeal (hipogeaal, ondergronds) - Situated beneath the surface of the earth.

hypogeous (hipogeaal, ondergronds) - the same as "hypogeal" above.

imbricate (imbrikaat) - Leaf arrangement in which the apex of the older leaves overlaps the basal parts of the adjoining younger ones.

imparipinnate (onewe geveer) - Pinnate leaves bearing a single terminate leaflet which extends from the end of the rachis.

incubous (nie-dakpansgewys) - Said of laterally overlapping leaflets in which the upper (distal) margin of a leaflet overlaps the lower (proximal) margin of the adjoining more distal leaflet.

incurved (ingekrom) - curved inwards (in an adaxial direction).

indehiscent (nie-oopspringend) - Not opening on maturity.

indeterminate (onbepaald) - Growing on without termination, as in the trunks of most cycads.

indigenous (inheems) - Native to a country, region or area but not necessarily restricted there.

indumentum (indumentum, haarkleed) - A collective term describing the hairs or scales found on the surface of an organ.

induplicate (geïndupliseer) - Rolled or folded inwards; leaflets folded longitudinally with the V opened on the adaxial side of the leaflet.

inflexed (ingebuig) - Curved inwards (in adaxial direction).

internode (lit, stingellit) - The stem between the point of attachment of two successive leaves.

involute (involuut) - Rolled inwards (in adaxial direction) from the edge; opposite of "revolute".

irregular (onreëlmatig) - Said of leaflets not arranged directly opposite on either side of the rachis.

juvenile (jeug-) - The young stage of growth before the plant is capable of coning.

karoid (karooagtig, karooïed) - Of or relating to the "karoo", the arid inland plateau of South Africa which is characterised by a sparse xerophytic vegetation.

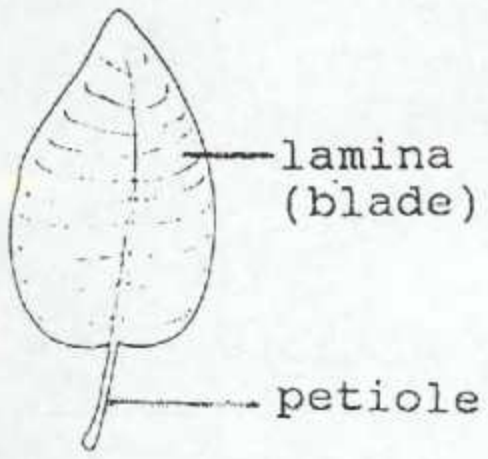
lacerate (ingeskeur) - Irregularly cut or torn into narrow segments.

lacinate (gelasineer) - Cut into narrow segments.

lamina (blaarskyf, lamina) - The expanded part of a leaf.

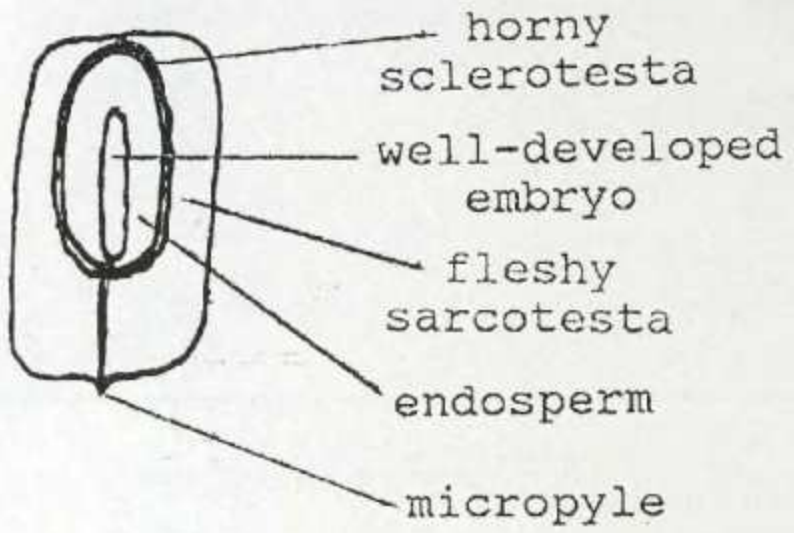
lanceolate (gelanseoleer) - Lance-shaped, tapering to each end especially the apex.

SIMPLE LEAF



lamina (blade)
undivided

LONGITUDINAL SECTION TROUGH
ENCEPHALARTOS SEED

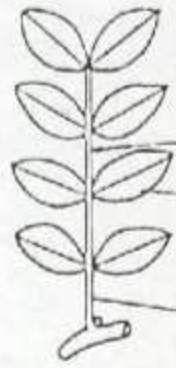


COMPOUND LEAVES

Palmately
compound

Pinnately compound

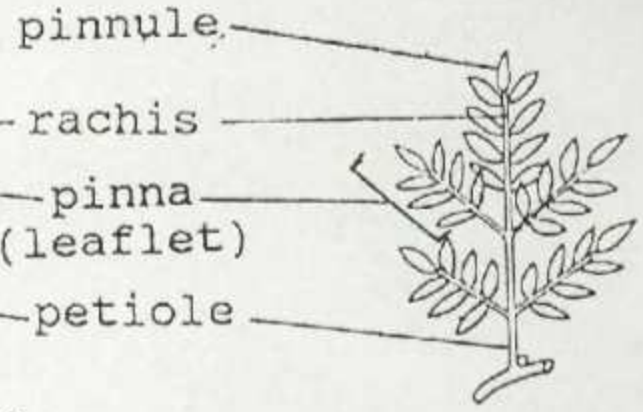
imparipinnate



paripinnate

lamina (blade) once divided

Bipinnately
compound



lamina (blade)
twice divided

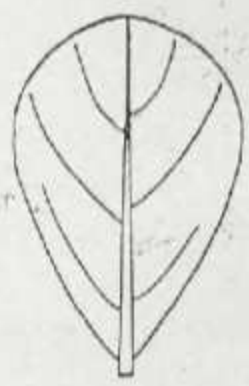
LEAF SHAPES

linear

lanceolate

oblanceolate

ovate



obovate

cordate

obcordate

falcate

LEAF MARGINS

entire

undulate

lacerate

laciniate

LEAF APICES

apiculate

obtuse

acuminate

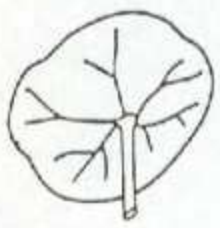
acute

mucronate

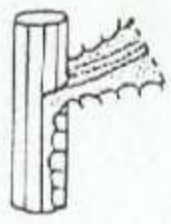
truncate

emarginate

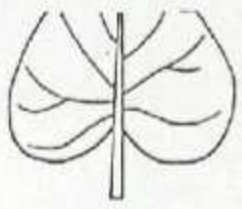
ATTACHMENT OF LAMINA TO PETIOLE OR PINNA TO RACHIS



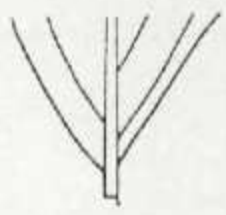
peltate



decurrent

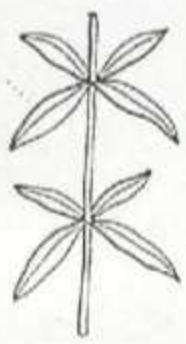


cordate



cuneate

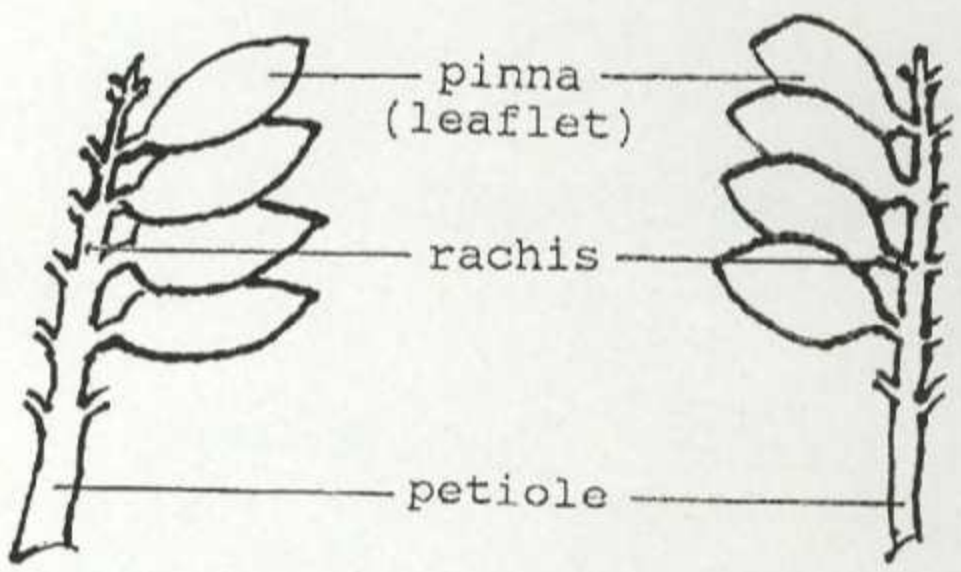
LEAF OR LEAFLET ARRANGEMENT



verticillate
(whorled)

imbricate

fasciculate



succubously
overlapping
leaflets

incubously
overlapping
leaflets

lateral (lateraal, sydelings) - Arising at the side of the main axis.
lax (los, vry) - Open and loose.
leaf-base (blaarbasis) - Specialised and sheathing part of the petiole where it joins the trunk.
leaf-spine (blaarstekel) - A term sometimes used to refer to spines on leaflet margins.
leaflet (pinna) - One of the expanded, leaflike segments of a pinnately or palmately compound leaf.
lepidote (fynskurfgeskub) - Dotted with persistent, small scurfy, peltate scales.
linear (lineêr) - Long and narrow with parallel sides.
litoral (littoraal, kus-, strand-) - Growing in communities near the sea.
lower margin (onderste rand) - In the case of a leaflet, it is the margin of the leaflet nearer to the base of the leaf. Also called the "proximal" margin.

maritime (marine-, pelagies, see-) - Growing near the sea.
mealy (amiloïed, styselagtig) - covered with fine, flour-like powder.
median (mediaan, middel-) Situated in the middle, as in "median leaflet" or "median cone scale".
megagametophyte (megagametofiet) - The fleshy tissue of a cycad ovule which after fertilisation surrounds the embryo of the seed, also called the "endosperm".
megasporangiate (megasporangiale) - Said of a plant, organ or tissue which bears megasporangia.
megasporangium (megasporangium) - Ovule; structure which, after fertilisation, develops into a seed.
megaspore (megaspoor) - The haploid cell in the ovule which develops into the multicellular megagametophyte with its archegonia each of which contains an egg cell (female gamete).
megasporophyll (megasporofil) - The female cone scale on which the ovules are borne.
megastrobilus (megastrobilus, vroulike keël) - A female cone.
membranous (membraanagtig) - Thin-textured.
meristem (meristeem) - A group of actively dividing cells whose daughter cells differentiate into various tissues and organs. The apical meristem of a root and stem results in the longitudinal growth of these organs.
mesic (mesies) - Moist conditions
micropyle (mikropile, poortjie) - The pore in the side of an ovule which faces towards the cone axis and through which pollen is drawn into the ovule prior to fertilisation.
microsporangia (mikrosporangiums) - Pollen sacs. The small sac-like structures on the abaxial (lower) surface of a male cone scale (microsporophyll) which encloses the pollen grains (microspores).
microsporangiate (mikrosporangiale) - Said of a plant, organ or tissue which bears microsporangia (pollen sacs).
microspore (mikrospoor, stuifmeelkorrel) - A pollen grain.
microsporophyll (mikrosporofil) - A male cone scale which bears pollen sacs (microsporangia).
microstrobilus (mikrostrobilus, manlike keël) - A male cone.
midrib (hoofaar) The main vein that runs the full length of a leaflet or segment.
monopodial (monopodiaal) - A term used to describe a growth habit with unlimited apical growth, e.g. most, if not all, cycads.
monotypic (monotipies) - A genus with a single species.
mucronate (gemukroneer) - With a short sharp point.
mutation (mutasie, mutering) - A sudden change in the genetic constitution of a cell.
mutualistic (mutualisties) - A symbiotic system in which the two partners both benefit from the close association, e.g. the cyanobacteria living in the coralloid roots of cycads.

nerves (are) - The fine veins which traverse the leaf blade.
node (node, knoop) - A point on the stem where leaves or bracts arise.
notched (ingekeep) - A cut or indentation in the edge.

obcordate (omgekeer hartvormig) - Shaped like an inverted heart.
obtuse (stomp) - Blunt or rounded at the apex.
offset (syloot) - A lateral branch of a cycad arising above ground level.
orbicular (diskoïdaal, orbikulêr) - Nearly circular.
oval (ovaal) - Rounded but longer than wide.
ovate (eiervormig) - Egg-shaped in outline and attached at the broad end (applied to flat surfaces). Compare "ovoid".
ovipositor (ovipositor, eierplaser) - The egg-laying organ of a female insect.
ovoid (eiervormig) - Egg-shaped (applied to three-dimensional structures). Compare "ovate".
ovulate (vroulike) - An ovule-bearing or female cone ("ovulate cone").
ovule (saadknop, ovulum) - The organ which develops into a seed after fertilisation.

GROWING CYCADS IN FLORIDA
3. WATER

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The quality of your water source is just as important as the soil and the fertlizer used in growing your cycads. [see *Encephalartos* **55**: 27–28 (September 1998) and **56**: 9-10 (December 1998. - **Editor.**] If you grow cycads in containers, you can change the brand of fertilizer, or change the soil mix, but many times you are stuck with the available water supply. In fact, when choosing a location for a nursery, after, "Is this land prone to flooding?" your second question should be, "What is the quality of the available water resource?" I have seen two nursery owners buy the same seedlings, use the same soil and fertilizer, but get totally different results. These two nurseries were only two miles apart, but the water supply was different.

Your water can contain elements such as iron, sulphur, calcium, magnesium, sodium, and chlorine, as well as carbonates and bicarbonates. If concentrations of any of these chemicals are too high, there can be trouble. Compensating for these chemicals can be expensive and time consuming.

If your water contains sulphur, your pH can get on the acidic side. If so, add some dolomite. If you have alkaline water, which is very common in south Florida, add some sulphur to the soil. Iron doesn't really hurt your plants that much, but the build-up will stain the leaves badly. There are various chemicals that can be used in an injector system to dissolve iron build-up. If drip irrigation can be used, at least then the leaves won't be stained. If your water contains high concentrations of calcium, magnesium, sodium, or chlorine, things can get a little more complicated. These elements are salts that can cause many different problems. Build-up of salts can burn roots and kill your plants. Before discussing remedies, a few things need to be explained.

Dissolved nutrients in the soil, fertilizers, and certain chemicals, such as sodium, in the water are all types of soluble salts. Water is attracted from areas of low salt concentration to areas of high concentration. The concentration of salts in the root system of plants causes water to move from the soil into roots. When salt levels become so high in the soil, water can be drawn out of the roots. Salts can be absorbed by roots as well as by leaves. If these salts accumulate to toxic levels, roots and leaves can be burned. High levels of sodium can cause other nutrients such as calcium and magnesium to be leached out, causing nutrient deficiencies in plants. If your water contains high salt levels, drip irrigation can at least keep the salts off the leaves. Newly emerging leaves on cycads are particularly vulnerable to burning.

As you water your plants, nutrients and salts are being leached out. As you fertilize, salts are being added. The secret to all this is the balance between the adding and leaching of salts. Soils with coarse materials in them, such as pine bark, can cause water to flow through too quickly. Soils with fine textured materials hold water longer, helping the leaching process. This is one reason why I suggested the soil mix in a previous issue. If salt levels are high in your water, another way to compensate is by using a time release fertilizer. That is why using Nutricote can be beneficial. Many people like to keep cycads on the dry side when it comes to watering. When salt levels are high in the soil, the reduced water levels intensify the effects of salts on roots. Watering for shorter periods of time, but on a regular basis, will help with this. If salts are not being leached out properly from normal watering, once-in-a-while watering for two or three times longer than normal may be necessary.

While we are on the subject of water, I have noticed that one of the most common ways that people kill cycads is by rotting the stems or roots. Several years ago, I was talking to Larry Bussell about our native *Zamia* (*Z. integrifolia*), and he told me what would be the single most important clue in growing cycads: "*Zamia* likes to be uniformly moist, not dry, not wet." I have noticed at more xeric habitats that the apex of the plant was one foot below the surface. The soil was almost pure sand. The wetness of the rain never really reached the stem, but the capillary action of the sand drew down a uniform moistness. At the same time, at that level, the sun never dried the soil completely. I have also observed Zamias growing in marginally wet areas. The bottom of the tuber would rot, harden off, then pull the apex below ground level. As the plant grew above the surface, the process would repeat. Even though you can't generalize about all cycads, if you keep your growing medium "uniformly moist", I think most cycads would benefit.

Here in Florida, growers of *Zamia integrifolia* have noticed that plants grown in full sun have a tendency to

have curled leaflets. In the shade these same plants will have flattened out, attractive leaflets. When the newly emerging leaflets are soft, they will curl to reduce the amount of surface facing the sun, thus reducing the loss of water in the leaflets. I have experienced with several plants and found that extra watering while new leaves are still soft will flatten out the leaflets. Once the leaflets harden off, they will stay flattened. This procedure will make your plants a lot more attractive.

