ENCEPHALARTOS

JOURNAL OF THE CYCAD SOCIETY OF SOUTH AFRICA

TYDSKRIF VAN DIE BROODBOOM VERENIGING VAN SUID-AFRIKA

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CYCAD SOCIETY OF SOUTH AFRICA
BROODBOOM VERENIGING VAN SUID-AFRIKA
www.cycadsociety.org

Council members / Raadslede

President
Dr Piet Vorster
Botany Department / Departement Plantkunde
University of / Universiteit van Stellenbosch
Private Bag / Privaatsak X1, 7602 Matieland
Tel.: 021-808 3056; Fax/Faks: 021- 808 3607
E-mail/E-pos: **pjvor@sun.ac.za**

Secretary-treasurer / Sekretaris-tesourier
Back copies officer / Beampte vir vorige uitgawes
Prof. Guillaume Theron
P.O. Box / Posbus 1790
0027 Groenkloof (Pretoria)
Tel.: 012-329 2054 (only available between / slegs beskikbaar tussen 17h00 and/en 19h00)
Fax/Faks: 012 347 7807
E-mail / E-pos: **GTheron@nsnper1.up.ac.za**

Accountant &Auditor
Rekenmeester & Ouditeur
Werner Diedericks
P.O. Box/Posbus 17081
0027 Groenkloof (Pretoria)
Tel. 012- 460 6123

Electronic Services
Elektroniese Dienste
Wynand van Eeden
P.O. Box / Posbus 3489
7536 Tygerpark
E-mail/E-pos:
wvaneeden@eurologic.com
or/of
wynand@ananzi.co.za

Editor of "*Encephalartos*"
Redakteur van "*Encephalartos*"
Isabella Claassen
P.O. Box / Posbus 25688
0105 Monumentpark (Pretoria)
Tel. & Fax/Faks: 012-347 7807
(between / tussen 06h00 and/en 18h00)

Regional officers / Streeksverteenwoordigers

Lowveld / Laeveld

Leon van Rooy
P.O. Box / Posbus 1019
1240 White River / Witrivier
Tel.: 013-751 2419

Natal

Danie Nel
P.O. Box / Posbus 45
3730 Umlaas Road
Tel.: 0332-510478
Cell/Sel: 082 9254540
082 9246969

Northern Province Cycad Working Group / Noordelike Provinsie Broodboom Werkgroep

Gerrie de Haas
Private Bag / Privaatsak X9474
0700 Pietersburg
Tel.: 015-297 2180 (w); 015-295 4021 (h)
Fax/Faks: 015-297 3947

Transvaal

Derik Minnaar
Postnet Suite 5
Private Bag / Privaatsak X8
0047 Elardus Park (Pretoria)
Cell/Sel: 082-4131025 (after hours / na-ure)

Pollen- and seedbank officers / Stuifmeel- en saadbankbeamptes

Natal

Rudi van Niekerk
P.O.Box / Posbus 252
4277 Southbroom
Tel: 039-3149762
Fax/Faks: 039-3149766; E-mail/E-pos:
arsvanniekerk@worldonline.co.za

Northern Province and Country-wide / Noordelike Provinsie en Landswyd

Diekie de Klerk
Private Bag / Privaatsak X9474
0700 Pietersburg
Tel.: 015-297 3196
Fax/Faks: 015-297 3947

Transvaal

Manie Maritz
P.O. Box / Posbus 39156
0060 Garsfontein East / -Oos (Pretoria)
Tel.: 012-998 9667

Overseas correspondents / Buitelandse skakelbeamptes

Australia

Paul Kennedy
21 Sierra Road, Engadine, New South Wales 2233
Tel.: 02-520-7690
E-mail: **cycads@hotmail.com**

U.S.A. and Canada

Willie Tang
Fairchild Tropical Garden, 11935 Old Cutler Road
Miami, Florida 33156
Tel.: 305-667-1651
E-mail: **WLMTang@email.msn.com**

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When changing address, please notify the Secretary-treasurer.
Wanneer u van adres verander, laat weet asseblief die Sekretaris-tesourier.

CYCAD SOCIETY OF SOUTH AFRICA

NEW MEMBERSHIP APPLICATION

I/We .....
(Title, initials and surname, and name by which person is known or name of institution in block letters)

of postal address: .....

.....

Post code: ..... E-mail: .....

hereby apply for membership of the **Cycad Society of South Africa** and declare that I/we fully endorse the aims of the Society as listed below:

1. *To encourage the cultivation and propagation of cycads.* 2. *To disseminate information on cycads by various means, inter alia through the regular publication of a magazine.* 3. *To arrange the legal exchange of plants, seedlings, seed, and pollen of different cycad species between members.* 4. *To encourage scientific research on cycads.* 5. *To promote all aspects of cycad conservation.* 6. *To foster and maintain links with organizations having similar aims on an international basis.*

I/We herewith enclose the sum of ..... as payment for membership fees

for 2002, of which ..... is intended as a donation to the Society.

Signature: ..... **Date:** .....

MEMBERSHIP FEES FOR 2002:
Local Members: **R106**; Foreign Members: **R290, US$44** and **A$72** (airmail delivery of quaterly magazine "*Encephalartos*") or **R175, US$26** and **A$44** (surface mail delivery). **Local members must send their dues together with this form to Guillaume Theron, and all cheques are to be made out to: Cycad Society of South Africa. American members must send their dues in American dollar together with this form to Willie Tang, and Australian members must send their dues in Australian dollar together with this form to Paul Kennedy. Foreign members of other countries may send their dues together with this form either in South African Rand or by international money order made out to the Cycad Society of South Africa, and not by a personal cheque, to Guillaume Theron; or in American dollar to Willie Tang; or in Australian dollar to Paul Kennedy.**

Members in Southern Africa (e.g. Namibia, Swaziland, Zimbabwe): **R195** (airmail delivery of quaterly magazine "*Encephalartos*") or **R123** (surface mail delivery). **Please send your dues either in South African Rand or US$ together with this form to Guillaume Theron.**

The appropriate addresses are: **Guillaume Theron:** P.O. Box 1790, 0027 Groenkloof (Pretoria), South Africa. **Paul Kennedy:** 21 Sierra Road, Engadine, NSW 2233, Australia. **Willie Tang:** Fairchild Tropical Garden, 11935 Old Cutler Road, Miami, Florida 33156, U.S.A.