Sometimes I will have plants that push new leaves, but these leaves will abort before reaching full size. In particular, I had a group of *Cycas micholitzii* in my hot greenhouse that would abort leaves on a regular basis. Last summer, I noticed they were all pushing new leaves again. One of them was pushing two leaves, and the first leaf to emerge was already half shriveled. I brought the plant into the shade and started watering it twice a day. The bad leaf started growing and hardened up beautifully, except for the few leaflets that were already damaged. After repeating this procedure on the rest of the plants, all leaves came up and hardened off normally. Since then, I have had six species of cycads try to do the same thing, and I have saved all the leaf flushes after repeating this procedure. I have noticed that plants growing in a well-drained potting mix have a tendency to abort leaves more often. Sometimes, the aborting of leaves can be a sign of a reduced root system due to fungus, or a high water table, if the plant is grown in the ground.

This is the last article of a series of three. Once you have mastered the balance of soil, fertilizer, and water, everything else in culture becomes easier. There are many ways to speed up growth and to produce more seeds. Some of these techniques may not work for you unless this balance can be maintained. Keep in mind that certain soil components and fertilizer brands may not be available in all parts of the country. Also, climate can alter individual results, but the basics of these three articles should help all growers. If you are not all that concerned with fast growth, you will at least lose fewer plants. In many cases, some of these cycads are hard to find. At least by reducing the mortality rate of your cycads, these plants can become more common.

CYCADS OF THE WORLD FOR THE LAYMAN

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Bowenia

1.	*B. serrulata*	Queensland, Australia
2.	*B. spectabilis*	Queensland, Australia

Ceratozamia

1.	*C. euryphyllidia*	Mexico
2.	*C. hildae*	San Luis Polosi and Queretaro, Mexico
3.	*C. kuesteriana*	Tamaulipas, Mexico
4.	*C. latifolia*	Mexico
5.	*C. matudae*	Chiapas, Mexico
6.	*C. mexicana*	Mexico
7.	*C. microstrobila*	Mexico
8.	*C. miqueliana*	Mexico
9.	*C. mixeorum*	Oaxaca, Mexico
10.	*C. morettii*	Veracruz, Mexico
11.	*C. norstogii*	Chiapas, Mexico
12.	*C. parsifica*	Mexico
13.	*C. robusta*	Mexico
14.	*C. sabatoi*	Mexico
15.	*C. whitelockiana*	Oaxaca, Mexico

16.	*C. zaragozae*	Mexico

Chigua

1.	*C. bernalii*	Colombia
2.	*C. restrepoi*	Colombia

Cycas

1.	*C. angulata*	Western Australia
2.	*C. apoa*	New Guinea; Indonesia
3.	*C. arenicola*	Western Australia
4.	*C. armstrongii*	Western Australia
5.	*C. arnhemica* subsp. *arnhemica*	Northern Territory, Australia
6.	*C. arnhemica* subsp. *muninga*	Australia
7.	*C. arnhemica* subsp. *natja*	Australia
8.	*C. badensis*	Australia
9.	*C. balansae*	Vietnam
10.	*C. basaltica*	Western Australia
11.	*C. beddomei*	India
12.	*C. bellefonti*	Southern India
13.	*C. bougainvilleana*	New Britain, Solomon Islands
14.	*C. brunnea*	Northern Territory and Queensland, Australia
15.	*C. cairnsiana*	Queensland, Australia
16.	*C. calcicola*	Northern Territory, Australia
17.	*C. campestris*	Papua New Guinea
18.	*C. canalis* subsp. *canalis*	Northern Territory, Australia
19.	*C. canalis* subsp. *carinata*	Northern Territory, Australia
20.	*C. chamaoensis*	Thailand
21.	*C. chamberlainii*	Philippines
22.	*C. chevalieri*	Vietnam
23.	*C. circinalis* var. *circinalis*	South India
24.	*C. circinalis* var. *orixensis*	Northern eastern Ghats, Indian State of Orissa
25.	*C. circinalis* var. *swamyii*	India, Hassan District of Karnataka
26.	*C. clivicola* subsp. *clivicola*	Thailand
27.	*C. clivicola* subsp. *lutea*	Thailand
28.	*C. conferta*	Northern Territory, Australia
29.	*C. couttsiana*	Queensland, Australia
30.	*C. curranii*	Philippines
31.	*C. desolata*	Queensland, Australia
32.	*C. diannenensis*	China
33.	*C. elongata*	Vietnam
34.	*C. ferruginea*	China
35.	*C. furfuracea*	Western Australia
36.	*C. guizhouensis*	China
37.	*C. hainanensis*	Hainan Island; China
38.	*C. hongheensis*	China
39.	*C. inermis*	China
40.	*C. javana*	Java; Indonesia
41.	*C. lane-poolei*	Australia
42.	*C. lindstromii*	Vietnam
43.	*C. litoralis*	Myanmar; Thailand; Malaysia; Sumatra, Vietnam
44.	*C. maconochiei* subsp. *maconochiei*	Australia
45.	*C. maconochiei* subsp. *lanata*	Australia
46.	*C. maconochiei* subsp. *viridis*	Australia
47.	*C. macrocarpa*	Malaysia; Thailand
48.	*C. media* subsp. *media*	Northern Territory, Australia

49.	*C. media* subsp. *ensata*	Australia
50.	*C. media* subsp. *banksii*	Australia
51.	*C. megacarpa*	Queensland, Australia
52.	*C. micholitzii*	Vietnam; China
53.	*C. micronesia*	Mariana Island; Guam
54.	*C. miquelii*	China
55.	*C. multipinnata*	China
56.	*C. nathorstii*	Sri Lanka
57.	*C. nongnoochiae*	Thailand
58.	*C. ophiolitica*	Queensland, Australia
59.	*C. orientis*	Northern Territory, Australia
60.	*C. panzhihuaensis*	China
61.	*C. papuana*	Papua New Guinea
62.	*C. parvulus*	China
63.	*C. pectinata*	S.E. Asia; N.E. India; China
64.	*C. platyphylla*	Queensland, Australia
65.	*C. pranburiensis*	Thailand
66.	*C. pruinosa*	Western Australia
67.	*C. revoluta*	China, Japan
68.	*C. riuminiana*	Philippines
69.	*C. rumphii*	S.E. Asia; Pacific Islands
70.	*C. seemannii*	Fiji; Tonga; Vanuata; New Caledonia
71.	*C. segmentifida*	China
72.	*C. semota*	Australia
73.	*C. scratchleyana*	New Guinea
74.	*C. schumanniana*	Papua New Guinea
75.	*C. siamensis*	S.E. Asia; China
76.	*C. silvestris*	Queensland, Australia
77.	*C. simplicipinna*	S.E. Asia
78.	*C. szechuanensis*	China
79.	*C. taitungensis*	Taiwan; China
80.	*C. taiwaniana*	China
81.	*C. tanqingii*	China
82.	*C. tansachana*	Thailand
83.	*C. thouarsii*	Madagascar; Africa
84.	*C. tokinensis*	
85.	*C. tuckeri*	Australia
86.	*C. wadei*	Philippines
87.	*C. xipholepis*	Australia
88.	*C. yorkiana*	Australia
89.	*C. zeylonica*	Sri Lanka; Andaman Islands; Nicobar

Dioon

1.	*D. califanoi*	Oaxaca, Mexico
2.	*D. capitoi*	Puebla, Mexico
3.	*D. edule* var. *edule*	Mexico
4.	*D. edule* var. *angustifolium*	Nuevo Leon and Tamaulipas, Mexico
5.	*D. holmgrenii*	Oaxaca, Mexico
6.	*D. mejiae*	Honduras
7.	*D. merolae*	Chiapas, Mexico
8.	*D. purpusii*	Oaxaca, Mexico
9.	*D. rzedowskii*	Oaxaca, Mexico
10.	*D. spinulosum*	Vera Cruz and Oaxaca, Mexico
11.	*D. tomasellii* var. *tomasellii*	S.W. Coast, Mexico
12.	*D. tomasellii* var. *sonorense*	N.W. Coast, Mexico

Encephalartos

1.	*E. aemulans*	KwaZulu-Natal, South Africa
2.	*E. altensteinii*	E. Cape, South Africa
3.	*E. aplanatus*	Swaziland
4.	*E. arenarius*	E. Cape, South Africa
5.	*E. barteri* subsp. *barteri*	Benin; Ghana; Nigeria; Sudan; Togo
6.	*E. barteri* subsp. *allochrous*	Nigeria
7.	*E. brevifoliolatus*	Northern Province, South Africa
8.	*E. bubalinus*	Tanzania; Kenya
9.	*E. caffer*	E. Cape, South Africa
10.	*E. cerinus*	KwaZulu-Natal, South Africa
11.	*E. chimanimaniensis*	Mozambique; Zimbabwe
12.	*E. concinnus*	Zimbabwe
13.	*E. cupidus*	Northern Province, South Africa
14.	*E. cycadifolius*	E. Cape, South Africa
15.	*E. delucanus*	Tanzania
16.	*E. dolomiticus*	Northern Province, South Africa
17.	*E. dyerianus*	Northern Province, South Africa
18.	*E. equatorialis*	Uganda
19.	*E. eugene-maraisii*	Northern Province, South Africa
20.	*E. ferox*	KwaZulu-Natal, South Africa; Mozambique
21.	*E. friderici-guilielmi*	E. Cape, South Africa
22.	*E. ghellinckii*	KwaZulu-Natal, South Africa
23.	*E. gratus*	Malawi; Mozambique
24.	*E. heenanii*	Swaziland; Mpumalanga, South Africa
25.	*E. hildebrandtii*	Kenya; Tanzania
26.	*E. hirsutus*	Northern Province, South Africa
27.	*E. horridus*	E. Cape, South Africa
28.	*E. humilis*	Mpumalanga, South Africa
29.	*E. inopinus*	Northern Province, South Africa
30.	*E. ituriensis*	Zaire
31.	*E. kisambo*	Kenya
32.	*E. laevifolius*	Mpumalanga, South Africa; Swaziland
33.	*E. lanatus*	Mpumalanga and Gauteng, South Africa
34.	*E. latifrons*	E. Cape, South Africa
35.	*E. laurentianus*	Angola; Zaire
36.	*E. lebomboensis*	KwaZulu-Natal and Mpumalanga, South Africa; Swaziland; Mozambique
37.	*E. lehmannii*	E. Cape, South Africa
38.	*E. longifolius*	E. Cape, South Africa
39.	*E. macrostrobilus*	Uganda
40.	*E. manikensis*	Zimbabwe; Mozambique
41.	*E. marunguensis*	Zaire
42.	*E. middelburgensis*	Mpumalanga and Gauteng, South Africa
43.	*E. msinganus*	KwaZulu-Natal, South Africa
44.	*E. munchii*	Mozambique
45.	*E. natalensis*	KwaZulu-Natal, South Africa
46.	*E. ngoyanus*	KwaZulu-Natal and Mpumalanga, South Africa; Swaziland
47.	*E. nubimontanus*	Northern Province, South Africa
48.	*E. paucidentatus*	Mpumalanga, South Africa; Swaziland
49.	*E. poggei*	Angola; Zaire
50.	*E. princeps*	E. Cape, South Africa
51.	*E. pterogonus*	Mozambique
52.	*E. schaijesii*	Zaire
53.	*E. schmitzii*	Zaire
54.	*E. sclavoi*	Tanzania
55.	*E. senticosus*	Mpumalanga and KwaZulu-Natal, South Africa

56.	*E. septentrionalis*	Zaire; Sudan
57.	*E. tegulaneus*	Kenya
58.	*E. transvenosus*	Northern Province, South Africa
59.	*E. trispinosus*	E. Cape, South Africa
60.	*E. turneri*	Mozambique
61.	*E. umbeluziensis*	Swaziland; Mozambique
62.	*E. villosus*	E. Cape, KwaZulu-Natal and Mpumalanga, South Africa
63.	*E. whitelockii*	Western Uganda
64.	*E. woodii*	KwaZulu-Natal, South Africa

Lepidozamia

1.	*L. hopei*	Queensland, Australia
2.	*L. peroffskyana*	N.S.W. and Queensland, Australia

Macrozamia

1.	*M. cardiacensis*	Australia
2.	*M. communis*	N.S.W.
3.	*M. concinna*	Australia
4.	*M. conferta*	Queensland
5.	*M. cranei*	Queensland
6.	*M. crassifolia*	Queensland
7.	*M. diplomera*	N.S.W.
8.	*M. douglasii*	Queensland
9.	*M. dyeri*	W. Australia
10.	*M. elegans*	Australia
11.	*M. fawcettii*	N.S.W.
12.	*M. fearnsidei*	Queensland
13.	*M. flexuosa*	N.S.W.
14.	*M. fraseri*	Western Australia
15.	*M. glaucophylla*	Australia
16.	*M. heteromera*	N.S.W.
17.	*M. humilis*	Australia
18.	*M. johnsonii*	N.S.W.
19.	*M. lomandroides*	Queensland
20.	*M. longispina*	Australia
21.	*M. lucida*	Queensland
22.	*M. macdonnellii*	Central Australia
23.	*M. machinii*	Queensland
24.	*M. miquelii*	N.S.W. and Queensland
25.	*M. montana*	Australia
26.	*M. moorei*	Queensland
27.	*M. mountperriensis*	Queensland
28.	*M. occidua*	Queensland
29.	*M. parcifolia*	Queensland
30.	*M. pauli-guilielmi*	Queensland
31.	*M. platyrachis*	Queensland
32.	*M. plurinervia*	N.S.W. and Queensland
33.	*M. polymorpha*	Australia
34.	*M. reducta*	Australia
36.	*M. riedlei*	W. Australia
37.	*M. secunda*	N.S.W.
38.	*M. spiralis*	N.S.W.
39.	*M. stenomera*	N.S.W.
40.	*M. viridis*	Queensland

Microcycas

1.	*M. calocoma*	W. Cuba

Stangeria

1.	*S. eriopus*	E. Cape and KwaZulu-Natal, South Africa

Zamia

1.	*Z. acuminata*	Nicaragua; Panama
2.	*Z. amazonia*	Brazil; Colombia; Venezuela
3.	*Z. amblyphyllidia*	Cuba; Jamaica; Puerto Rico
4.	*Z. amplifolia*	Colombia
5.	*Z. angustifolia*	Bahamas; Cuba
6.	*Z. boliviana*	Bolivia
7.	*Z. chiqua*	Colombia, Panama
8.	*Z. cremnophila*	Mexico
9.	*Z. cunaria*	Panama
10.	*Z. dressleri*	Panama
11.	*Z. encephalaroides*	Colombia
12.	*Z. fairchildiana*	Costa Rica; Panama
13.	*Z. fischeri*	Mexico
14.	*Z. furfuracea*	Mexico
15.	*Z. gentryi*	Ecuador
16.	*Z. herrerae*	Mexico; Guatemala
17.	*Z. inermis*	Mexico
18.	*Z. integrifolia*	Florida and Georgia, U.S.A.; Bahamas; Cuba; Caiman Islands
19.	*Z. ipetiensis*	Panama
20.	*Z. lacondonis*	Mexico
21.	*Z. lecointei*	Brazil
22.	*Z. lindleyi*	Panama
23.	*Z. loddigesii*	Mexico
24.	*Z. lucayana*	Bahamas
25.	*Z. manicata*	N. Colombia; S. Panama
26.	*Z. montana*	Colombia; Venezuela
27.	*Z. muricata*	Venezuela
28.	*Z. neurophyllidia*	Panama
29.	*Z. obliqua*	Colombia; S. Panam
30.	*Z. paucijuga*	W. Mexico
31.	*Z. poeppigiana*	Peru; Ecuador
32.	*Z. polymorpha*	Mexico; Belize
33.	*Z. portoricensis*	Puerto Rico
34.	*Z. pseudomonticola*	Costa Rica
35.	*Z. pseudoparasitica*	Panama; Costa Rica
36.	*Z. pumila*	Dominican Rep.; Florida, U.S.A.; Cuba
37.	*Z. purpurea*	Mexico
38.	*Z. pygmaea*	Cuba
39.	*Z. roezlii*	Colombia
40.	*Z. skinneri*	Panama
41.	*Z. soconuscensis*	Mexico
42.	*Z. spartea*	Mexico
43.	*Z. splendens*	Mexico
44.	*Z. standleyi*	Honduras
45.	*Z. tuerckheimii*	Guatemala
46.	*Z. ulei*	Brazil
47.	*Z. urep*	

48.	*Z. variegata*	Guatemala; Belize; Mexico
49.	*Z. vazquezii*	Mexico
50.	*Z. wallisii*	Colombia

The compilers wish to thank Roy Osborne, Piet Vorster and Anders Lindstrom for their help.

LETTERS TO THE EDITOR / BRIEWE AAN DIE REDAKTEUR

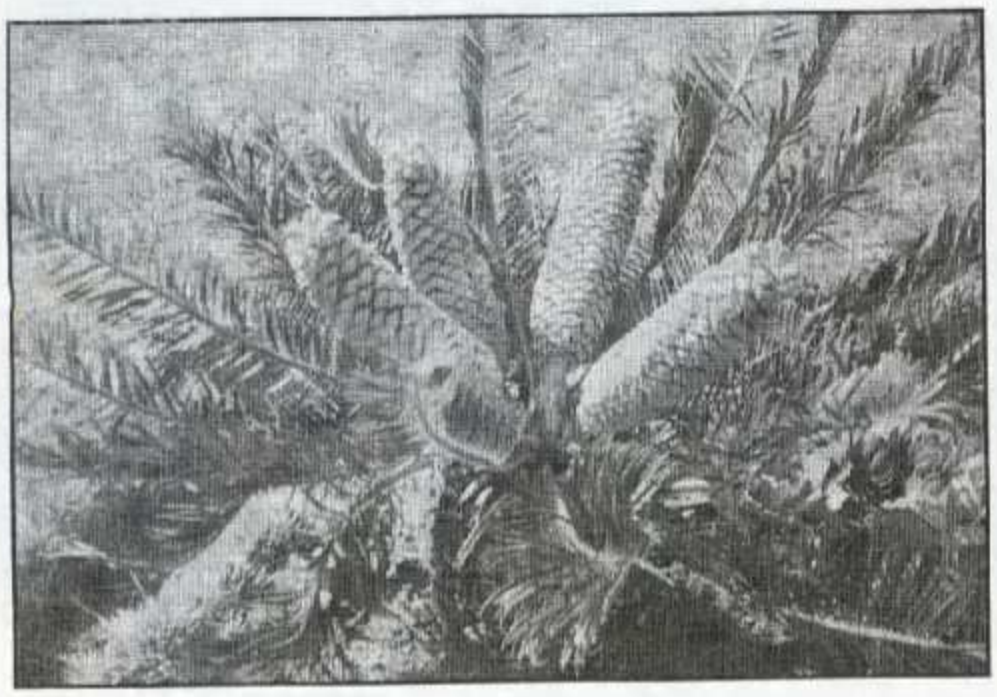
Geagte Redaktrise

R.S.A.

Ontvang 31 Desember 1998

MANLIKE *ENCEPHALARTOS CAFFER* MET VIER KEËLS

Ons het verlede jaar foto's aan u gestuur van 'n *Encephalartos longifolius* vroulike plant met keëls op die hoofstam asook 'n keël op elk van die sytakke (*Encephalartos* **53**: 21–22, Maart 1998).



Figuur 1 Manlike *Encephalartos caffer*, met vier keëls, in 'n tuin in Jeffreysbaai. (Figure 1 Male *Encephalartos caffer*, with four cones, in a Jeffreys Bay garden.)

Hierdie keer stuur ons 'n foto van 'n *E. caffer* met vier manlike keëls (Figuur 1). Dit is ook in 'n tuin in Jeffreysbaai geneem. Ons *E. caffer* het net een keël op 'n keer - soos op hierdie stadium juis weer die geval is en soos die boeke dit beskryf.

Lyk my Jeffreysbaai is baie vrugbaar vir keëlvorming, òf was dit 'n baie goeie jaar vir keëlvorming!!

James en Salomé Lessing, Oribistraat 30, 6330 Jeffreysbaai,

[In vorige uitgawes van "*Encephalartos*" het verskeie kort mededelings verskyn oor *Encephalartos*-plante (meestal manlike plante) in tuine wat meer keëls op 'n keer produseer as in die natuur. Op die foto van hierdie *E. caffer*-eksemplaar kan gesien word dat dit so geplant is dat die stam bogronds is alhoewel hierdie Oos-Kaapse spesie 'n ondergrondse stam het. - **Redaktrise.**]

Summary

MALE *ENCEPHALARTOS CAFFER* WITH FOUR CONES

In December 1997 the authors sent photographs of a female *E. longifolius* that produced cones on the main stem as well as on the three branches at the same time (*Encephalartos* **53**: 21–22, March 1998). Now they sent a photograph of a male *E. caffer* that, instead of the usual one cone only, produced four cones (Figure 1). They postulate that either the Jeffreys Bay's environmental conditions favour cone production or it could have been a good year for cone production.

[In previous issues of "*Encephalartos*" several short communications appeared on the unusual cone number of *Encephalartos* plants in cultivation (mainly male plants). On the photograph it can be seen that this *E. caffer* specimen has been planted with the stem above ground level, although in the wild this Eastern Cape species has a subterranean stem. - **Editor.**]

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Dear Editor

STRANGE LEAVES IN *CYCAS REVOLUTA*

Figure 1 ***Cycas revoluta*****, with atypical leaves, growing on the premises of the Agricultural Research Council in Potchefstroom.**

Many letters with accompanying photos have been submitted in the past to this journal of cycads with atypical or strange leaves. It seems, however, that there are rarely any satisfactory answers for these phenomena. I attempt to provide an answer in this case. I observed the *Cycas revoluta* shown in Figure 1 on the premises of my employer, the Agricultural Research Council in Potchefstroom, on the 19th of October 1998. The new flush of leaves are clearly atypical and appear fern-like at first glance (Figure 2). The rachis is bent and the leaflets curved even though the leaves have matured. The leaves are also unnaturally long compared to the older flush which is clearly visible in Figures 1 and 2. On first observation, the thought that came to my mind was a hormonal imbalance in the plant. The growth of the leaves strongly resembles that of any broad leaf weed that has been treated with a hormonal herbicide such as 2-4 D (see figure 3). The growth of the new leaves appears to be abnormally lush, suggesting a hormone imbalance. The action of the chemical 2-4 D is such that it causes the treated weeds (plants) to produce prolific growth which then causes the vascular tissue of the plant to become "overgrown" with vegetative material, causing wilting and eventual death. The weed therefore "grows itself to death". The fact that this cycad is growing on an agricultural research station, where such chemicals abound, would further support my suspicion. The cycad may have been exposed to a small dose of such a chemical which was unable to kill the plant but nevertheless caused the atypical growth. The fact that

Figure 2 Close-up of the atypical leaves.

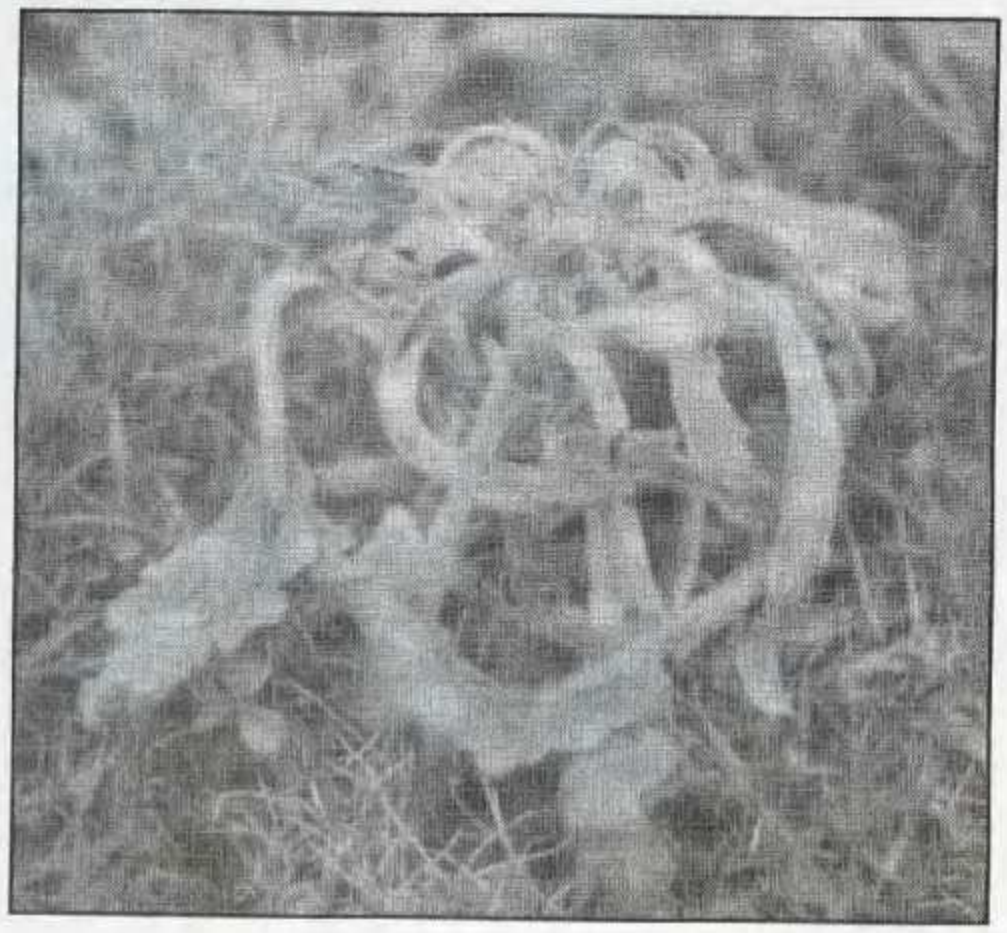

Figure 3 A broad leaf weed that has been treated with a hormonal herbicide.

the cycad is growing close to an agricultural field also suggests that the chemicals may have drifted from the adjoining field and landed on the cycad. Upon investigation of my own *C. revoluta* plants and those of friends in Potchefstroom, I also discovered that in October very few of the plants had produced a mature flush of new leaves for the season, once again suggesting that the plant in question was stimulated. I would like to hear what specialist botanists such as Dr. Vorster from Stellenbosch and other collectors suggest could have caused this phenomenon.

Andre Cilliers, Private Bag X1251, 2520 Potchefstroom, R.S.A.

Received 6 November 1998

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Geagte prof. Nat Grobbelaar

ONGEWONE VROULIKE KEËLONTWIKKELING BY *ENCEPHALARTOS TRISPINOSUS*

Na aanleiding van u artikel in "*Encephalartos*" nommer 53, bladsy 5 van Maart 1998, wil ek u net meedeel dat ek 'n *E. trispinosus* vroulike plant het wat vir die afgelope tien jaar elke jaar of twee wanneer sy 'n keël ontwikkel soortgelyke "saad" afgooi as wat u in u artikel meld.

Die keël word normaal gevorm en sy maak oop wanneer sy gereed is vir bestuiwing. Ek bestuif haar ook gereeld op verskeie tye soos met al my ander plante. Maar elke keer word die "saad" gevorm soos in u artikel met slegs 3–4 "sade" wat normaal is.

Die stuifmeel wat gebruik is, was vars en/of gevries, maar elke keer was die "saad" so gevorm. Die keël was ook nie voor die tyd afgesny nie, maar aan die plant gelaat totdat sy die "saad" self afgooi.

Het die plante nie moontlik half manlike/vroulike eienskappe nie?

Die "saad" word vir u inligting aangestuur, dit stem min of meer ooreen met wat u ondervind het.

Groete.

***Corrie Meyer,** Ralstonweg 20, Fernglen, 6045 Port Elizabeth.*

Written 22 November 1998

[Die enkele normale-grootte omnule ("sade") wat Corrie voorsien het is 25 mm lank met 'n deursnee van 20 mm terwyl die onontwikkelde omnule 18 mm lank is en 'n deursnee van 8 mm het. By nadere ondersoek het dit geblyk dat al die omnule inderdaad korruptule (embriolose omnule) is. As Corrie stuifmeel van verskillende *E. trispinosus*-plante gebruik het, lyk dit geregverdig om af te lei dat die fout by die vroulike plant lê en dat haar gedrag waarskynlik die gevolg van 'n genetiese afwyking is wat grens aan steriliteit. Ek twyfel of die plant hermafrodities is. Baie dankie vir die interessante inligting, Corrie. **- Nat Grobbelaar.**]

Translation of Corrie Meyer's letter.

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

Dear Professor Nat Grobbelaar

UNUSUAL FEMALE CONE DEVELOPMENT IN *ENCEPHALARTOS TRISPINOSUS*

In response to your article in "*Encephalartos*", number 53, page 5, of March 1998, I would like to inform you that I have a female *E. trispinosus* which coned every year or every second year during the past ten years and which bore "seeds" similar to the ones you mentioned in your article.

The cone develops normally and opens when ready to be pollinated. I pollinate her regularly on several occasions as for all my other plants. However, every time the "seeds" are produced as in your article with only 3–4 normal "seeds".

The pollen that was used was either fresh or frozen. But every time the "seed" produced was as described above.

The cone was not removed from the plant until after "seed" scattering occurred naturally.

Is it possible that the plants are half male/female?

The "seed" are forwarded to you for your information. They correspond more or less to the ones you described.

Greetings.

[The few normal-sized omnules ("seeds") that Corrie provided are 25 mm long with a diameter of 20 mm whilst the under developed omnules are 18 mm long with a diameter of 8 mm. Closer inspection revealed that all the omnules are in fact corruptules (embryoless omnules). If Corrie used pollen from different *E. trispinosus* plants, one is probably entiteld to deduce that the female plant is at fault. She probably suffers from a genetic defect which makes her near sterile. I doubt whether she can be classified as hermaphroditic. Thanks for the interesting information, Corrie. - **Nat Grobbelaar.**]

Received 13 January 1999

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Geagte Redakteur

HET U ENIGE BOEKE OOR BROODBOME OM TE VERKOOP?

Ek is 'n groot liefhebber en ook versamelaar van broodbome. Ek het egter 'n baie groot stryd om leesstof oor broodbome te bekom. Ek geniet die tydskrif van die Vereniging baie, maar wil graag uitvind of daar enige boeke is wat ek sou kon koop. Ek verneem dat die Vereniging die regte bekom het om die boek "Cycads of Africa" deur Douglas Goode te kan herdruk, en ek verneem graag of dit wel gedoen gaan word.

Tweedens benodig ek stuifmeel van *Encephalartos princeps*. Ek sal ook binnekort *E. trispinosus*-stuifmeel beskikbaar hê indien iemand moontlik stuifmeel wil uitruil.

Ek hoop om in die volgende uitgawe van "*Encephalartos*" moontlike antwoorde op my vrae te kry.

L. Calitz, Posbus 29565, 9310 Danhof (Bloemfontein), R.S.A.

Ontvang 18 Januarie 1999

[Die regte om Douglas Goode se boek "Cycads of Africa" te herdruk is nie deur die Broodboom Vereniging van Suid-Afrika gekoop nie maar deur die Broodboom Sentrum, Posbus 45, 3730 Umlaasweg, KwaZulu-Natal (kyk hulle advertensie agterin *Encephalartos* **55**, September 1998). Indien enige van ons lesers die broodboomboeke van Cynthia Giddy *en/of* David Jones besit en dit wil verkoop, kan hulle gerus met mnr Calitz in verbinding tree, asook lede wie *Encephalartos princeps*-stuifmeel beskikbaar het.

Summary

DO YOU HAVE ANY BOOKS ON CYCADS TO SELL?

The author is an enthusiastic cycad collector and enjoys reading our journal. He would like to know whether any books on cycads are available for sale. He has heard that our Society has bought the rights to reprint Douglas Goode's book "Cycads of Africa".

He needs pollen of *Encephalartos princeps* and will soon have *E. trispinosus* pollen to exchange.

[The Cycad Centre, P.O. Box 35, 3730 Umlaas Road, KwaZulu-Natal bought the rights to reprint Douglas Goode's book "Cycads of Africa" (not the Cycad Society of South Africa), see their advertisement at the back of *Encephalartos* **55**, September 1998. Any of our readers owning the cycad books by Cynthia Giddy and/or David Jones and wish to sell them, please contact Mr. Calitz, as well as members who have *Encephalartos princeps* available. - **Editor.**]

DONATIONS RECEIVED / DONASIES ONTVANG

1 JANUARY/JANUARIE 1998 TO/TOT 31 DECEMBER/DESEMBER 1998

THE FOLLOWING DONATIONS TO THE CYCAD SOCIETY OF SOUTH AFRICA ARE ACKNOWLEDGED WITH THANKS:
DIE VOLGENDE DONASIES AAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA WORD MET DANK ERKEN:

Number Nommer	NAME/NAAM	Amount Bedrag	Number Nommer	NAME/NAAM	Amount Bedrag
0884	Allen, D. & I.	R 10.00	2040	Du Toit, P.J. & van der Westhuizen, P.	R 40.00
2264	Allen, J.E.	10.00			
2184	Anthony, L.	25.00	2148	Elliot, V.	35.00
1578	Avenant, S.F.du T.	25.00	0817	Erasmus, C.S.	15.00
2201	Barnard, E.	35.00	1863	Erasmus, P.M.S.J.	35.00
2082	Barry, C.T.	10.00	2360	Exley, S.	40.00
2390	Berga, A.S.	55.00	1963	Fokkens, J.F.	65.00
2370	Berry, E.H.	15.00	1190	Fouche, H.P.J.	49.00
0776	Besseling, J.	75.00	1901	Fourie, G.B.	10.00
1541	Bezuidenhout, L.	35.00	2044	Fourie, J.J.A.	35.00
0399	Bischofberger, K.	35.00	0689	Fourie, M.J.	5.00
2382	Bohne, P.	8.00	0482	Gargiulo, M.	15.00
1669	Botha, K.D.	80.00	2238	Garratt, P.J.V.	15.00
0848	Bothma, J.W.	75.00	0200	Gerber, H.	10.00
2372	Bradshaw, M. & C.P.	40.00	2113	Gielink, C.C.	75.00
1807	Brumme, D.	35.00	1841	Gittleson, G.	200.00
1191	Bruwer, P.C.	5.00	0525	Gore, P.H.	10.00
0595	Bursey, J.	5.00	2309	Graham, C.D.	50.00
0228	Christopulo, G.	35.00	1789	Greyling, J.J.	40.00
2200	Cilliers, A.	5.00	1720	Griesel, C.L.B.	20.00
2312	Coetzee, D.F.	75.00	2285	Grobler, P.C.	15.00
1206	Coetzee, S.D.	20.00	2305	Groenewald, L.	20.00
2389	Coetzer, E. & J.	75.00	0420	Hanaczeck, H.W.	35.00
1930	Cronjé, J.A.S.	10.00	1600	Harris, R.	10.00
2029	Crous, D.	15.00	0601	Hart, G.B.	20.00
2247	Day, G.L.	40.00	0433	Henning, N.G.C.	100.00
2233	De Andrade, A.G.	23.00	2417	Hills, G.	38.00
2267	De Beer, C.M.	35.00	1794	Hoog, R.J.L.	55.00
1956	De Beer, H.J.	5.00	2236	Howes, C. & J.	35.00
0080	De Jong, J.J.	30.00	0528	Jacobs, W.J.	10.00
2034	De Klerk, J.C.	35.00	1002	Janse van Rensburg, J.M.	35.00
0452	De Kock, C.V.	15.00	2248	Janse van Rensburg, M.M.	35.00
1374	De Kock, K.N.	15.00	2214	Jonker, W.	20.00
2017	De Ridder, G.	40.00	2350	Jordaan, A.M.	50.00
1817	Dexter, P.	40.00	1355	Joubert, W.	33.00
2039	Diedericks, W.	10.00	1462	Kable, A.J.	55.00
1403	Doddemeade, P.W.	39.00	0745	Kloppers, J.S.	100.00
1195	Doherty, R.P.	40.00	1871	Konig, A.	35.00
1428	Du Rand, L.	35.00	0853	Kruger, P.W.B.	40.00
1810	Du Toit, B.	35.00	1672	Kuschke, A.E.	15.00
2358	Du Toit, C.L.	40.00	1315	Lapham, E.	110.00
0971	Du Toit, K.P.	20.00	1679	Leach, M.	10.00