New members receive all issues of magazine for current year. Back copies of magazine available from **Guillaume Theron, P.O. Box 1790, 0027 Groenkloof, South Africa** at **R26** (with colour) or **R15** (black and white) per copy locally to members, and **R32** (with colour) or **R20** (black and white) to non-members; and **R60, US$9** and **A$16** (with colour) or **R50, US$7** and **A$13** (black and white) a copy to foreign members and **R75, US$11** and **A$20** (with colour) or **R55, US$8** and **A$14** (black and white) to foreign non-members (airmail delivery); and **R48, US$7** and **A$13** (with colour) or **R39, US$6** and **A$10** (black and white) a copy to foreign members and **R54, US$8** and **A$14** (with colour) or **R50, US$7** and **A$13** (black and white) to foreign non-members (surface mail delivery).

BROODBOOM VERENIGING VAN SUID-AFRIKA

NUWE LIDMAATSKAP AANSOEK

Ek/Ons .....
(Titel, voorletters en van, asook noemnaam van persoon of naam van inrigting in BLOKLETTERS)

van posadres .....

.....

..... Poskode: .....

E-pos: .....

doen hiermee aansoek om lidmaatskap van die **Broodboom Vereniging van Suid-Afrika** en verklaar dat ek/ons die doelstellings van die Vereniging soos dit hieronder gelys is, heelhartig onderskryf:

1. *Om die kweek en vermeerdering van broodbome aan te moedig.*
2. *Om inligting oor broodbome op verskillende wyses te versprei, onder andere deur die gereeëlde publisering van 'n tydskrif.*
3. *Om die wettige uitruil van plante, saailinge, saad en stuifmeel van broodbome tussen lede te reël.*
4. *Om wetenskaplike navorsing oor broodbome aan te moedig.*
5. *Om alle aspekte van die bewaring van broodbome te bevorder.*
6. *Om bande met organisasies wat soortgelyke doelstellings het op 'n internasionale basis te smee en te handhaaf.*

Ek/Ons sluit hiermee die bedrag van ..... in as betaling van ledegeld vir

2002, waarvan ..... as donasie aan die Vereniging gaan.

Handtekening: ..... **Datum:** .....

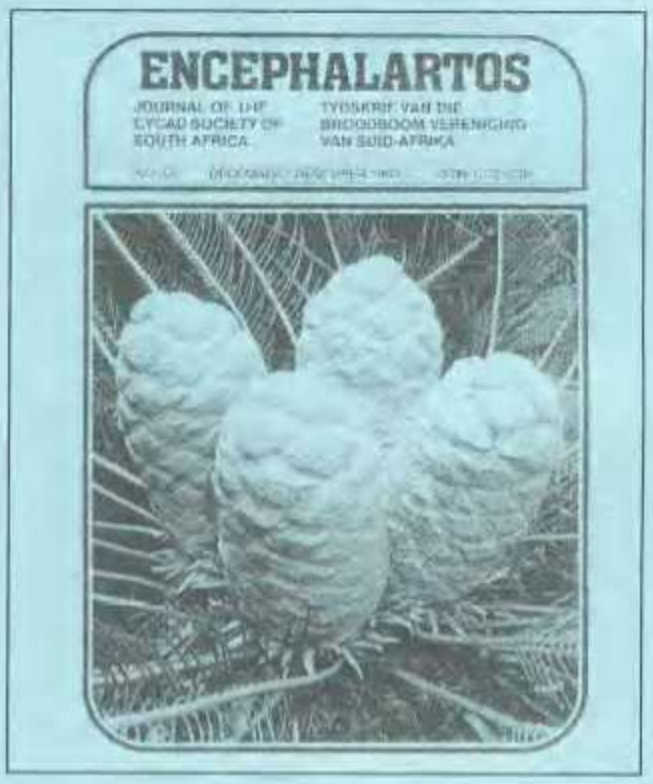
LEDEGELD VIR 2002:

Plaaslike lede: **R106 (alle tjeks moet uitgemaak word aan: Broodboom Vereniging van Suid-Afrika).**

Lede in Suider-Afrika (bv. Namibië, Swaziland, Zimbabwe) **moet asseblief in Suid-Afrikaanse Rand of Amerikaanse dollar betaal: R195** (lugposversending van kwartaallikse tydskrif "*Encephalartos*") of **R123** (landposversending).

Stuur asseblief u ledegeld saam met die voltooide vorm aan: Guillaume Theron, Posbus 1790, 0027 Groenkloof (Pretoria), [Suid-Afrika].