Number Nommer	NAME/NAAM	Amount Bedrag	Number Nommer	NAME/NAAM	Amount Bedrag
2228	Loots, H.	R 40.00	0477	Scriba, J.H.	R 35.00
2133	Lötter, L.J.	10.00	1249	Seedat, H.	40.00
0159	Loubser, J.D.	35.00	2256	Sim, H.	5.00
1324	Lovatt, M.	35.00	1650	Slaviero, L.G.	13.00
2083	Lucas, S.C.	20.00	1959	Smalberger, H.C.	35.00
2096	Manga, V.	35.00	2399	Smit, C.A.	70.00
2376	Marais, D.D.	20.00	2116	Smith, M.R.	35.00
2255	Massyn, C.	10.00	2378	Smook, G.J.	40.00
1805	Maud, C.J.	40.00	2120	Snyman, A.D.	20.00
2142	McBean, W.	10.00	0992	Spicer, B.E.J.	40.00
2325	McLaren, S.	40.00	0609	Stainer, O.	15.00
1809	Middlewick, G.C.	15.00	2349	Staude, H.S.	42.50
2150	Minnaar, D.	40.00	1004	Stranex, P.	10.00
0006	Minnie, O.J.	20.00	1117	Strang, C.	40.00
2199	Monteiro, A.M.	140.00	2341	Strobos, J.M.L.	30.00
1908	Monteux, G.	250.00	2210	Struyf, W.	35.00
1210	Moodie, S.T.	35.00	1708	Terblanche, J.	35.00
2404	Mostert, P.H.	40.00	1981	Trollip, S.W.K.	22.50
2086	Mostert, P.J.	25.00	2237	Udemans, W.L.	35.00
1722	Muller, T.I.	15.00	1760	Uys, A.G.	5.00
2220	Naude, L.J.	15.00	0322	Vallabh, P.D.	10.00
2296	Nel, E.U.	75.00	2299	Van Buren-Schele, F.J.	20.00
0237	Nell, J.M.	5.00	1526	Van den Berg, I.J.	5.00
2346	Nienaber, H.J.	5.00	1836	Van den Berg, T.	20.00
0829	Niewoudt, C.F.	15.00	1144	Van den Heede, A.M.P.	100.00
1968	Oberholzer, N. & T.	35.00	1969	Van de Pest, P.	15.00
2352	Olivier, J.	20.00	1283	Van der Merwe, C.H.	5.00
0094	Olivier, L.	35.00	0490	Van der Merwe, W.D.	5.00
2215	Parker, K.	35.00	2284	Van der Walt, W.H.	39.00
2300	Pautz, M.J.	117.50	1728	Van Deventer, J.C.	140.00
2287	Pienaar, W.J.	40.00	2297	Van Geems, J.J.	10.00
0078	Pinker, C.	65.00	2105	Van Jaarsveld, W.J.	125.00
0734	Platford, R.J.	5.00	2213	Van Onselen, R.L.	10.00
1941	Potgieter, C.	5.00	2240	Van Rensburg, P.F.J.	10.00
2409	Pretorius, J.J.	35.00	1258	Van Rooy, L.	35.00
1581	Prinsloo, J.J.	15.00	1756	Van Zyl, E.	15.00
0631	Prozesky, J.G.	35.00	0681	Venter, F.F.C.	35.00
1917	Quinn, P. & L.	35.00	2364	Verwey, P. & M.	75.00
1112	Rautenbach, M.J.	30.00	1033	Vice, A.R.	100.00
1197	Reinach, N.	35.00	1949	Viljoen, N.	35.00
1222	Riordan, S.	15.00	0500	Vissers, H.	5.00
2175	Roosendal, S.	40.00	0847	Walters, J.W.	135.00
2197	Rossouw, W.D.G.	10.00	2119	Webb, A.R.F.	35.00
0415	Rudman, R.R.	15.00	2172	Welken, P.A.	40.00
2301	Schelhase, G.F.	75.00	0047	Wentzel, S.	40.00
0311	Schimmer, C.M.	20.00	0448	Wessels, F.H.	40.00
1984	Schmidt, E.V.	165.00	0008	Wohlberg, H.E.	20.00
2410	Schnetler, A.M.	40.00	2303	Wolfaardt, P.	40.00
				TOTAL / TOTAAL	**R6629.50**

EXCHANGE COLUMN / RUILHOEKIE

Saailinge te ruil of te koop/Seedlings to exchange or to sell:

Encephalartos altensteinii, E. ferox (Natal), *E. natalensis* (R30.00 elk/each)

E. longifolius, E. manikensis (Hondc) (R40.00 elk/each)

E. ferox (Mosambiek), *E. friderici-guillielmi, E. horridus, E. lehmannii, E. princeps, E. transvenosus, E. natalensis* x *E. woodii* (R50.00 elk/each)

E. umbeluziensis (R60.00 elk/each).

Encephalartos friderici saad/seed @ R4.00 elk/each (die saad is in die natuur ge-oes en is van goeie gehalte/the seeds were harvested in the wild and are of a high standard).

Gesoek/Wanted:
Saad van enige spesie/seed of any species.
Saailinge van/Seedlings of:
Encephalartos aemulans, E. aplanatus, E. arenarius, E. caffer, E. cerinus, E. cupidus, E. dolomiticus, E. eugene-maraisii, E. ghellinckii, E. heenanii, E. inopinus, E. laevifolius, E. lanatus, E. latifrons, E. middelburgensis, E. msinganus, E. nubimontanus en *E. trispinosus*.

Marius Helm, Posbus/P.O. Box 9612, 5320 Queenstown. Tel.: 0451-5728; Faks/Fax: 0451-81424; Sel/Cell: 082 807 1029.

NEW CYCAD PUBLICATIONS

ALBRETSEN, J.C., KHAN, S.A. & RICHARDSON, J.A. 1998. **Cycad palm toxicosis in dogs: 60 cases (1987–1997).** *Journal of the American Veterinary Medical Association* 213(1): 99–101.

[Objective:- To report clinical and epidemiologic information, summarize characteristic clinical signs and laboratory results, and describe the expected course of cycad toxicosis in dogs. Design:- Retrospective study. Animals:- 60 dogs with evidence of cycad ingestion. Procedure:- The National Animal Poison Control Center's case record database was searched for records of dogs ingesting cycad plants from January 1987 to November 1997. Data were retrieved on clinical signs, laboratory test results, exposure history and physical examination findings. Cases were assessed as toxicosis, suspected toxicosis, or possible toxicosis. Results:- Records from 60 dogs were retrieved; 89.7% of the dogs were from the southern United States, 38.7% ingested seeds, 95% developed liver and gastrointestinal tract problems, and 53.3% had abnormal neurological signs. High serum bilirubin concentration and alkaline phosphatase and alanine aminotransferase activities were the most common serum biochemical abnormalities. Although clinical signs were observed within 1 day, laboratory values did not change for 24 to 48 hours after cycad ingestion. Mortality rate was reportedly 32.1%. Clinical Implications:- 68% of dogs responded well to treatment and supportive care. Dogs ingesting seeds are likely to develop more serious problems. Clinical signs can develop within 1 to 3 days and can last for several days. A tentative diagnosis should be made on the the basis of history of ingestion, clinical signs, and duration of signs. Because of the nature of these toxins, cycad ingestion is serious and should be treated aggressively.]

First author's address: American Society Prevention Cruelty Anim.-Natl. Anim. Poison Control Cent., 1717S. Philo Rd., Ste. 36, Urbana, IL 61802, U.S.A.

CHAVEZ, V.M., LITZ, R.E., MONROY, M., MOON, P.A. & VOVIDES, A.M. 1998. **Regeneration of *Ceratozamia euryphyllidia* (Cycadales, Gymnospermae) plants from embryogenic leaf cultures derived from mature-phase trees.** *Plant Cell Reports* 17(8): 612–616.

[Embryonic cultures were induced from pinnae removed from young leaf flushes of mature-phase trees of the endangered cycad species, *Ceratozamia euryphyllidia*. Induction media consisted of B5 major salts, Murashige and Skoog minor salts and organics, 400 mg/l glutamine, 100 mg/l asparagine, 100 mg/l arginine, 60 g/l sucrose, 2 g/l gellan gum, 4.65–13.94 μM kinetin and 4.52–9.05 μM 2,4-dichlorophenoxyacetic acid. Cultures were maintained in darkness. Embryogenic cultures were comprised of precotyledonary somatic embryos that proliferated by somatic polyembryogenesis following subculture onto medium without plant growth regulators. Somatic embryo development and

maturation occurred spontaneously from proliferating cultures on medium without plant growth regulators. Somatic embryos were monocotyledonous and mature somatic embryos germinated on semisolid medium without growth regulators. Subsequent development, which included the elongation of the first leaves, occurred only after subculture onto semisolid medium without plant growth regulators containing 0.5% (wt/vol) activated charcoal and under low light intensity. The time period from explanting to plant recovery was approximately 3 years.]

First author's address: Trop. Res. Educ. Cent., Univ Florida, 18905 SW 280 Street, Homestead, FL 33031, U.S.A.

CHEMNICK, J., GREGORY, T.J. & SALAS-MORALES, S. 1997. **A revision of *Dioon tomasellii* (Zamiaceae) from western Mexico, a range extension of *D. merolae*, and clarification of *D. purpusii*.** *Phytologia* 83(1): 1–6.

[*Dioon tomasellii* was treated by De Luca *et al.* 1984 as two varieties; var. *tomasellii* and var. *sonorense*. To quote from the description, "Both the vegetative and reproductive characters show in general continuous variation patterns that do not support specific segregation within the range of *D. tomasellii* but the variation in the populations of Sonora and northern Sinaloa is such to warrant segregating them as a distinct variety." Apparently the reference to a continuous gradient of patterns was based on conjecture and not on observations in the field, as we have examined both living plants and/or herbarium vouchers of nearly all known populations and have found no pattern of continuous variation. Our studies show that the two varieties of *D. tomasellii* merit recognition at the species level based on: a host of distinct morphological characters that are maintained even in cultivation; the lack of continuous variation between the two varieties; different habitat preferences; and an RFLP analysis by Moretti *et al.* 1993. A nomenclatural recombination (*Dioon sonorense*) is proposed. Some comments follow on *Dioon merolae* and *D. purpusii*.

First author's address: 114 Conejo Road, Santa Barbara, CA 93103, U.S.A.

CHEMNICK, J., GREGORY, T.J. & SALAS-MORALES, S. 1997. ***Ceratozamia mixeorum* (Zamiaceae), a new species from Oaxaca, Mexico with comments on distribution, habitat, and species relationships.** *Phytologia* 83(1): 47–52.

[*Ceratozamia mixeorum* spec. nov., from Oaxaca, Mexico is described and illustrated. The species differs from others in the genus by the presence of both remarkably long peduncles bearing the megastrobili and microstrobili, and large, arching leaves with numerous, wide leaflets. Its affinity is unresolved at present, but it is likely to be close to *C. matudae*. *Ceratozamia mixeorum* is known only from cloud forest on montane peaks of the Sierra Mixes in central Oaxaca, ranging in elevation from 1440 m to 1895 m.]

First author's address: 114 Conejo Road, Santa Barbara, CA 93103, U.S.A.

FARRELL, B.D. 1998. **"Inordinate fondness": Explained: Why are there so many beetles?** *Science* (Washington D.C.) 281 (5376): 555–559.

[The phylogeny of the Phytophaga, the largest and oldest radiation of herbivorous beetles, was reconstructed from 115 complete DNA sequences for 18S nuclear ribosomal subunit and from 212 morphological characters. The results of these analyses were used to interpret the role of angiosperms in beetle diversification. Jurassic fossils represent basal lineages that are still associated with conifers and cycads. Repeated origins of angiosperm-feeding beetle lineages are associated with enhanced rates of beetle diversification, indicating a series of adaptive radiations. Collectively, these radiations represent nearly half of the species in the order Coleoptera and a similar proportion of herbivorous insect species.]

Author's address: Mus. Comparative Zoology, Harvard Univ., Cambridge, MA 02138, U.S.A.

GRUEZO, W. 1998. **Species alpha diversity of Pagbilao Grande Island vegetations, Quezon Province, Philippines.** *Asia Life Sciences* 7(1): 39–92.

[Five vegetation types were recorded from Pagbilao Grande Island, Quezon Province, Philippines. A total of 251 vascular plant species belonging to 220 genera and 72 families were recorded. A rare biological phenomenon involving formation of female cones in *Cycas revoluta* - an introduced cycad of temperate origin is recorded for the first time. In the Philippines and probably elsewhere in the tropics, this cycad species is commonly asexually propagated by using plantlets or suckers from stem base of mature plants.]

Author's address: Plant Biol Div. Inst. Biological Sci. Coll. Arts Sci. Hortorium, Mus. Nat. History, Univ. Phi, Philippines.

SCHNEIDER-POETSCH, H.A.W., KOLUKISAOGLU, U., CLAPHAM, D.H., HUGHES, J. & LAMPARTER, T. 1998. **Non-angiosperm phytochromes and the evolution of vascular plants.** *Physiologia Plantarum* 102(4): 612–622.

[The phytochromes, a class of plant light-sensing pigments, are a gene family with a long, complex evolutionary history. Angiosperms each have five or more phytochromes (designated A to E in Arabidopsis) with distinct functions as light receptors and only moderate sequence identities for different types within a species. The long-term challenge taken up here is to trace the origin and function of the various motifs within

the angiosperm phytochromes through gymnosperm phytochromes (types N, O and P) and lower plant phytochromes, sometimes reaching even to bacterial progenitor molecules. Particular intriguing are the findings of homology of a C-terminal region of phytochromes with bacterial transmitter modules and of a large N-terminal region with a protein encoded by a gene from the cyanobacterium *Synechocystis*. Phylogenetic analysis helps to answer general questions such as the times of divergence of mono- and dicotyledons, of groups of gymnosperms or of ferns. Phytochrome sequences suggest (1) that mono- and dicotyledons became separated 150–200 million years earlier than indicated by the fossil record and (2) that *Ginkgo* and *Cycas* have been separated unexpectedly late from the lineage giving rise to the Pinidae. (3) The status of *Psilotum* as a close relative of the primeval vascular plants is not supported. Phytochrome gene sequences additionally reveal that (4) moss and fern phytochromes have erratically acquired C-termini which, though kinase-like, are different from the common ones and that (5) introns have been lost, gained or shifted in position from algae to angiosperms. Phytochromes promise to be a rich source of phyllogenetic information into the future as some sequences and functional data emerge, not least from studies of lower plants.]

First author's address: Botanisches Inst., Univ. Koeln, D-50931 Koeln, Germany.

SHARMA, I.K., JONES, D.L., FORSTER, P.I. & YOUNG, A.G. 1998. **The extent and structure of genetic variation in the *Macrozamia pauli-guilielmi* complex (Zamiaceae).** *Biochemical Systematics and Ecology* 26(1): 45–54.

[Allozyme variation in 12 enzyme systems coded by 17 loci was investigated in six populations of *Macrozamia*, including two populations of *M. parcifolia*, three populations of *M. pauli-guilielmi* and one population of *M. crassifolia* from Queensland (Australia) in order to measure the levels of genetic variation. This was required to establish whether the allozyme data supports recent taxonomic treatment. Seven loci were found to be monomorphic. All species were genetically depauperate, with low levels of genetic diversity (P = 17.6–35.3%, A = 1.2–1.4, H-e = 0.02–0.11) compared with two (only) existing reports, and plants in general. Genetic differentiation among populations was high (G-ST = 0.47). UPGMA cluster analysis using Nei unbiased genetic distance showed *M. parcifolia* and *M. pauli-guilielmi* to be more similar genetically to each other than either is to *M. crassifolia*. This is concordant with groupings based on morphological characters, thus supporting the objectives of the investigation.]

First author's address: Cent. Plant Biodiversity Res., CSIRO, Div. Plant Industry, GPO. Box 1600, Canberra, ACT 2601, Australia.

VAN DER BANK, F.H., VORSTER, P. & VAN DER BANK, M. 1998. **Phylogenetic relationships, based on allozyme data, between six cycad taxa indigenous to South Africa.** *South African Journal of Botany* 64(3): 182–188.

[Phylogenetic relationships between *Encephalartos altensteinii* Lehmann, *E. friderici-guilielmi* Lehman, *E. natalensis* Dyer & Verdoorn, *E. transvenosus* Stapf & Burtt Davy and *E. villosus* Lemaire were studied, using *Cycas revoluta* Thunberg as outgroup. Three continuous and one discontinuous buffer systems were used and gene products of 21 enzyme coding loci were examined by horizontal starch gel-electrophoresis. A biochemical key, based on fixed allele differences, is presented. Fixed allele differences at one locus between *E. altensteinii* and *E. natalensis* may confirm that these species do not share the same gene pool. However, the genetic distance is the least (0.042) between these two species, compared to the mean genetic distance value of 0.222 for the other ingroup taxa. The results are discussed with reference to affinities based on morpholgy and distribution.]

First author's address: Dep. Zool., Rand Afrikaans Univ., P.O. Box 524, Auckland Park 2006, South Africa.

VORSTER, P. & GEREAU, R.E. 1998. ***Encephalartos ituriensis* (Zamiaceae): An emended description.** *Adansonia* (Paris) 20(1): 211–216.

[The original description of *Encephalartos ituriensis* (Zamiaceae) is incomplete, to some extent inaccurate and based in part on immature material. Based on subsequently collected material and on observations *in situ*, an emended description with illustrations of the leaves and mature female cones is provided.]

First author's address: Dep. Bot., Univ. Stellenbosch, Private Bag X1, 7602 Matieland, South Africa.

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

Beeld Bladsy 6 ★★ Donderdag 17 Desember 1998

Broodbome uit Mananga in Nederland bemark

Johan de Meyer

Mananga. – Broodbome wat hier gekweek word as deel van 'n opheffingsprojek om die *Encephalartos lebomboensis*-spesie van ondergang te red, gaan binnekort in Nederland bemark word ná 'n suksesvolle eerste bemarkingsronde in Suid-Afrika.

Volgens mnr. Jeremy Christiansen van Braaks, wat die Manangabroodboomprojek saam met die Mpumalanga Parkeraad (MPR) bestuur, het die projek reeds Citesgoedkeuring gekry om die broodbome uit te voer. Bykans 2 000 plante is reeds in Suid-Afrika verkoop.

Braaks beoog nou verdere bemarkingsprogramme vir onder meer Kersfees en Valentynsdag.

"Ons het al die afsetpunte onlangs in oënskou geneem en gevind dat baie kwekerye die broodbome weggesteek het in hul afdeling vir inheemse plante. Die broodbome is 'n emosionele kopie. Dit moet uitgestal word by betalingspunte.

"Die grootste uitdaging is om die boodskap van die broodboomprojek uit te dra. Mense stel baie meer belang as hulle hoor dat die plante deur inwoners van Mananga gekweek word, dat die projek werk skep en dat die broodboomspesie só gespaar word," verduidelik Christiansen.

Nóg 'n uitdaging is om in die behoefte aan broodbome te kan voorsien. 'n Beperkte aantal sade kan uit die Mananga-gebergtes naby die Swazilandse grens geoes word en dit vat lank voordat die sade ontkiem. Mense wat in groter plante belang stel, moet nog langer wag.

"Die mense het altyd in die nag gekom en die broodbome uitgehaal. Nou is ons hier om die bome te beskerm. Ons wil hê ons kinders moet die belang van die plante sien," het mnr. Mfundo Mkhabela, gemeenskapsleier, gesê.

Die projek verskaf reeds werk aan ses mense. Die gemeenskap is volgens Mkhabela toenemend besig om die projek te sien as 'n geleentheid om verskeie ander vaardighede te bemark. Hulle wil onder meer 'n piekniekterrein vir toeriste by hul kwekery ontwikkel.

Hulle is ook opgewonde oor planne om 'n heining om hul groot skat – die berg waar die lebomboensis-broodbome voorkom – te span.

"Vroeër het ons geweet van die broodbome. Die parkeraad leer ons om te onderskei watter sade sal ontkiem," het mnr. Thomas Makhushe, gemeenskapsleier, gesê.

Summary

MANANGA CYCADS TO BE MARKETED IN THE NETHERLANDS

Cycads propagated at Mananga as part of the project to save *Encephalartos lebomboensis* from extinction, will soon be marketed in the Netherlands, following its successful first marketing project in South Africa.

According to Mr. Jeremy Christiansen of Braaks Environmental Products, who in conjuntion with the Mpumalanga Parks Board, administer the Mananga cycad project, CITES approval of the project to export cycads has already been obtained. About 2000 plants have already been sold in South Africa.

The challenge is to make known the aims of the project. People are much more interested when they learn that

the cycads are propagated by the Mananga community, that the project brings about job-oppurtunities, and that the cycad species is thus protected.

Another challenge is to satisfy wants for cycad plants. A limited number of seeds can be harvested at the Mananga mountains near the Swaziland border and it takes a long time for the seeds to germinate. People wanting larger plants have to wait even longer.

Mr. Mfundo Mkhabela, a leader of the community, said that people used to come at night to dig up the plants but now the Mananga people are there to protect the plants. They want their children to know the importance of the plants.

The project already supply jobs to six people.

Dié bome gesteel as vigsmiddel

Sikadeë 'hou bose geeste weg'

Johan de Meyer

Mananga. – Landelike mense wat reken broodbome kan hulle help om vigs te bekamp, word nou gereken as die grootste broodboomstelers.

Plattelandse inwoners van Mpumalanga glo toenemend dat 'n broodboom wat in stukkies gekap en op obskure maniere ingeneem word 'n mens teen vigs kan beskerm, sê mnr. Gerhard Strydom, projekleier van die Mpumalanga-Parkeraad (MPR) se broodboomprojek in Mananga. Dit kan dié siekte selfs glo genees.

Volgens inwoners van dié landelike gebied aan die Swazilandse grens is daar ook die bygelowe dat 'n broodboom in jou tuin alle bose geeste en toordoktervloeke van jou sal weghou.

"Jy kan maar gaan kyk. In elke polisiekantoor, landdroshof en selfs in die wetgewer sal jy iewers 'n broodboom kry. Mense dink hulle sal ryk word as hulle 'n broodboom het, waarskynlik omdat al die mense wat broodbome hier kom steel reeds ryk is," verduidelik mnr. Thomas Makhushe, 'n gemeenskapsleier by die broodboomprojek. Die ironiese waarheid is egter dat broodbome giftig is, sê Strydom.

Hy meen die enigste antwoord is om die mark te oorspoel met broodbome, sodat dit makliker sal word om een te koop as om een iewers in die gebergtes uit te grou.

Tans is dit baie maklik om, soos broodboomstelers verlede week in Bourke's Luck gedoen het, eenvoudig veld toe te stap en om broodbome uit te grou of in stukkies te kap vir sy herverkoopwaarde.

In Witrivier is 'n hele broodboomspesie onlangs binne weke vernietig voordat kenners dit kon beskryf.

Die MPR se antwoord was om saam met Braaks 'n kwekery in Mananga te begin.

Inwoners van die gebied word ingespan om elke jaar sade te oes in die enigste bergreeks in die land waar die *Encephalartos lebomboensis*-broodboom voorkom.

Die kwekery gaan later uitgebrei word om allerhande plante te kweek sodat moeti-handelaars nie plante in die veld sal plunder nie.

"Daar is egter baie persepsies wat nog moet verander. Kan jy dink watter opskudding dit sal veroorsaak as 'n mens 'n moetimark in Nelspruit wil oopmaak om plante in die natuur met jou winste te hervestig?" vra Strydom.

"Die renosterkrisis is niks in vergelyking met dié een nie. Plante kan nie skree en bloei nie en kry daarom nie soveel blootstelling nie. As ons egter maniere kan vind om die plante teen 'n wins te kweek en suksesvol te bemark, kan ons baie spesies red."

Translation

THESE CYCADS STOLEN AS A REMEDY AGAINST AIDS

Mananga:- Rural people who reckon that cycads can help them to withstand aids are now considered to be the main poachers of cycads.

Mr. Gerhard Strydom, project leader of the Mpumalanga Parks Board's cycad project at Mananga, said that rural inhabitants of Mpumalanga increasingly believe that cycads, cut into pieces and taken by obscure manners, can protect man against aids and can even cure the disease.

According to rural inhabitants of this area adjacent to the Swaziland border, superstitions exist that a cycad in your garden will keep away evil spirits and witch-doctors' curses.

"At every police station, magistrates's court, and even at the legislator's offices, you will find a cycad somewhere. People think that they will become rich if they own a cycad, possibly because all the people coming to steal cycads are already rich" said Mr. Thomas Makhushe, a community leader of the cycad project. The ironical fact, however, is that cycads are poisonous, said Strydom. In his opinion the answer is to flood the market with cycads, so that it would be much easier to buy one than to dig one up somewhere in the mountains.

At present it is easy to go into the veld, as happened last week at Burke's Luck, and dig up a cycad or cut it into pieces because of its selling value.

In White River recently a cycad species was wiped out completely over a period of only a few weeks before authorities could describe it. The Mpumalanga Parks Board's answer was to bring about a cycad nursery at Mananga.

Each year inhabitants of the area are roped in to harvest the seeds on the only mountain range in the country where *Encephalartos lebomboensis* grows.

The nursery will later on be expanded to raise all kinds of plants to prevent "muti" vendors plundering plants in the wild.

"However, many perceptions still have to be changed. Can you imagine the fracas that will be caused when someone wants to open a "muti" market in Nelspruit and use the profits to resettle plants in nature?" asks Strydom. "The rhinoceros crisis is nothing compared to this. Plants can't scream and bleed and therefore not much fuss is made about them. If we can find a way to cultivate plants at a profit and to market them successfully, many species can be saved."

Focus on Durban Botanic Gardens....

Rare cycad specimen

Berea Mail Reporter

DURING a plant exploration of the Ngoye Forest in Zululand in the late 1890s, then curator of Durban Botanic Gardens, John Medley Wood, found the rarest cycad in the world.

Mr Wood stumbled on the solitary clump of *Encephalartos woodii* while botanising in the area.

His "find" consisted of four stems, the tallest of which was 18 feet high with proportionate girth of stem and with a few offsets at the base. The stems were all male. Mr Wood's search of the area for another plant of the species proved fruitless.

In 1903 he sent James Wylie to Zululand to fetch some of the smaller offsets of which three were planted in the gardens. Two of these produced new leaves a couple of years later.

Mr Wylie went to Zululand again in 1907 and this time he returned to Durban with two large trunks which were planted on the terrace of the old conservancy and remain a "must see" for visitors to the gardens.

"Cycads are dioceous plants which means they have male and female sexual parts on separate plants," said curator Chris Dalzell. "If you want to propagate these plants sexually, that is, by seed you need both male and female plants."

Encephalartos woodii only has male plants as the females are extinct so the cycad can only be propagated by removing suckers off the parent plant.

"This has been done successfully over the years with plants being donated to large botanic gardens and institutions around the world."

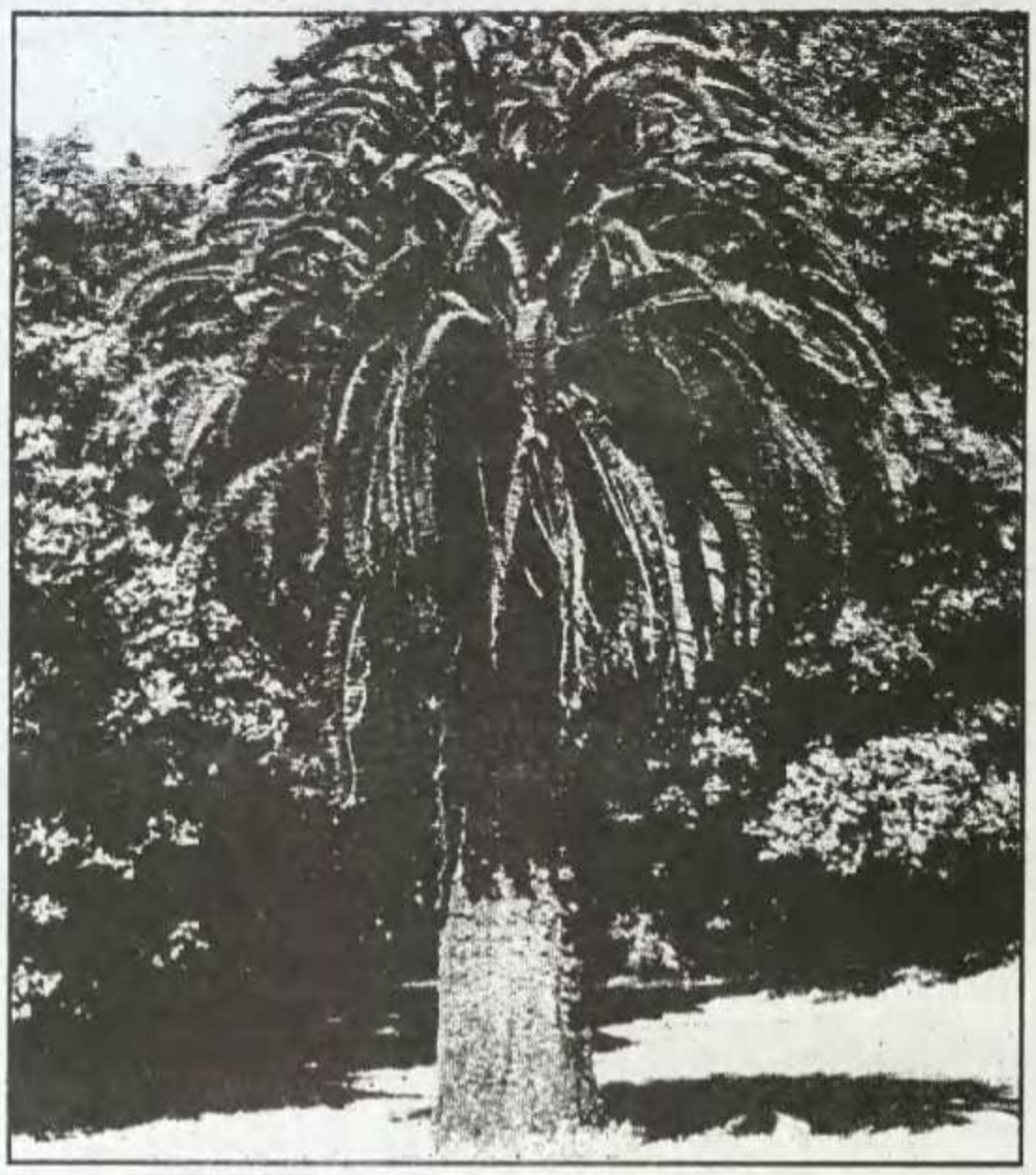
Encephalartos woodii is extinct in the wild. Durban Botanic Gardens is in the process of propagating these rare cycads by removing leaf bases from the crown of the division.

The process was attempted in the 1980s and was successful.

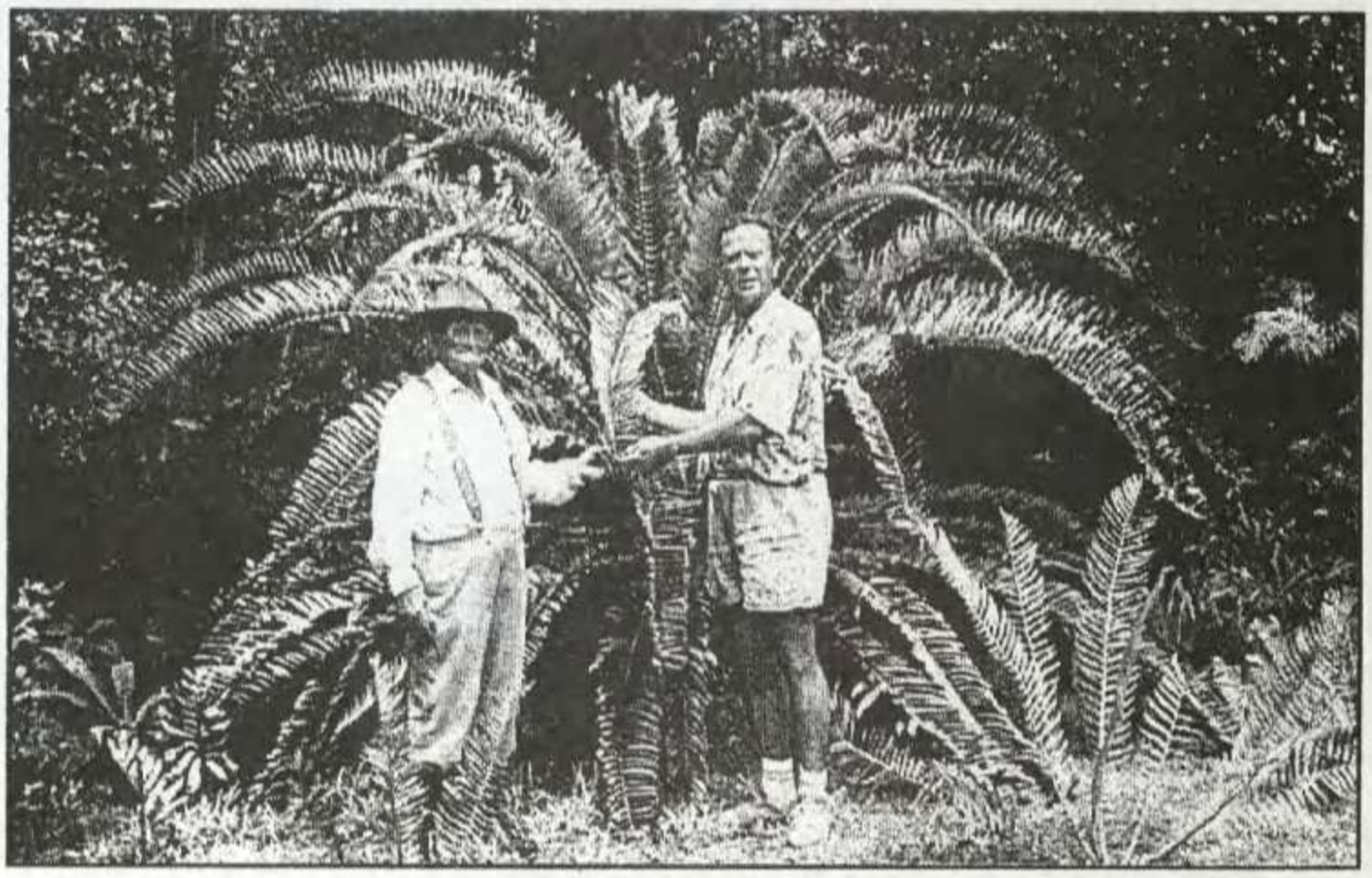
"If we are successful this time we will be able to increase the number of *woodii* cycads that presently number only a few hundred.

"We can be proud of the fact we own the original specimens of one of the rarest plants in the world," said Mr Dalzell.