Nuwe lede ontvang 'n eksemplaar van al die uitgawes van die tydskrif "*Encephalartos*" wat kwartaalliks verskyn vir die jaar waarin hulle aansluit. Vorige uitgawes van die tydskrif kan afsonderlik bestel word van **Guillaume Theron, Posbus 1790, 0027 Groenkloof (Pretoria) [Suid-Afrika]** teen **R26** (met kleur) of **R15** (swart en wit) per eksemplaar vir lede, en **R32** (met kleur) of **R20** (swart en wit) vir nie-lede.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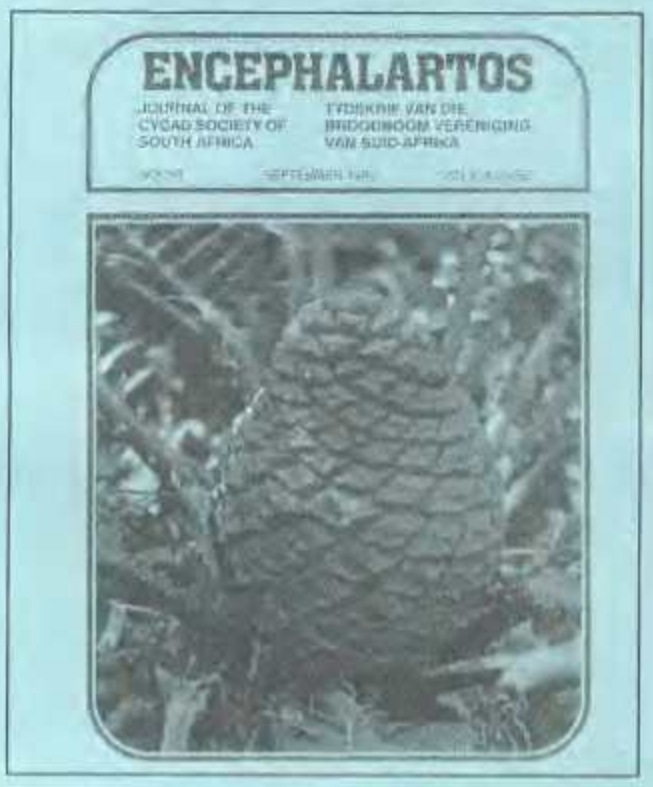
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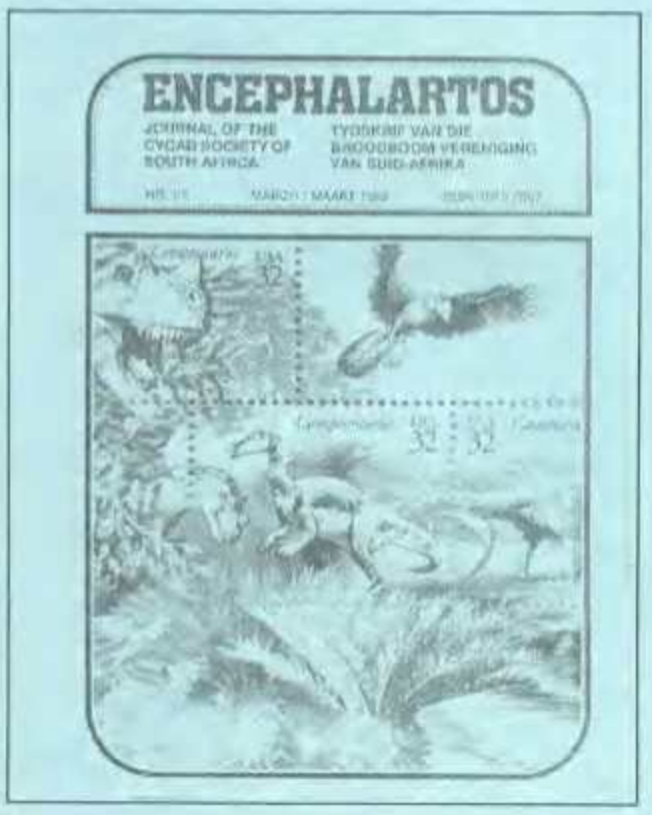
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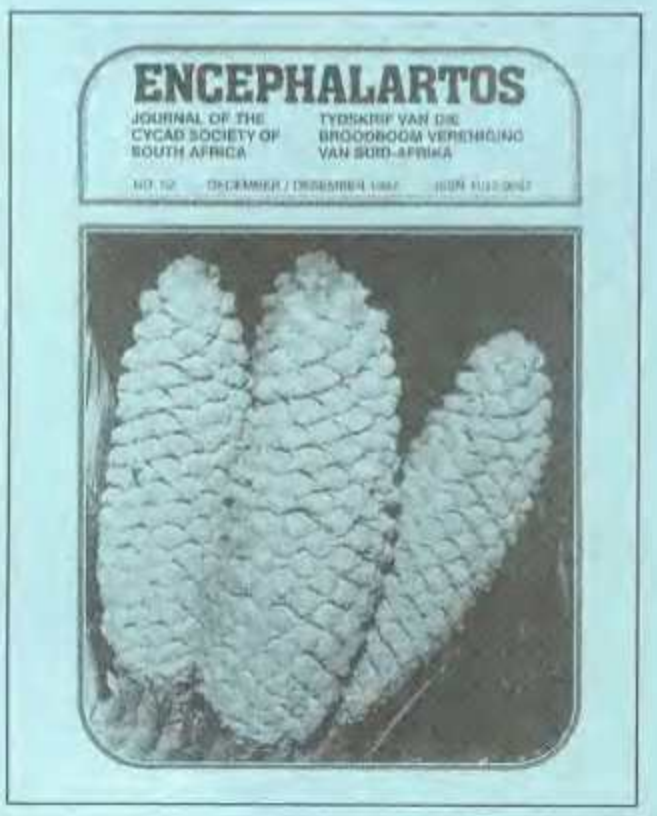
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APPLICATION TO PURCHASE

Encephalartos latifrons from KIRSTENBOSCH

NATIONAL
BOTANICAL
INSTITUTE

A limited number of *Encephalartos latifrons* seedlings are available to local and overseas cycad enthusiasts. Caudex size ranges from 10cm to 16cm in diameter. Price R250,00 per cm of caudex. The cost of documentation, packaging and delivery charges are not included.

If demand exceeds availability, there will be a lucky draw to take place on 31 July 2002. Successful persons will be informed immediately by e-mail, telephone or fax. **PLEASE DO NOT SEND PAYMENT WITH YOUR ORDER.**

If you wish to purchase *Encephalartos latifrons* seedlings from Kirstenbosch, please fill in this form and fax or post it to reach us by **31 July 2002.**

National Botanical Institute
Kirstenbosch
Private Bag X7
7735, CLAREMONT
South Africa

Fax (021) 797 6570
Tel (021) 799 8899
International Code 27 21

e-mail : winter@nbict.nbi.ac.za

Name : .....

Address : .....

..... Postal code : .....

Telephone No. ..... Fax No. .....

E-mail : .....