He added: "In 1995 the gardens donated a large specimen of the cycad to Ian Garland who owns a farm in Mtunzini, as we were not able to return a specimen to the Ngoye Forest due to security reasons."



ONE of the rarest cycad specimens in the world



OWNER of the Mtunzini farm Twin Streams, Ian Garland, receives a specimen of *Encephalartos woodii* from director of parks Errol Scarr.

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2034	DE KLERK, Mr J C	P O Box 90458, GARSFONTEIN X4, 0042
0452	DE KOCK, Mnr C V	Posbus 7222, TZANENG MALL, 0855
0815	DE KOCK, Dr J A	Posbus 2498, PIETERSBURG, 0700
1374	DE KOCK, Prof K N	Richardsonstraat 2, Bailliepark, POTCHEFSTROOM, 2520
2383	DE LANGE, Mr Leon S	P O Box 1503, AMANZIMTOTI, 4125
1062	DE LA REY, Mnr A le R	Posbus 1411, LETSITELE, 0885
2288	DELPORT, Mr J L	P O Box 523, DURBANVILLE, 7551
2355	DE MUNNIK, Dr A	Posbus 17308, WITBANK, 1035
2152	DENYER, Mr D C	P O Box 81, FAERIE GLEN, 0043
2017	DE RIDDER, Mr Gerard	P O Box 783148, SANDTON, 2146
1818	DE SMIDT, Mr D J	P O Box 71329, BRYANSTON, 2021
2090	DE VRY, Mnr C F P	Posbus 11404, QUEENSWOOD, 0121
0328	DE WET, Daniel S	Primariusstraat 17, STRAND, 7140
1817	DEXTER, Peter	P O Box 747, KLOOF, 3640
2039	DIEDERICKS, Mnr W J	Posbus 17081, GROENKLOOF, 0027
0085	DIXON, Mr Ian	20 Varley Road, Hayfields, PIETERMARITZBURG, 3201
1403	DODDEMEADE, Mr P W	P O Box 59112, KENGRAY, 2100
1649	DOEPEL, Mr W R	P O Box 1127, HONEYDEW, 2040
1195	DOHERTY, Mr R P	30 Sunnysode Avenue, Westdene, BENONI, 1501

2289	DOLLOWAY, Kevin	11 Padfield Gardens, Eleanor Crescent, PINETOWN, 3610
1464	DONALDSON, Dr J S	NBI, Private Bag X7, CLAREMONT, 7735
2227	DROTSKY, Mnr S J	Posbus 1202, CARLETONVILLE, 2500
2281	DU BOIS, B	P O Box 95205, WATERKLOOF, 0145, (Pretoria)
0806	DUNCAN, Mrs Lorraine	10 7th Street, Linden, JOHANNESBURG, 2195
1298	DU PLESSIS, Mnr André	Essenhoutweg 9, Wilkoppies, KLERKSDORP, 2570
2298	DU PLESSIS, Mnr C J	Posbus 31436, TOTIUSDAL, 0134
2377	DU PLESSIS, MNR JOHAN P	Posbus 3173, PRETORIA, 0001
2107	DU PLESSIS, Mev I E	Posbus 2064, MIDDELBURG, 1050
2290	DU PLESSIS, Dr J	Wychwoodlaan 31, Linkside, PORT ELIZABETH, 6001
0955	DU PLOOY, Mnr J F	Posbus 177, MONDEOR, 2110
2218	DU PREEZ, Mnr H K	Dikbaslaan 59, WONDERBOOM, 0182
1577	DU PREEZ, Mnr J C	Posbus 5452, Onverwacht, ELLISRAS, 0557
1854	DU PREEZ, Mnr J G	Fismerstraat 8, ELSBURG, 1428
1428	DU RAND, Mr L	P O Box 1254, ROOSEVELT PARK, 2129
1810	DU TOIT, Mnr Biem	Posbus 3942, PIETERSBURG, 0700
2358	DU TOIT, Mnr C L	Terblanchstraat 5, De Zoete Inval, SUIDER PAARL, 7646
1271	DU TOIT, Mnr H X N	Posbus 22, BREDASDORP, 7280
0971	DU TOIT, Mnr K P	Posbus 75, BURGERSFORT, 1150
2040	DU TOIT, Mnr P J & VAN DER WESTHUIZEN, Mnr P	Posbus 2328, KLERKSDORP, 2570
1040	EALES, Mr L E	263 Lewisham Road, BLACKHEATH, Johannesburg, 2195
1630	EKSTEEN, Mnr L J	Posbus 4496, EMPANGENI, 3880
2148	ELLIOT, Mr V	45 Grenville Avenue, SAVOY ESTATE, 2090
2011	ELOFF, Mnr Frits	Posbus 12609, CLUBVIEW, 0014
2321	ENTABENI GAME RESERVE	Dolf Blignaut, Algemene Bestuurder, Posbus 441, NABOOMSPRUIT, 0560
0817	ERASMUS, Dr C S	77 Rustenburg Road, EMMARENTIA, Johannesburg, 2195
2132	ERASMUS, Mnr H J	Posbus 180, DUIWELSKLOOF, 0835
2052	ERASMUS, Mnr M J	Posbus 914-1178, WINGATEPARK, 0153
1863	ERASMUS, Mnr P M S J	Posbus 31231, TOTIUSDAL, 0134
2327	ESTERHUIZEN Jacque	Posbus 11909, ASTON MANOR, 1630
2252	ESTERHUYSE, Mnr L W	Balmoral Ave 169, Lisdogan Park, ARCADIA, 0083
0793	EVERETT, Mr W A	P O Box 238, CONSTANTIA, 7848
2360	EXLEY, Mnr Schalk	Posbus 1913, RICHARDS BAAI, 3900
2319	FERREIRA, Mev C	Posbus 733, LOUIS TRICHARDT, 0920
9015	FLORA CONSERVATION COMMITTEE	Botanical Society of SA, Kirstenbosch, CLAREMONT, 7735
1961	FLETCHER, Mr C M	P O Box 200, PORT ALFRED, 6170
1963	FOKKENS, Mr J F	P O Box 14504, NELSPRUIT, 1200
1852	FOUCHÉ, Mnr G W	Oaklaan 43, PRIMROSE, 1401
1190	FOUCHÉ, Mnr H P J	Posbus 1527, HALFWAY HOUSE 1685
1901	FOURIE, Mnr G B	Posbus 75113, LYNNWOODRIF, 0040
2044	FOURIE, Mnr J J A	Posbus 908541, MONTANA, 0151
0689	FOURIE, Mnr M J	Hobsonstraat 9, STILFONTEIN, 2551
0542	FRITZ, Mnr G	Posbus 139, HEIDELBERG, 2400
1632	FUGLISTER, Mr F J	P O Box 121, HALFWAY HOUSE, 1685
2238	GARRATT, Dr P J V	71 Myro Drive, Glenmore, DURBAN, 4001
0200	GERBER, Mr Harry	45 Anleno Road, Montclair, DURBAN, 4001
2113	GIELINK, Mr C C	P O Box 3786, DURBAN, 4000
2108	GIESE, Mr D G	P O Box 2, GONUBIE, 5256
1841	GITTLESON, Mr G	31 Sunnyside Road, ORCHARDS, 2192
1614	GNEITING, Mr C F H	P O Box 72188, LYNNWOOD RIDGE, 0040
1466	GOLDSCHMIDT, Dr R P	P O Box 68332, BRYANSTON, 2021
0525	GORE, Mnr P H	669 Killick Avenue, Les Marais, PRETORIA, 0084
2273	GOSSMANN, J F	Sultanastraat 5, Uitsig, WELLINGTON, 7655
1335	GOULD, MR & MRS T	P O Box 132, PENNINGTON, 4184
2138	GOUWS, Mnr A R	Arcadiastraat 869, ARCADIA, 0083
2342	GOUWS, Mnr L C	Posbus 635, FONTAINEBLEAU, 2032
1789	GREYLING, Mnr J J	21ste Laan 760, RIETFONTEIN, 0084
1720	GRIESEL, Mnr C L B	Queens Crescent 427, Lynnwood, PRETORIA, 0081
2030	GRIMBEEK, Mnr P J	Posbus 5238, BARBERTON, 1300
1400	GROBBELAAR, Mev Hanneke	Tarentaalkloof, Posbus 15357, LYNN-OOS, 0039
0097	GROBBELAAR, Prof N (Erelid)	Tarentaalkloof, Posbus 15357, LYNN-OOS, 0039
0143	GROBLER, Mev Maria	Posbus 914, PIETERSBURG, 0700
2285	GROBLER, Mnr P C	Posbus 236, PIETERSBURG, 0700
1840	GROBLER, Mnr P S	Posbus 20871, NEWCASTLE, 2940

2305	GROENEWALD, Kaptein L	Katjiepieringlaan 114, EDELWEISS, Springs, 1559
2234	HACKNEY, Mr F M	29 Danny Street, GLENVISTA, 2091
0420	HANACZECK, Mr H W	P O Box 44, DUIWELSKLOOF, 0835
2406	HARRIS, Mrs J B	P O Box 1765, NEW GERMANY, 3620
1178	HARRIS, Mr M V	5 FitzPatrick Street, SASOLBURG, 9570
1600	HARRIS, Mnr R	Posbus 16514, VERWOERDBURG, 0140
0510	HARRISON, E R	P O Box 104, MTUBATUBA, 3935
0296	HARRY MOLTENO LIBRARY	The Librarian, Kirstenbosch, Private Bag X7, CLAREMONT, 7735
0601	HART Mr G B	P O Box 72727, LYNWOOD RIDGE, 0040
2271	HATTINGH, Mev Elza	Posbus 797, HONEYDEW, 2040
0077	HATTINGH, Mev E F	Posbus 181, GROBLERSDAL, 0470
2318	HATTINGH, Mnr J F	Posbus 13717, SINOVILLE 0129
1964	HEINE, Mnr E W P	Groeneweide 10, STELLENBOSCH, 7600
2326	HELM, Marius	Posbus 9612, QUEENSTOWN, 5320
0115	HENMAN, Mr Enrico	12 Dhlinza Street, ESHOWE, 3815
2096	HENNING, Dr J C	Posbus 1168, ELLISRAS, 0555
0433	HENNING, Dr N G C	Cantonmentsweg 80, Lyttelton Manor, VERWOERDBURG, 0157
1080	HEYNS, Mnr J O	Wenningstraat 115, Groenkloof, PRETORIA, 0181
2417	HILLS, Mnr G	Posbus 64, HENNEMAN, 9445
2063	HLOMOHLOMO GAME RESERVE cc	P O Box 95192, GRANT PARK, 2051
2006	HOBBS, Mnr E T	Bosveldweg 157, WONDERBOOM, 0182
1711	HOLLANDER, Prof W J	R.A.U., Posbus 524, AUCKLANDPARK, 2006
9002	HOOFDIREKTORAAT NATUURBEWARING	Privaatsak X209, PRETORIA, 0001
1794	HOOG, Mr R J L	22 Douglas Road, KLOOF, 3610
0086	HOOLE, Mr James C	P O Box 7958, Newton Park, PORT ELIZABETH, 6055
1946	HÖRING, Mr H J	12 Leeuwenhof Street, Oak Glen, BELLVILLE, 7530
1983	HORSTHEMKE, Mr R E	P O Box 365, FERNDALE, 2160
2236	HOWES, Cobie & Julie	55 Homestead Avenue, HILLCREST, 3610
0498	HULSHOF, Mr A	P O Box 1526, KLERKSDORP, 2570
1766	HUNTER, Dr J J	Nietvoorbij, Privaatsak X5026, STELLENBOSCH, 7599
1155	ISACKS, Mr G A	8 Medway Road, WESTVILLE, 3630
1168	ISACKS, Mr G R	44 Windham Avenue, HILLARY, 4094
0528	JACOBS, Mnr W J	Ashleyweg 19, SCOTTBURGH, 4180
2178	JANSEN, Mnr Zandberg	Roosweg 8, DAWNVIEW, Germiston, 1401
1900	JANSE VAN RENSBURG, Mnr J A	Privaatsak X9059, PIETERMARITZBURG, 3200
1002	JANSE VAN RENSBURG, Mnr J M	Posbus 92, VRYHEID, 3100
1217	JANSE VAN RENSBURG, J P	Jopie Fouriestraat 374, PRETORIA-NOORD, 0182
2248	JANSE VAN RENSBURG, Mev M M	Posbus 304, SWELLENDAM, 6740
2269	JANSE VAN RENSBURG, Mnr W	Privaatsak X5912, UPINGTON, 8800
0458	JOHANNES, Mr G	P O Box 215, PIET RETIEF, 2380
0644	JOHANNES, Mr H C	P O Box 276, PAULPIETERSBURG, 3180
1797	JOHANNESBURG PUBLIC LIBRARY	Market Square, JOHANNESBURG, 2001
2214	JONKER, Mnr W	Posbus 1363, MIDDELBURG, 1050, Mpumalanga
2350	JORDAAN, Mev A M	Posbus 1059, HEIDELBERG, 2400
1415	JORDAAN, Mnr A S	Ponsfordsingel 36, ESCOMBE, 4093
1527	JORDAAN, Past. Ben	P O Box 55884, PIETERSBURG, 0700
2076	JORDAAN, Dr J B	Posbus 19166, NELSPRUIT, 1200
0146	JORDAAN, Sakkie & Anna	Posbus 104, WARRENTON, 8530
2292	JOUBERT, J J	Posbus 21991, Helderkruin, ROODEPOORT, 1730
1355	JOUBERT, Mnr W	Posbus 376, WARMBAD, 0480
1462	KABLE, Mr A J	12 Orchid Road, Tygerdal, GOODWOOD, 7460
0223	KACHELHOFFER, Mr N J	P O Box 3107, PRETORIA, 0001
1791	KADWA, Dr M A	Plastic Surgeon, Parklane Clinic, Private Bag X40500, HOUGHTON, 2041
2270	KANONBERG BOERDERY	Posbus 2634, DURBANVILLE, 7551
0714	KANTOR, Mr S R	P O Box 59542, KAREN PARK, 0118
2002	KELLERMAN, Mnr E O	Posbus 73618, LYNNWOODRIF, 0040
0010	KEMP, Mr H J	51 Constance Road, Broadwood, PORT ELIZABETH, 6070
2151	KENDALL, L	P O Box 11324, HATFIELD, 0028
0081	KENNEDY, Mnr H C	Blok A–E 17, Huis Vergenoegd, Hoofstraat 188, PAARL, 7646
0745	KLOPPERS, Mnr John S	Posbus 24, GROBLERSDAL, 0470
2394	KLEYNHANS, Mnr P A	Dirk Van Deventerlaan 122, WONDERBOOM, 0182
1867	KOCKOTT, Mrs C P	P O Box 1253, STILFONTEIN, 2550
1358	KOFMAN Mnr J H	Posbus 1106, Montana Park, PRETORIA, 0159
1538	KOK, Mnr M B	Posbus 48187, HERCULES, 0030