CYCAD SALE

Date: **26 / 27 October 2002**

Time: **07h00 – 17h00**

Venue: **Grass Roots Nursery, Brits**

For further information contact:

Steve Trollip

(012) 252 7235 / (012) 252 7582

082 771 8497 / 082 789 3730

The following plants will be on sale:

- **Cycads**
- **Palms**
- **Bromelliads**
- **Tillandsias**
- **Clivias**
- **Orchids**
- **A selection of Succulents and Aloes**

CYCAD WORKSHOP

DATE: 13 JULY 2002
TIME: 09h00
VENUE: GRASS ROOTS NURSERY, BRITS

LISTEN TO SOME VERY INTERESTING SPEAKERS TALKING ABOUT CYCADS

TOPICS TO BE COVERED

1. **DOUGLAS GOODE'S TRIP TO GHANA TO VIEW *Encephalartos barteri* IN HABITAT.**
2. **STEVE TROLLIP WILL TALK ABOUT SOIL MIXES, FERTILIZING CYCADS AND GERMINATION OF SEED.**
3. **POLLINATION OF CYCADS AND POLLEN STORAGE.**
4. **DERIK MINNAAR WILL TALK ABOUT CYCAD SOCIETY EXCURSIONS INTO VARIOUS CYCAD HABITATS.**
5. **CYCAD PESTS AND DISEASES.**
6. **TALK AND SLIDE SHOW ON THE NATAL CYCADS.**

BREAKFAST AND LUNCH WILL BE SERVED.

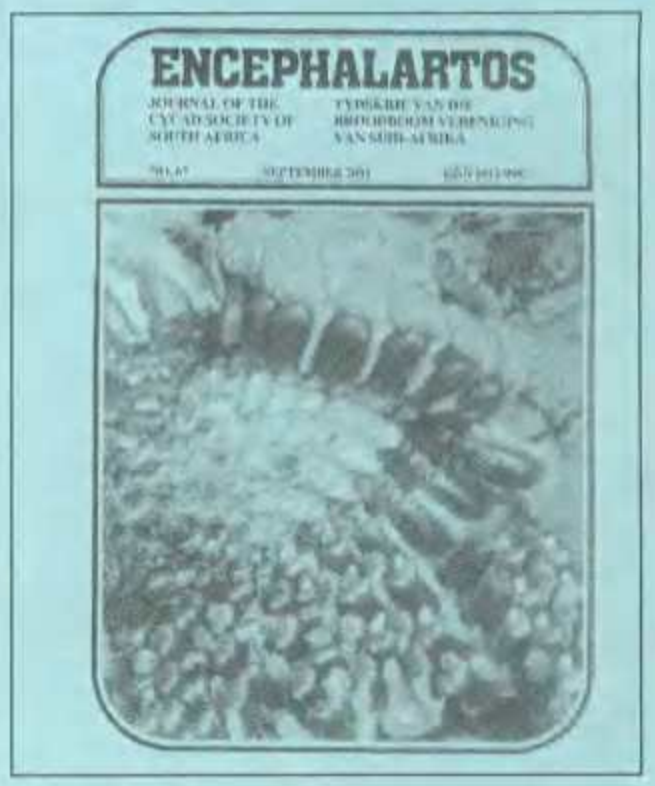
PROFITS FROM THIS DAY WILL BE DONATED TO THE CYCAD SOCIETY OF SOUTH AFTRICA

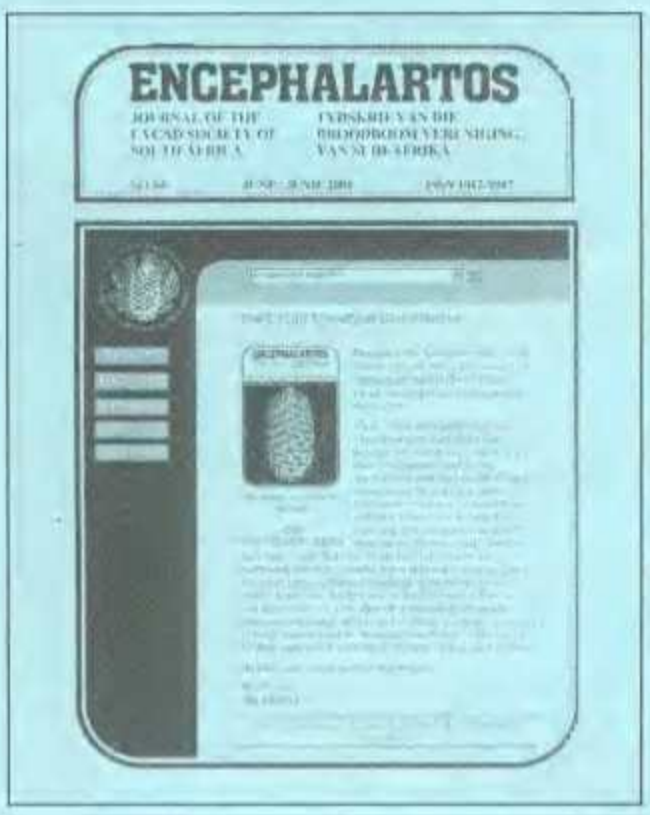
COST: R300.00 PER PERSON
(LIMITED TO 50 DELEGATES – R100.00 DEPOSIT)

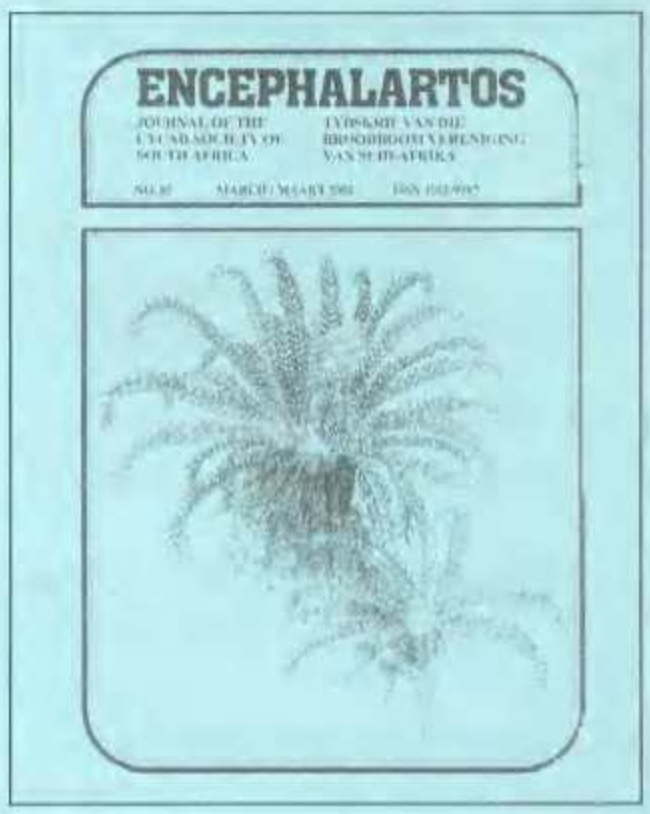
FOR FURTHER DETAILS: CONTACT STEVE TROLLIP
TEL: (012) 252 7235 / 252 7582
CELL: 082 771 8497 / 082 789 3730