2305	GROENEWALD, Kaptein L	Katjiepieringlaan 114, EDELWEISS, Springs, 1559
2234	HACKNEY, Mr F M	29 Danny Street, GLENVISTA, 2091
0420	HANACZECK, Mr H W	P O Box 44, DUIWELSKLOOF, 0835
2406	HARRIS, Mrs J B	P O Box 1765, NEW GERMANY, 3620
1178	HARRIS, Mr M V	5 FitzPatrick Street, SASOLBURG, 9570
1600	HARRIS, Mnr R	Posbus 16514, VERWOERDBURG, 0140
0510	HARRISON, E R	P O Box 104, MTUBATUBA, 3935
0296	HARRY MOLTENO LIBRARY	The Librarian, Kirstenbosch, Private Bag X7, CLAREMONT, 7735
0601	HART Mr G B	P O Box 72727, LYNWOOD RIDGE, 0040
2271	HATTINGH, Mev Elza	Posbus 797, HONEYDEW, 2040
0077	HATTINGH, Mev E F	Posbus 181, GROBLERSDAL, 0470
2318	HATTINGH, Mnr J F	Posbus 13717, SINOVILLE 0129
1964	HEINE, Mnr E W P	Groeneweide 10, STELLENBOSCH, 7600
2326	HELM, Marius	Posbus 9612, QUEENSTOWN, 5320
0115	HENMAN, Mr Enrico	12 Dhlinza Street, ESHOWE, 3815
2096	HENNING, Dr J C	Posbus 1168, ELLISRAS, 0555
0433	HENNING, Dr N G C	Cantonmentsweg 80, Lyttelton Manor, VERWOERDBURG, 0157
1080	HEYNS, Mnr J O	Wenningstraat 115, Groenkloof, PRETORIA, 0181
2417	HILLS, Mnr G	Posbus 64, HENNEMAN, 9445
2063	HLOMOHLOMO GAME RESERVE cc	P O Box 95192, GRANT PARK, 2051
2006	HOBBS, Mnr E T	Bosveldweg 157, WONDERBOOM, 0182
1711	HOLLANDER, Prof W J	R.A.U., Posbus 524, AUCKLANDPARK, 2006
9002	HOOFDIREKTORAAT NATUURBEWARING	Privaatsak X209, PRETORIA, 0001
1794	HOOG, Mr R J L	22 Douglas Road, KLOOF, 3610
0086	HOOLE, Mr James C	P O Box 7958, Newton Park, PORT ELIZABETH, 6055
1946	HÖRING, Mr H J	12 Leeuwenhof Street, Oak Glen, BELLVILLE, 7530
1983	HORSTHEMKE, Mr R E	P O Box 365, FERNDALE, 2160
2236	HOWES, Cobie & Julie	55 Homestead Avenue, HILLCREST, 3610
0498	HULSHOF, Mr A	P O Box 1526, KLERKSDORP, 2570
1766	HUNTER, Dr J J	Nietvoorbij, Privaatsak X5026, STELLENBOSCH, 7599
1155	ISACKS, Mr G A	8 Medway Road, WESTVILLE, 3630
1168	ISACKS, Mr G R	44 Windham Avenue, HILLARY, 4094
0528	JACOBS, Mnr W J	Ashleyweg 19, SCOTTBURGH, 4180
2178	JANSEN, Mnr Zandberg	Roosweg 8, DAWNVIEW, Germiston, 1401
1900	JANSE VAN RENSBURG, Mnr J A	Privaatsak X9059, PIETERMARITZBURG, 3200
1002	JANSE VAN RENSBURG, Mnr J M	Posbus 92, VRYHEID, 3100
1217	JANSE VAN RENSBURG, J P	Jopie Fouriestraat 374, PRETORIA-NOORD, 0182
2248	JANSE VAN RENSBURG, Mev M M	Posbus 304, SWELLENDAM, 6740
2269	JANSE VAN RENSBURG, Mnr W	Privaatsak X5912, UPINGTON, 8800
0458	JOHANNES, Mr G	P O Box 215, PIET RETIEF, 2380
0644	JOHANNES, Mr H C	P O Box 276, PAULPIETERSBURG, 3180
1797	JOHANNESBURG PUBLIC LIBRARY	Market Square, JOHANNESBURG, 2001
2214	JONKER, Mnr W	Posbus 1363, MIDDELBURG, 1050, Mpumalanga
2350	JORDAAN, Mev A M	Posbus 1059, HEIDELBERG, 2400
1415	JORDAAN, Mnr A S	Ponsfordsingel 36, ESCOMBE, 4093
1527	JORDAAN, Past. Ben	P O Box 55884, PIETERSBURG, 0700
2076	JORDAAN, Dr J B	Posbus 19166, NELSPRUIT, 1200
0146	JORDAAN, Sakkie & Anna	Posbus 104, WARRENTON, 8530
2292	JOUBERT, J J	Posbus 21991, Helderkruin, ROODEPOORT, 1730
1355	JOUBERT, Mnr W	Posbus 376, WARMBAD, 0480
1462	KABLE, Mr A J	12 Orchid Road, Tygerdal, GOODWOOD, 7460
0223	KACHELHOFFER, Mr N J	P O Box 3107, PRETORIA, 0001
1791	KADWA, Dr M A	Plastic Surgeon, Parklane Clinic, Private Bag X40500, HOUGHTON, 2041
2270	KANONBERG BOERDERY	Posbus 2634, DURBANVILLE, 7551
0714	KANTOR, Mr S R	P O Box 59542, KAREN PARK, 0118
2002	KELLERMAN, Mnr E O	Posbus 73618, LYNNWOODRIF, 0040
0010	KEMP, Mr H J	51 Constance Road, Broadwood, PORT ELIZABETH, 6070
2151	KENDALL, L	P O Box 11324, HATFIELD, 0028
0081	KENNEDY, Mnr H C	Blok A–E 17, Huis Vergenoegd, Hoofstraat 188, PAARL, 7646
0745	KLOPPERS, Mnr John S	Posbus 24, GROBLERSDAL, 0470
2394	KLEYNHANS, Mnr P A	Dirk Van Deventerlaan 122, WONDERBOOM, 0182
1867	KOCKOTT, Mrs C P	P O Box 1253, STILFONTEIN, 2550
1358	KOFMAN Mnr J H	Posbus 1106, Montana Park, PRETORIA, 0159
1538	KOK, Mnr M B	Posbus 48187, HERCULES, 0030

1871	KONIG, Mr Andrew	P O Box 475, BUCCLEUCH, 2066
1939	KORKIE, Mnr E S	Vampirestraat 569, ELARDUSPARK, 0181
2291	KOTZÉ, Mnr H J	Hoërskool Monument Park, Privaatsak, Dan Kingweg, KRAAIFONTEIN,7570
2192	KRIEL, Mnr Henri-Jacques	Posbus 130, FLORIDA, 1710
1812	KRIEL, Mnr W J	Rupertlaan 34, SOMERSET-WES, 7130
2260	KRITZINGER, E D & I M	Wrightstraat 15, Parkrand, BOKSBURG, 1459
1302	KRUGER, Mrs F J	22 Approach Avenue, Selwyn, FLORIDA, 1709
2286	KRUGER, H C	P O Box 1061, HERMANUS, 7200
2311	KRUGER, Mnr Johan	Posbus 911343, ROSSLYN, 0200
1373	KRUGER, Mnr N J S	Posbus 46, RANT-EN-DAL, 1751
0853	KRUGER, Dr P W B	Posbus 3173, PRETORIA, 0001
1140	KRUGER, Mnr S R	Reineckestraat 45, Panorama, BETHLEHEM, 9700
1672	KUSCHKE, Mnr A E	Posbus 54, HAZYVIEW, 1242
1832	KUUN, Mnr P J C	Posbus 39718, MORELETAPARK, 0044
1888	KUYPER, Mnr A	Posbus 2241, MONTANAPARK, 0159
2343	LAMBSON, Mr B	P O Box 411521, CRAIGHALL, 2024
1679	LEACH, Mev Marie	Kingfisherstraat 124, Horison Uitbreiding, ROODEPOORT, 1725
2114	LEEB, Mnr G A R	Posbus 1275, TZANEEN, 0850
2392	LEMMENS, Mr D R	P O Box 15285, LAMBTON, 1414
1532	LESSING, Mnr & Mev J	Oribistraat 30, JEFFREYSBAAI, 6330
1166	LIGHTLEY, Mr C G	c/o SA Wire, P O Box 756,, EMPANGENI, 3880
1948	LOMBAARD, Mnr J A	Posbus 50689, WIERDAPARK, 0149
2228	LOOTS, Hein	Posbus 2057, VRYHEID, 3100
1494	LOTTER, Mnr D	Posbus 602, GRAAFF-REINET, 6280
2133	LÖTTER, Mnr L J	Posbus 2442, VRYHEID, 3100
0645	LOTTER, Mnr W J	Posbus 48520, Hercules, PRETORIA, 0030
0159	LOUBSER, Prof J D	Posbus 11315, QUEENSWOOD, 0121
2219	LOURENS, Mnr A J	Posbus 9455, ELSBURG, 1407
2177	LOURENS, Mnr Jaco	Posbus 4078, HALFWAY HOUSE, 1685
2310	LOUW, Mev E	Posbus 832, OTJIWARONGO, NAMIBIË
1676	LOUW, Mr J P	P O Box 21433, VALHALLA, 0137
1272	LOUW, Mnr W H	Posbus 2860, BRITS, 0250
1324	LOVATT, Mr M	P O Box 338, EMPANGENI, 3880
2209	LOVE, Mr C F M	P O Box 2690, DURBAN, 4000
2083	LUCAS, Mr S C	36 Feldspar Road, HELDERKRUIN, Roodepoort, 1724
2094	LUBBE, Mnr C E J	Posbus 1126, TZANEEN, 0850
1587	LUBBE, Mnr D P	Giraffeweg 47, Monumentpark, PRETORIA, 0181
1978	MACGREGOR, Mr C A	P O Box 101525, MORELETAPARK, 0044
1721	MALAN, Mnr C	Posbus 11258, QUEENSWOOD, 0121
2069	MANGA, Mr Vasan	P O Box 1536, BENONI, 1500
0561	MARAIS, Mnr A J	Posbus 28006, SUNRIDGEPARK, 6008
2376	MARAIS, Dr D D	Posbus 13948, HATFIELD, Pretoria, 0028
1973	MARAIS, Mr R E B	67 Glover Avenue, DORINGKLOOF, 0157
2203	MARITZ, Mnr H P	Posbus 39156, GARSFONTEIN-OOS, 0060, Pretoria
2274	MARTEN, Mr M	32 A G Visser Street, Brackenhurst, ALBERTON, 1450
1372	MARX, Mr M A M	P O Box 701, BERGVILLE, 3350
2255	MASSYN, Mnr C	George Anton Park 29, George Antonstraat, ANNLIN, 0182
1805	MAUD, Mr C S	1 Howard Place, DURBAN NORTH, 4051
2142	McBEAN, Mr W	8 Louw Avenue, MONUMENT, 1739
1660	McCLELLAN, Dr Tracy	Dept Genetics, University of the Witwatersrand, Private Bag 3, WITS, 2050
2411	McINTOSH, Dr R R	Privaatsak X9474, PIETERSBURG, 0700
2324	McKINLAY, Mr D F	P O Box 31388, WONDERBOOMPOORT, Pretoria, 0033
2325	McLAREN, Mr S	9 Eleventh Ave, NORTHMEAD, Benoni, 1501
2280	MEIRING, Mnr R B	Posbus 438, KLAPMUTS, 7625
1701	MENTZ VAN ZYL, M H	P O Box 600, RAMSGATE, 4285
1667	MERESMAN, Ms Avis	P O Box 45, UMLAAS ROAD, 3730
0205	MEYER, Mnr C C	Ralstonweg 20, FERNGLEN, PORT ELIZABETH, 6045
2351	MEYER, Mnr Danie	Posbus 12116, ELSPARK, 1418
1575	MEYER, Prof J J M	Dept Plantkunde, Universiteit van Pretoria, PRETORIA, 0002
1109	MEYER, Mr P K	P O Box 435, ST MICHAEL'S-ON-SEA, 4265
1107	MIDDELMANN, Mr W J	402 CPOA, 231 Main Road, RONDEBOSCH, 7700
1809	MIDDLEWICK, Dr G C	P O Box 1383, ROOSEVELT PARK, 2129
2048	MILLAR, Mrs R E	P O Box 49300, ROSETTENVILLE, 2130
2150	MINNAAR, Mnr & Mev D	Posbus 95597, WATERKLOOF, 0145

0006	MINNIE, Dr Ollie J	P O Box 137, MTUBATUBA, 3935
2199	MONTEIRO, A M	P O Box 85, KNIGHTS, 1413
1210	MOODIE, Mnr S T	Posbus 72215, LYNNWOODRIF, 0040
2014	MOOLA, Dr Y	P O Box 23521, ISIPINGO RAIL, 4110
2375	MORRISON, B	P O Box 1233, SPRINGS, 1560
1957	MOSTERT, Mev Cassandra	Posbus 687, KEMPTONPARK, 1620
2404	MOSTERT, Mnr P H	Posbus 3379, RANDBURG, 2125
2086	MOSTERT, Mnr P J	Main Road 353, ESCOMBE, QUEENSBURGH, 4093
0741	MULDER, Mr I B	Saffraanlaan 10, Weltevredenpark X9, ROODEPOORT, 1709
2183	MULDER, René & Elmarie	Lynnburnweg 66, LYNNWOOD MANOR, 0081
2230	MULDER, Mnr Theuns	Ashstraat 3, VANDERBIJLPARK, 1911
1798	MÜLLER, Mnr E	Posbus 17360, PRETORIA-NOORD, 0116
1965	MULLER, Mnr H F	Kahlerstraat 64, Idasvallei, STELLENBOSCH, 7600
1837	MÜLLER Mr T	P O Box 12437, ONDERSTEPOORT, 0110
1722	MULLER, Mnr T I	Posbus 11074, Universitas, BLOEMFONTEIN, 9321
1922	MYBURGH, Mnr & Mev F M	1ste Weg 20, KEW, 2090
2304	MYBURGH, Dr Jan G	Victorstraat 43, MURRAYFIELD. Pretoria, 0184
2170	MYBURGH, Mnr J L	Posbus 6455, ONVERWACHT, Ellisras, 0557
0397	MYBURGH, Mej J S	Departement Plantkunde, Universiteit van Pretoria, PRETORIA, 0002
0523	MYBURGH, Mnr P P	Associationweg 9, Dawnview, GERMISTON, 1401
1620	MYERS, Mev M M	Posbus 401, WITRIVIER, 1240
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0993	NAUDE, Mnr A S B	Posbus 6895, Kanonkop, MIDDELBURG, 1050
1570	NAUDE, Mnr J J	Posbus 157, TZANEEN, 0850
2220	NAUDE, Mnr L J	Durbanweg 90, MOWBRAY, Kaapstad, 7700
2242	NEL, Mnr A J T	24ste Laan 828, RIETFONTEIN, 0084
0261	NEL, Mnr D P	P O Box 45, UMLAAS ROAD, 3730
2296	NEL, Dr E U	Posbus 11538, ERASMUSKLOOF, Pretoria, 0048
2361	NEL, Mev H J	Posbus 122, WITRIVIER, 1240
1423	NEL, Mnr J J G	Jan van Riebeeckweg 300, OUDTSHOORN, 6620
1784	NEL, Mnr P W	Posbus 122, NABOOMSPRUIT, 0560
0227	NEL, Mnr William	Posbus 87, MTUNZINI, 3867
2124	NELL, Dr Johan	Posbus 2787, RANDBURG, 2125
1943	NELL, Mnr J F	Hexrivierstraat 40, Eastvale, SPRINGS, 1560
0237	NELL, Mnr J M	Danielstraat 60, Lambtonm Gardens, GERMISTON, 1428
2353	NERANTZAKI S J	P O Box 22, PAVILION, 3611
1346	NEWLAND-NELL, Mr T	9 Perth Street, Kabega Park, PORT ELIZABETH, 6025
1194	NIEMAND, Mr & Mrs H & D	50 Judges Avenue, Cresta Ext 1, RANDBURG, 2195
2346	NIENABER, Mev H J	Posbus 20045, RICHARDSBAAI, 3900
1192	NIEUWENHUIZEN, Mr R	P O Box 2086, DURBANVILLE, 7551
1503	NIEUWOUDT, J & L	P O Box 292, SKEERPOORT, N W Province, 0232
0829	NIEWOUDT, Prof C F	Posbus 17129, GROENKLOOF, 0027
2294	NORMAN, Tyrone & Sue	P O Box 3315, Cluster No 1, SUNNINGDALE, 4051
1869	OBERHOLZER, Mr N S	61 17th Street, PARKHURST, 2193
1968	OBERHOLZER, Niel & Thea	Posbus 44622, LINDEN, 2104
1588	OCHSE, Mr A L	P O Box 310, HONEYDEW, 2040
2104	OLIVIER, Mnr A H J	Posbus 4761, BRITS, 0250
1732	OLIVIER, Mnr H G	Posbus 15057, LAMBTON, 1414
2352	OLIVIER, Ds Jan	Posbus 529, HUMANSDORP, 6300
0094	OLIVIER, Mnr L	Posbus 288, KIRKWOOD, 6120
2356	O'NEILL, Miss F M M	29 Wellington Street, IRENE, 0062
0872	OOSTHUYZEN, Mnr J C	Posbus 59911, KARENPARK, 0118
0400	OSBORNE, Mrs P J	Green Pastures, P O Box 45, DURBANVILLE, 7550
2257	PAGE, Mnr & Mev C & A	Posbus 32167, GLENSTANTIA, 0010

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0357	PARSONS, Mr J S	P O Box 41652, CRAIGHALL, 2024
2300	PAUTZ, Mr M J	Cycads for Africa, P O Box 209, KNYSNA, 6570
2244	PAUW, Dr J C	Posbus 461, PAARL, 7464
2266	PESSOA, Mr José P M C	P O Box 59064, KENGRAY, Johannesburg. 2100
0059	PHIPSON, Mrs Y H	3 Dickens Place, PINETOWN, 3610
2282	PIENAAR, Jacques	Posbus 14152, BREDELL, 1623
0024	PIENAAR, Mr Leon	626 Jan Visse Avenue, ROSEVILLE, 0084
2207	PIENAAR, Mnr M G	Posbus 1300, NELSPRUIT, 1200
2398	PIENAAR, P J	The Hillside 304, LYNNWOOD, Pretoria, 0081
2287	PIENAAR, Mnr W J	Posbus 2169, MONTANAPARK, 0159
2193	PIETERS, Mr A H	P O Box 14181, WEST ACRES, 1211
1323	PIETERSE, Mnr F P	Emus Erasmuslaan 278, Erasmusrand, PRETORIA, 0181
1354	PILLAI, Mr L	55 Maple Crescent, Circle Park, KLOOF, 3610
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1843	PRETORIUS, Mnr & Mev J	Posbus 327, LEVUBU, 0929
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2379	PROUDFOOT, Mr A T E	P O Box 24585, THREE RIVERS EAST, 1941
0631	PROZESKY, Mr J G	P O Box 6172, BIRCHLEIGH, 1621
2395	PURDON, Mrs C J	P O Box 815, PHALABORWA, 1390
1917	QUINN, Peter & Linda	P O Box 77, DURBAN, 4000
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2337	RADEMEYER, Mnr Gideon J	Posbus 1527, FONTAINEBLEAU, 2032
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2413	RAWLINS, Mr Greg K	7 Scouts Place, PINELANDS, Cape Town, 7405
0732	REICH, Mr R G	1015 Martha Street, ELDORAIGNE, 0157
1197	REINACH, Dr Norman	Posbus 1834, GEORGE, 6530
0759	RIDGE, Mr Bruce	22 Estuary View, Beacon Bay, EAST LONDON, 5241
1222	RIORDAN, Mr S	CRM City Branch 4 South, P O Box 61689, MARSHALLTOWN, 2107
1654	ROBBERTSE, Prof P J	Astridstraat 167, Meyerspark, PRETORIA, 0184
1253	ROBINSON, Mr Ken	P O Box 41168, CRAIGHALL, 2024
1201	ROOS, Dr A	Marine Rylaan 303, Brighton Strand, DURBAN, 4052
1699	ROOS, Mr C A	P O Box 7186, ALBEMARLE, 1410
2005	ROOS, Mnr P B	Posbus 1543, POTGIETERSRUS, 0600
2175	ROOSENDAL, Mr S	29 Bamboes Street, KILNER PARK, 0186
0187	ROSS, Mr W D	20 Wanless Road, Glenmore, DURBAN, 4001
0973	ROSSOUW, Mr N B	38 Middleton Road, ESCOMBE, 4093
2197	ROSSOUW, Mnr W D G	De La Fontainelaan 14, MONTE VISTA, 7460
2171	ROUSSEAU, Mnr Robert	Posbus 32416, GLENSTANTIA, 0010
1853	ROUWENHORST, Erik	Posbus 620, NEWCASTLE, 2940
1442	ROUX Mnr J J	Graphitestraat 64, WILROPARK, 1724
0415	RUDMAN, Mr R R	3 Dunn Road, Jansendal Township, UITENHAGE, 6229
2276	RUTOWITZ, Mrs Allison	Private Bag X571, SILVERTON, 0127
1402	RYAN, Dr M J	Mahemlaan 3, RUSTENBURG, 0299
1829	SCHAAP, Mnr S	Posbus 149, GRAVELOTTE, 0895
2301	SCHELHASE, Fred	Posbus 61596, PIERRE VAN RYNEVELD, 0045
0311	SCHIMMER, Mr C M	P O Box 274, ALLANRIDGE, 9490
1984	SCHMIDT, Mr E V	4 Lauriston Lanes, 55 Viking Road, GLEN LAURISTON, 0185
0424	SCHMIDT, Mnr F E	Posbus 53126, WIERDA PARK, 0149
2410	SCHNETLER, Mnr André M	Posbus 1916, WITBANK, 1035
1881	SCHOEMAN, Mnr J	Posbus 38448, GARSFONTEIN, 0042
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0082	SCHOEMAN, Mnr S J	Posbus 16001, PRETORIA-NOORD, 0116
2283	SCHUTTE, Mr H P	P O Box 12596, JACOBS, Durban, 4026
1880	SCHUTTE, Mev J E	Posbus 146, VILJOENSKROON, 9520
2202	SCHUTTE, Mnr M	Buhrmannstraat 30, Horison, ROODEPOORT, 1724

1077	SCHUTTE, Dr R L	P O Box 650580, BENMORE, 2010
0647	SCHWELLNUS, Mnr M R	Posbus 7045, Newton Park, PORT ELIZABETH, 6055
1612	SCOPEL, Dr G	32 12th Street, Orange Grove, JOHANNESBURG, 2192
2000	SCOTT, Mr J J	17 Slangkop Avenue, Rand Park Ext 4, RANDBURG, 2195
0477	SCRIBA, Mr J H	College for Foresters, Saasveld, Private Bag X6531, GEORGE, 6530
2186	SCRIBANTE, Mnr J C E	Christolaan 5, Birchleigh, KEMPTON PARK, 1618
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1249	SEEDAT, Hassim	P O Box 48611, QUALBERT, 4078
2256	SIM, Mnr Henry	Posbus 239, KROONSTAD, 9500
0254	SLABBERT, Mnr J F	Diazweg 122, Adcockvale, PORT ELIZABETH, 6001
1650	SLAVIERO, Mr L	2 Pierneef Road, Elma Park, EDENVALE, 1610
1959	SMALBERGER, Mnr H C	Posbus 17190, PRETORIA-NOORD, 0116
2399	SMIT, Mnr C A	Posbus 48114, HERCULES, Pretoria, 0030
0534	SMIT, Mnr D D	Posbus 11126, HATFIELD, 0028
1821	SMIT, Mnr J	Posbus 2110, POTCHEFSTROOM, 2520
1580	SMITH, Mrs D J F	29 Chipstead Avenue, Bluff, DURBAN, 4052
0903	SMITH, Prof G F	NBI, Privaatsak X101, PRETORIA, 0001
1356	SMITH, Mr J D	P O Box 210, WINKELSPRUIT, 4145
2402	SMITH, Mr J H	Private Bag X620, PRETORIA, 0001
2116	SMITH, Mr M R	P O Box 164, BROEDERSTROOM, 0240
1830	SMITH, Mr T D	6 Uve Road, KLOOF, 3610
2378	SMOOK, Dr Gustav J	Posbus 12801, HATFIELD, 0028
2403	SMUTS, Mnr L S	Kamferbosstraat 6, KILNERPARK, 0186
0698	SMUTS, Mnr M N	Posbus 13682, SINOVILLE, 0129
2120	SNYMAN, Mnr A D	Posbus 520, UTRECHT, 2980
1481	SNYMAN, Mr A J	P O Box 5450, Panorama Park, WINKELSPRUIT, 4145
1815	SNYMAN, Dr P H R	Posbus 565, MONTANAPARK, 0159
2391	SNYMAN, Mnr S	Posbus 434, MAGALIESKRUIN, Pretoria, 0150
2249	SOLE, Terry	P O Box 634, EDENVALE, 1610
2401	SOPP, Willie	Posbus 47, MALELANE, 1320
2374	SPICER, Mr Andrew J P	P O Box 1927, JUKSKEI PARK, 2153
0992	SPICER, Mr B E J	23 Westriding Road, HILLCREST, 3610
9003	STAATSBIBLIOTEEK	Die Direkteur, (Afd Pligeksemplare), Posbus 397, PRETORIA, 0001
2349	STAUDE, Mr H S	P O Box 398, MAGALIESBURG, 2805
2381	STEENKAMP, Dr Gerhard	Posbus 914-182, WINGATE PARK, 0153
2331	STEENKAMP, Mnr J H	Posbus 34, BRITS, 0250
0911	STEENKAMP, Mnr & Mev K	Posbus 218, LOUWSBURG, 3150
2205	STEENKAMP, Mnre P & W	Posbus 17257, GROENKLOOF, 0027
1576	STEP, Mnr E O	Van Riebeecklaan 133, LYTTELTON MANOR, Centurion, 0157
2279	STEVENS, Mr J S	P O Box 121, SKUKUZA, 1350
2344	STEYN, Mnr B G & Mev H M	Burnslaan 71, ORKNEY, 2619
1236	STEYN, Mr R C	P O Box 1218, HONEYDEW, 2040
2254	STOLZ, A H G	Moultonlaan 1176, WAVERLEY, Pretoria, 0186
1004	STRANEX, Mr Phillip	P O Box 53235, KENILWORTH, 7745
1117	STRANG, Mrs C	P O Box 69212, BRYANSTON, 2021
2341	STROBOS, Mev J M L	Posbus 1732, LINK HILLS, 3652
2384	STRONACH, Mr Laurie	P O Box 644, GRAAFF-REINET, 6280
2210	STRUYF, Mnr Wim	Posbus 1954, NELSPRUIT, 1200
0213	STRYDOM, Dr Dawid	32 Louie Avenue, NORTHCLIFF, 2195
2056	STRYDOM, Mr G	21 Constantia Street, Culemborg Park, RANDFONTEIN, 1760
9006	SUID-AFRIKAANSE BIBLIOTEEK	Die Direkteur, (Afd Pligeksemplare), Posbus 496, KAAPSTAD, 8000
0139	SWANEPOEL, Mnr Johan	Posbus 911, BLOEMFONTEIN, 9300
1879	SWANEPOEL, Mnr Louis	Posbus 6093, BIRCHLEIGH, 1620
1890	SWART, Dr I J	Posbus 1006, WITRIVIER, 1240
0265	TARR, Dr A A	14 St Matthews Road, EAST LONDON, 5201
0147	TATE, Mr D M	P O Box 8099, DIE HEUWEL, 1042
1689	TEN CATE, Mnr A S	Posbus 1, BROEDERSTROOM, 0240
1708	TERBLANCHE, Prof J	Mimosalaan 448, LYNNWOOD, 0081
()	THERON, Prof G K	Posbus 1790, GROENKLOOF, 0027
2078	THEUNISSEN, Mnr P	Posbus 244, HECTORSPRUIT, 1330
2246	THORPE, Mr Robin P	P O Box 1797, MOUNT EDGECOMBE, 4300
0304	TOPHAM, Mr André	P O Box 44, HOEDSPRUIT, 1380
0178	TOPHAM, Mnr C W	Apiesdoringlaan 88, Wonderboom, PRETORIA, 0182
2058	TOWNSEND, Mrs F A	8 Spray Street, Farrarmore, BENONI, 1500
1981	TROLLIP, Mr S W K	P O Box 3622, BRITS, 0250

0184	TRUTER, Mr J W	Môreson, P O Box 4, RIEBEECK EAST, 6140
2237	UDEMANS, Mr Willie L	P O Box 90711, BERTSHAM, Johannesburg, 2013
1599	ULRICH, Mnr B J	Posbus 1956, LADYSMITH, 3370
0678	UNGERER, Heinrich	Posbus 279, MELVILLE, 2109
1760	UYS, Mev A G	Posbus 2399, PANORAMA LANDGOED, 1718
0322	VALLABH, Mr P D	373 Mink Street, Laudium, PRETORIA, 0037
2371	VAN AS, Mnr Martin	Posbus 911-110, ROSSLYN, 0200
2299	VAN BUREN-SCHELE, Mnr F J	Posbus 1881, CRESTA, 2118
2134	VAN DAM, Mev H C	Posbus 8496, NEWCASTLE, 2940
1526	VAN DEN BERG, Mnr I J	Williamsstraat 59, Wilkoppies, KLERKSDORP, 2571
1836	VAN DEN BERG, Mnr T	Posbus 768, POTGIETERSRUS, 0600
1144	VAN DEN HEEDE, Mr A M P	P O Box 2031, PINETOWN, 3600
1882	VAN DER MERWE, Dr Antoinette	P O Box 44004, LINDEN, 2104
1283	VAN DER MERWE, Mnr C H	Posbus 993, Rant-en-Dal, KRUGERSDORP, 1751
1918	VAN DER MERWE, Mnr F A	Posbus 679, BARBERTON, 1300
0136	VAN DER MERWE, Mnr J F	Jack's Cycads, Posbus 39, DUIWELSKLOOF, 0835
0490	VAN DER MERWE, Mnr W D	Posbus 686, PIETERSBURG, 0700
1745	VAN DER MERWE, Mr W S	P O Box 13655, SINOVILLE, 0129
2181	VAN DER WALT, Mnr A J (Snr)	Blackberry 85, ZWARTKOPS X4, Centurion, 0157
2140	VAN DER WALT, Mnr A J	Posbus 39, ELLISRAS, 0555
0203	VAN DER WALT, Mnr A S J	Posbus 77720, Fontainebleau, RANDBURG, 2032
0038	VAN DER WALT, Mev Ita	Cycad Kwekery, Posbus 15251, LYNN-OOS, 0039
2400	VAN DER WALT, D J A	Posbus 105, MALELANE, 1320
2284	VAN DER WALT, W H	P O Box 59112, KENGRAY, 2100
2077	VAN DER WESTHUIZEN, Mnr J	Posbus 335, AMANZIMTOTI, 4125
0746	VAN DER WESTHUIZEN, J F G	Posbus 1536, NORTHCLIFF, 2115
2127	VAN DER WESTHUIZEN, Mnr M G	Posbus 424, MAGALIESKRUIN, 0150
1728	VAN DEVENTER, J C	Posbus 10274, WELGEDACHT, 7530
2328	VAN ELLEWEE, Mev Christa	Leliehof, PIKETBERG, 7320
1987	VAN ELST, Mr Deon	P O Box 89201, LYNDHURST, 2106
2297	VAN GEEMS, Mnr J J	Walnutstraat 26, KUILSRIVIER, 7580
0752	VAN GREUNING, Mnr J	8ste Laan 940, WONDERBOOM-SUID, 0084
2010	VAN HEERDEN, Mnr F J	Posbus 90678, MAGALIESKRUIN, Pretoria, 0150
1185	VAN HEERDEN, Dr H G	P O Box 237, STRAND, 7140
0938	VAN HEERDEN, J L	Undine 2, Eversdal, DURBANVILLE, 7550
2105	VAN JAARSVELD, Dr W J	Posbus 28283, DANHOF, 9310
2070	VAN NIEKERK, Dr A R	Posbus 252, SOUTHBROOM, 4277
2272	VAN NIEKERK, Mev Cecilia	Posbus 262, IRENE, 1675
2397	VAN NIEKERK, Mnr G A	Posbus 32, UMBOGINTWINI, 4120
2329	VAN NOORD, A A	140 Senior Drive, NORTHCLIFF, 2195
2213	VAN ONSELEN, Mnr R L	Posbus 82680, DOORNPOORT, Pretoria, 0017
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2293	VAN RENSBURG, Mnr Johannes	Posbus 3270, DAINFERN, 2055
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2240	VAN RENSBURG, Mr P F J	54 Kosmos Avenue, WILRO PARK, 1724
1258	VAN ROOY, Mnr Leon	Posbus 1019, WITRIVIER, 1240
1924	VAN ROOYEN, Mnr H C	Posbus 2690, WELKOM, 9460
1903	VAN ROOYEN, Prof H G	Dept Kurrikulumstudies, R.A.U., Posbus 524, AUCKLANDPARK, 2006
1925	VAN ROOYEN, Ds J C	Posbus 2752, MIDDELBURG, 1050
2332	VAN VUUREN, Mnr Henco	Posbus 32395, GLENSTANTIA, 0010
1819	VAN VUUREN, Mr J A	P O Box 13474, CLUBVIEW, 0014
0229	VAN WYK, Mev G	Posbus 11306, HATFIELD, 0028
1267	VAN WYK, Mnr P L	Posbus 12881, ONDERSTEPOORT, 0110
1891	VAN WYK, Mnr R J	Posbus 113, MOOINOOI, 0325
1756	VAN ZYL, Elkie	Posbus 115, MOOKETSI, 0825
0681	VENTER, Mnr F F C	Ontdekkersweg 367, Florida Park, Uitbr 3, FLORIDA, 1709
2320	VENTER, Mev Marlene	Posbus 854, PHALABORWA, 1390
2057	VERMAAK, Mnr E de J	Perskeblomweg 9, Pelissier, BLOEMFONTEIN, 9301
2364	VERWEY, Peet & Mina	Posbus 1382, HAZYVIEW, 1242
1033	VICE, Dr A R	26 Beatty Road, SELBORNE, East London, 5201
1945	VILJOEN, Mr Frank	P O Box 261, FERNDALE, 2160
1825	VILOEN, Mnr G T R	Tugelaweg 1, DUNDEE, 3000
1607	VILJOEN, Mnr Jaap	Posbus 1735, MULBARTON, 2059
2393	VILJOEN, Mnr J A	Flamboyantweg 12, Whitfieldpark, KINGSBURGH, 4126
2123	VILJOEN, Mnr J H	Mineroastraat 8, Amanda Glen, DURBANVILLE, 7550

1949	VILJOEN, Mr Norman	28 Cheviot Road, THE HILL, Johannesburg, 2197
0071	VISSER, Mnr Ben	Posbus 3538, BRITS, 0250
2013	VISSER, Mr George	39 Rouxton Road, LANSDOWNE, 7780
1770	VISSER, Mnr W P	Windhoekweg 2, Arauna, BRACKENFELL, 7560
0917	VORAJEE, Mr R	P O Box 222, LADYSMITH, 3370
0016	VORSTER, Dr Piet	Dept Plantkunde, Universiteit van Stellenbosch, Privaatsak X1, MATIELAND, 7602
0051	WALTERS, Mr George	198 Torquay Avenue, BLUFF, 4052
0847	WALTERS, Mr J W	5 Nagel Street, Lakefield, BENONI, 1501
2119	WEBB, Mr A R F	25 Anemone Road, PRIMROSE, 1401
2172	WELKEN, Mnr Pieter A (Jnr)	Posbus 398, PONGOLA, 3170
0175	WELLS, Mr B K	P O Box 7068, Newton Park, PORT ELIZABETH, 6055
0039	WENTZEL, Mr B	19 Rietfontein Road, Primrose, GERMISTON, 1401
1380	WENTZEL, Mnr P	Posbus 1016, KROONSTAD, 9500
0047	WENTZEL, Mr Stephanus	170 Blackwood Street, ARCADIA, 0083
2144	WESSELS, Mnr A P	Posbus 3110, KENMARE, 1745
0448	WESSELS, Dr F H	P O Box 7, PHALABORWA, 1390
1318	WESSELS, Mnr J W	Posbus 31, HEIDELBERG, 6665
2322	WESTLAND, Mnr Chris	Posbus 837, HUMANSDORP, 6300
2180	WHEELER, Mnr J H F	Killicklaan 667, LES MARAIS, 0084
1441	WIGGILL, Mr D L	P O Box 6260, FLAMWOOD, 2572
1990	WILLIAMS, Mr S M	P O Box 35050, MENLOPARK, 0102
2408	WINTOUR, Mr A F	P O Box 1881, ALBERTON, 1450
0008	WOHLBERG, Mr H Edgar	10 Stephens Avenue, WESTVILLE, 3630
1950	WOLFAARDT, Dr L B	Posbus 1428, GROENKLOOF, 0027
2303	WOLFAARDT, Pieter	Posbus 2527, BELLVILLE, 7535
9008	WORLD WILDLIFE FUND, DIRECTOR OF COMMUNICATION	P O Box 456, STELLENBOSCH, 7599
1164	WUNDERLIN, Mr P	9 Monarch Road, WESTVILLE, 3630
9009	WWF SOUTH AFRICA	(Att Dr Ian McDonald), P O Box 456, STELLENBOSCH, 7599
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2335	FOSTER, Phillip A	11521 Augusta Dr, BALCH SPRINGS, TX 75180
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2396	MISSOURI BOTANICAL GARDEN	The Library, P O Box 299, ST LOUIS, Missouri 63166
0570	MOLDOCH, Mr W	1544 Shipview Road, ANNAPOLIS, Maryland 21401

2366	NGUYEN, Andrew	1076 Horseshoe Bend, WALNUT, CA 91789
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1670	LEACH, Mrs M P	P O Box 726, MUTARE
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