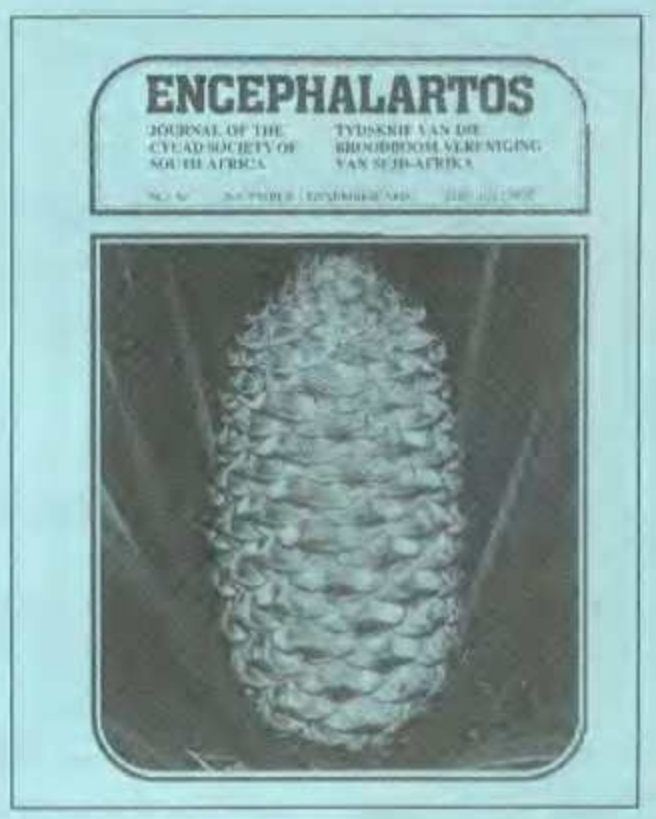
VERMIS U VORIGE UITGAWES VAN *ENCEPHALARTOS*? Party is nog beskikbaar. Vir pryse en bestel-adres, kyk bl. ii. Vanaf nr. 58 bevat hulle kleurfotos.

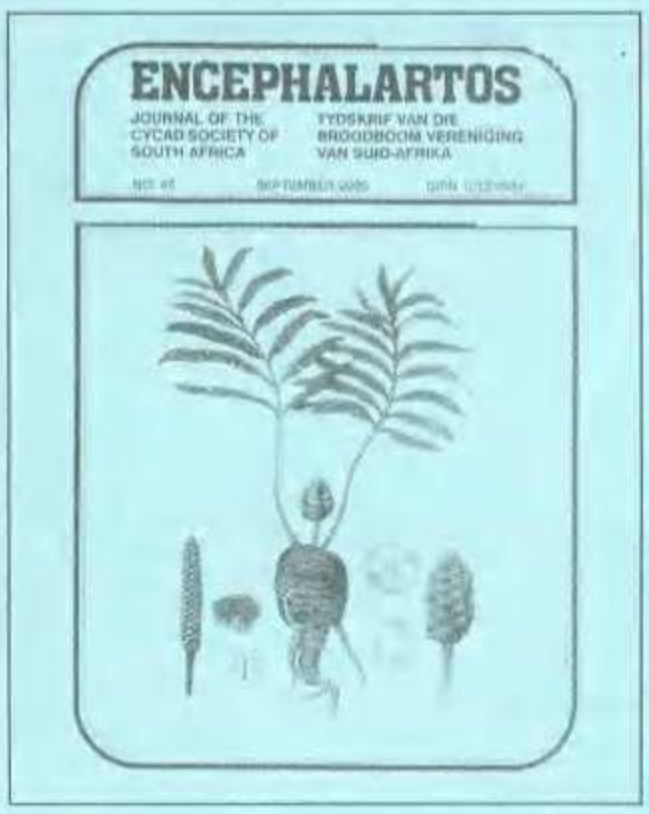
MISSING PREVIOUS ISSUES OF *ENCEPHALARTOS*? Some are still available. For prices and ordering address, see page ii. From no, 58 they contain colour photographs.











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COVER / VOORBLAD : ***Cycas papuana*** **photographed in the Wasur Nature Reserve, Iryan Jaya, by Gerald Cubitt. This record extends the distribution of this species over the border from Papua New Guinea to Iryan Jaya, and the identity was confirmed by Ken Hill.**

Gerald Cubitt, living in Cape Town, is the photographer for one of the most beautiful books published in recent years, Gerald Cubitt & Belinda Stewart-Cox's *Wild Thailand* (Cambridge, Massachusetts: MIT Press, 1995).

CONTENTS / INHOUD

CONTENTS / INHOUD (continued / vervolg)

FROM THE PRESIDENT

VAN DIE PRESIDENT

I have just returned from a "workshop" on cycad classification hosted by the Montgomery Botanical Center in Miami (see page 4) This was an important occasion, because it indicates that our knowledge of cycad classification is approaching a point where we can start thinking seriously about the evolutionary relationships between species and
genera.

During this meeting Loran Whitelock's long-awaited book was released (see page 8). This is an impressive synthesis of our current knowledge of the almost 300 species of living cycads, but it is noteworthy that the author did not attempt to arrange the species according to suspected evolutionary relationships.

By the time that you read this issue, some of us will already be packing our bags for the CYCAD 2002 conference in Thailand. These conferences have contributed so much to the increase in our knowledge of cycads. We may attempt to report on the conference already in the September issue, but that will mean that that issue will be about six weeks late.

It is regrettable that there is a stigma to cycad enthusiasts' integrity. Every time I hear of someone caught for cycad misdemeanors, my first thought is "I hope he isn't one of our members". It is a fact that many of the provincial nature conservation authorities have serious reservations about the lawfulness of our members, but that is not a good reason to obstruct legitimate activities. Here I refer specifically to proposed legislation in Gauteng to prohibit all exports of cycads. In my opinion this is counterproductive, because it does not encourage people to multiply and distribute their *cultivated* plants. Indirectly the plants which so many of us propagate in our backyards are of direct importance for conservation, because these plants reduce the pressure on wild plants. On pages 26–32 is correspondence which illustrates the problems which members encounter when they excercise their legitimate rights to propagate plants and try to distribute them.

In the previous issue we mentioned that we would like to emphasize in *ENCEPHALARTOS* landscape design with cycads. Please write to us, and send photographs of how you do it.

Piet Vorster

Ek het sopas teruggekeer van 'n "werkswinkel" oor broodboomklassifikasie wat aangebied is deur die Montgomery Botanical Center in Miami (kyk bl. 4). Hierdie was 'n belangrike byeenkoms, want dit dui daarop dat ons kennis van broodboomklassifikasie 'n punt begin bereik waar ons ernstig kan begin dink aan die evolusionêre verwantskappe tussen spesies en genusse.

By dieselfde geleentheid is Loran Whitelock se lankverwagte boek bekendgestel (kyk bl. 8). Dit is 'n indrukwekkende besinning oor ons huidige kennis van die byna 300 soorte lewende broodbome, maar dit is opmerklik dat die skrywer nie probeer het om die soorte te rangskik volgens vermeende evolusionêre verwantskappe nie.

Teen die tyd dat u hierdie uitgawe lees, sal party van ons reeds besig wees om ons tasse te pak vir die CYCAD 2002 konferensie in Thailand. Dit is juis hierdie konferensies wat soveel bygedra het tot die groei van ons kennis van broodbome. Ons mag probeer om reeds in die September-uitgawe te berig oor die konferensie, maar dit sal beteken dat daardie uitgawe omtrent ses weke laat sal wees.

Dit is jammer dat daar 'n stigma oor wettigheid kleef aan broodboomliefhebbers. Elke keer as ek hoor van iemand wat gevang is oor 'n broodboommisdryf, is my eerste gedagte "ek hoop nie hy is een van ons lede nie". Dit is 'n feit dat baie van die provinsiale natuurbewaringsowerhede ernstige bedenkings het oor die wetsgehoorsaamheid van ons lede, maar dit is nie 'n goeie rede om wettige aktiviteite te dwarsboom nie. Hier verwys ek spesifiek na voorgestelde wetgewing in Gauteng om alle uitvoere van broodbome te verbied. Myns insiens is dit teenproduktief, omdat dit mense nie aanmoedig om hulle *gekweekte* plante te vermeerder en te versprei nie. Indirek is die plante wat soveel van ons in ons agterplase kweek van direkte belang vir bewaring, omdat hierdie plante die druk op wilde plante verminder. Op bl. 26–32 is daar korrespondensie wat die probleme illustreer wat lede ondervind as hulle wettig plante vermeerder en probeer versprei.

In die vorige uitgawe het ons genoem dat ons graag in *ENCEPHALARTOS* meer klem wil lê op landskapsuitleg met broodbome. Skryf asb. vir ons, en stuur foto's van hoe u dit doen.

Piet Vorster

FROM COUNCIL / VAN DIE RAAD

OUR REPRESENTATIVE IN THE CYCAD INTEREST GROUP

Roy Osborne has been designated as our representative in the *Cycad Interest Group* of the *International Union for the Conservation of Nature and Natural Resources (I.U.C.N.).*

This body is concerned with formulating strategies for conserving cycads world-wide. Watch this space for his reports.

BUTTERFLIES AND CYCADS

Volume 12 no. 4 (2001) of *Metamorphosis*, the journal of the Lepidopterists' Society of Africa, consists of a treatise of the butterfly genus *Callioratis* by Hermann Staude. This is of importance to us, because the larvae feed on cycad leaves.

To most of us the only lepidopterous larvae feeding on cycads are those of the dreaded Leopard Moth, *Zerenopsis leopardina*. However, various unrelated species also feed on *Cycas, Dioon,* and *Zamia*. *Callioratis* is of interest because it occurs so widely through Africa, because most of the species are so host-specific that they only live on a single cycad species, and because we know so little about them. This is another opportunity for our members to make a real contribution to scientific progress by keeping their eyes open for these insects when visiting wild cycads.

This publication is available from The Editor: *Metamorphosis* (Dr. D. Kroon), P.O. Box 572, 1947 Sasolburg, South Africa (dougkroon@icon.co.za), at R20 within South Africa and U.S. $12 elsewhere.

A SERIOUS MATTER

This photograph (Colour Figure 14 on p. 18) is no joke, but depicts a very serious matter. It shows a number of huge and very old *Cycas revoluta* plants in Japan, wrapped up in grass for the duration of winter to protect them against cold. The summers there are gloriously warm, but the winters are bitter and the plants would probably not survive unless sheltered like this. Surely we can do the same with other species.

This photograph, by Christa Holm, first appeared in her book *Japanska Trädgådar* (Köping: Natur och Kultur, 1996), page 87, and is here reproduced by generous permission of the author and publisher.

CYCAD CLASSIFICATION CONCEPTS WORKSHOP

From 7 to 9 April 2002 a *Cycad Classification Concepts* workshop was held at the Montgomery Botanical Center in Miami, who also convened and hosted the meeting. The purpose of this meeting was to formulate a common approach to the taxonomy of the different cycad genera, with the eventual aim of producing a classification system which reflects evolutionary relationships.

On the first day the following lectures were given.

Paul Forster (Australia): Classification concepts in *Macrozamia* from eastern Australia.

Anders Lindstrom (Thailand): A review of morphological taxonomical characters useful in determining species boundaries within the genus *Cycas*.
John Donaldson (South Africa): The problems associated with inconsistent cycad taxonomy for threat assessments and conservation management.
Ken Hill (Australia): Character distribution, molecular phylogeny, and classification concepts in the genus *Cycas*.
Jeff Chemnick, Tim Gregory, (U.S.A.) **& Silvia Salas Morales** (Mexico): A hypothesis about the relationship between biogeography and speciation in *Dioon*.
Andrew Vovides, Miquel Angel Perez-Farrera, Dolores Gonzalez, S. Avendaño, & C. Hernández (Mexico): The genus *Ceratozamia*: relationships and biogeography.
Dennis Stevenson (U.S.A.): Future of cycad systematics with emphasis upon *Zamia*.
Bart Schutzman (U.S.A.): Systematics of *Zamia* in Mesoamerica.
Jia-Rui Chen China), **Ken Hill** (Australia), **& Dennis Stevenson** (U.S.A.): discussion on the taxonomy of the genus *Epicycas*.
Paulo Caputo (Italy): Molecular evolution in *Zamia*.
Piet Vorster (South Africa): Taxonomic classification concepts in *Encephalartos*.
Loran Whitelock (U.S.A.): Taxonomic classification concepts within *Ceratozamia*.

The remaining two days were spent trying to reach a common philosophy and approach to realise the aim of the meeting.

The results of the meeting, including the text of the lectures, will be published in book form.

A more detailed assessment by the convenor, Terrence Walters, will in due course appear in ***ENCEPHALARTOS***.

The *Montgomery Botanical Center* is the world's largest *ex situ* collection of living cycads and palms, compiled and maintained to provide well documented living research material for the scientific community. See also ***ENCEPHALARTOS* 69**: 37 for an extract of T. Walters & S. Cuestas' article, *Montgomery Botanical Center's collection: a 2001 update on the collection*, in *The Cycad Newsletter* **24**(3): 9–11 (2001).

BOTANISTS GATHER LOCALLY TO PONDER CYCAD MYSTERIES

(Transcription of newspaper report in "The Miami Herald", Sunday, April 21, 2002, page 2K)
By **Georgia Tasker**
Herald Garden Writer

Cycad experts from four continents spent three days in Miami last week trying to figure out how to best identify endangered cycads, one of nature's oldest plants.

They even brought in a management consultant to help arrive at a consensus.

What, you say, does it matter?

The reasons have to do with the parable of the blindfolded men and the elephant. Each man feels a different part of the elephant and describes it as trunk or tail or lots of big wrinkly skin.

So the aim was to take off the blindfolds and come up with a set of guidelines they all agreed upon to help identify the critically endangered cycads.

Cycads are plants from the age of dinosaurs that have survived as artifacts of that geologic age. The palm-like leaves with rapier tips or spines once fended off big teeth. Many are so slow growing they form leaves every two or three years, about as speedy as a T-Rex lumbering through a swamp.

Today, their habitats have nearly disappeared and they linger on ledges of rocky cliffs or river canyons, deserts or rare rainforest undergrowth - places where most people cannot get them.

Intrepid botanists, however, are tracking them down. And in these out-of-the-way places, new cycads are being discovered.

Still, there is confusion about their identities.

John Donaldson, with the nonprofit International Union for the Conservation of Nature, said the plants have been assessed five times over the last 25 years and each time botanists report a different number of species.

Donaldson, speaking to the cycad experts at the Montgomery Botanical Center, said the IUCN/world Conservation Union officially listed 180 cycad species in 1997, saying 83 percent were threatened.

In 2002 the number was changed to 197 species, but only 52 percent threatened. Such changes make saving them a much harder task, he said.

More than a dozen men gave their presentations about their work on the first day of the symposium, and it was clear that each scientist looked at the plants he was studying in a slightly different way. Some looked at the plant's leaf types for clues to their identities, others looked at the cones and seeds, while others examined them under electron microscopes for differences in cell structure.

Loran Whitelock, whose book *The Cycads* will be published next month by Timber Press, said spines on the cones of the male and female *Ceratozamia* species separate them from other cycads. But, he said, "there's variation within every population in the wild, and botanists should take a range of samples when collecting for a herbarium or plant library".

Ken Hill from Australia said the scientists using molecular techniques still had problems in finding characteristics that would remain true throughout a species.

When Mexican botanist Andrew Vovides was asked how he decided to classify as species the *Ceratozamia* cycads, he declared, "It's a nightmare".

Management consultant Don Decker took the 15 scientists through two days of brainstorming to come up with a more coherent way to classify the plants, using management techniques to get a concept of plant classifications.

A new book of universally accepted concepts will come out of the symposium, said Terrence Walters, executive director of Montgomery. The book will be published in 2003, and two evaluation sessions are scheduled for 2008 and 2013. In cycad time, that's the blink of an eye.

ARTICLE / ARTIKEL

PANAMIAN PARADISE REVISITED

Russell Adams
Gainesville Tree Farm

The year 2001 brought about a second Panama Expedition involving three great institutions and a reunion among three old friends. The group included myself as representative of Montgomery Botanical Center (MBC), Dr. Dennis Stevenson from the New York Botanical Garden, and Dr. Alberto Taylor from the University of Panama. We were joined on this excursion by world traveller and cycad enthusiast Alan Whittington of Florida. Our goal was to explore the northwestern region of Panama, including the states of Cocle, Veraguas, Chiriquí, and Bocas Del Toro. We were especially interested in the *Zamia skinneri/Z. neurophyllidia* complex and targeted several localities for this group.

From Panama City, we travelled west to the town of Santa Fe. This was to be our starting point for what we knew would be a very long and difficult day of travel. We planned to drive our four wheel drive Pathfinder as far as the road would allow and then continue on foot over the continental divide and down the Caribbean slope to the headwaters of the Calovebora River. This location is where Dr. Bob Dressler reported finding a plant that was a "perfect match" for Warscewicz's 1851 sketch and description of *Z. skinneri*.

With our shiny new SUV buried to the frame only two kilometers outside of Santa Fe, our hopes of a successful trip were greatly diminished. Alberto was dispatched back to Santa Fe for help, while Dennis, Alan, and I set our backs to the task of extracting the vehicle from the giant mud hole. Two hours later, we were much muddier but no closer to freeing the vehicle from the suction of the giant hole. At this moment, the most wonderful sight we could imagine rounded the corner—a caravan of four-wheel-drive trucks, right out of the "Dukes of Hazard", complete with giant knobby tires and, even better, snow chains for traction. Riding shotgun in the lead truck was our dear friend Alberto. The caravan was taking school desks and building supplies to a small town at the end of a new road on the Calovebora River. We were saved! The trucks were completely filled with people in the cab and school desks in the back, but we were able to stand on the bumper and hold on to the steel frame that encased the truck bed. The next two hours were an incredible mix of pleasure and pain. The pain was brought about by leg cramps from constant flexing as the trucks forded small rivers, traversed giant boulders, and scaled inclines as steep as 50 degrees. The constantly shifting chairs would occasionally smash into our also cramping hands, forcing us to relinquish our white-knuckled grip, but only for a second. This pain was offset by the sheer ecstasy of the sights unfolding before us. This new road was less than one month old and we were literally

Map of Panama, with adjacent countries to show the geographical position of Panama with respect to its neighbouring countries.

travelling through miles of virgin rain forest.

As we neared the divide, we began to see massive *Z. pseudoparasitica* plants settled in their lofty perches like venerable grey-green gentry looking down upon us. Were they contemplating the consequences of this new road, which was sure to bring a flood of people? Because of time constraints, we were not able to collect any specimens but we did allow ourselves the luxury of stopping to admire their magnificence. A little further along the road, we began to see the real quarry of our quest—*Z. skinneri*. Like garnet and ruby fountains in an emerald green sea, the massive new leaves arched skyward from trunks measuring a meter tall. Leaves were produced in numbers from one to five, but mostly in sets of three. Some leaves were over 2.5 m long with leaflets up to 60 cm long and 20 cm wide. The anthocyanins, which gave the new leaves a ruddy hue, stood out in stark contrast to the green forest behind.

Once in the town of El Guabal, we quickly unloaded the trucks with the help of the entire town and headed into the forest. Zamias were very abundant and we soon had all the plants, herbarium vouchers, and DNA samples we needed. The steady rain that had accompanied us all day now became a downpour and we rushed to leave before the road became totally impassable. We arrived back in town as night fell — bruised, tired, and hungry, but giggling like school children at the day's events.

The next morning, we were up early, driving west to the town of Chiriquí, then turning north on one of only two roads to transect Panama from the Pacific to the Caribbean coast. Near midway along this road is the continental divide and the Fortuna Dam area. This is an incredibly diverse botanical region protected by the national park system of Panama. Here, in cloud forest at 1,200 m elevation, we found the rare and beautiful *Z. lindleyi*. The plants were scattered sparsely along the top of the ridge. The trunks averaged about a meter tall, although all sizes from seedlings to much larger trunks were observed. Each plant held about five to six leaves per flush. New leaves were a bright shiny green; the older leaves were dull green and almost completely covered with bryophytes. A leaf was composed of 20 to 30 pairs of narrow leaflets, each leaflet measuring 2.5 cm wide by about 20 cm long.

As we continued down the mountain toward the town of Chiriquí Grande we again observed *Z. pseudoparasitica*. In the hills above the town, and along the coastal road, which continues northwest to the Costa Rican border, we collected *Z. neurophyllidia*. This plant is described basically as a dwarf form of *Z. skinneri*. The emergent leaves of this species are bright green as opposed to the reddish bronze color of *Z. skinneri*, and they tend to sport twice as many

leaves at any one time. Leaflets of *Z. neurophyllidia* are generally smaller and more numerous than those of *Z. skinneri*. However, we found some mature *Z. neurophyllidia* individuals with leaves over 2.2 m long and leaflets 15 cm wide by 50 cm long. We found at least one large female plant with a trunk over 3 m tall. This is much larger than any trunks of *Z. skinneri* that I have personally seen. Plants were abundant all throughout this area, but are being threatened by deforestation.

Next, we headed to the barrier islands on the seaward side of Laguna de Chiriquí. We landed on the southern or mainland side of the island and made our way over the tall ridge that runs down the centre and then started down to the northern side. At the bottom of the ridge was a low swampy area. From here, the ground rose gently but steadily toward the beach. It was here that I saw something that I will never forget. It was a forest of *Z. neurophyllidia*. This forest was narrow, starting at the beach and continuing back toward the swamp for maybe 100 meters. It continued for about 1.5 km and contained literally thousands of individuals, maybe tens of thousands of plants. Plants were in all stages of development, from seedlings to mature plants with trunks 3 m tall. There were emergent male cones, emergent female cones, female cones with ripe seeds, and cones at every stage in between. Zamias were the dominant understorey plant as well as the dominant ground cover. This was due in part to the fact that the indigenous people keep the underbrush down with their machetes. The Zamias, like the great Hydra of myth, seem to sprout anew with each swing of the blade. The severed apex, likewise, falls to the ground, becomes rooted, and continues growing. This has created the most robust population of cycads I have ever seen. I only hope some steps towards conservation are made in this area, as beach-front real estate, even in these remote islands, is at a premium. The first beach house on this part of the island already decimated the eastern end of the cycad population.

On the next leg of our journey, we travelled back to the mainland, over the Cordillera de Talamanca, and into the State of Chiriquí. Near the border with Costa Rica, at an elevation of 1,300 m, we found the beautiful and controversial *Z. pseudomonticola*. The plants were growing along steep slopes in dark volcanic soils in the forest remnants between coffee plantations. Trunks were up to 1.2 m tall with leaves up to 2 m long. The bright glossy green leaflets had a slight crease down the middle, and the petiole was lightly armed with prickles.

On our way back to Panama City, we stopped in the State of Cocle near the town of El Valle to look for the diminuitive *Z. acuminata*. We found them in abundance along the slopes of an extinct volcano. This is a subterranean species with small glossy green leaves less than 60 cm long.

The 2001 Panama Expedition was an unqualified success. Over 50 accessions of cycads and palms were collected. Collaborations developed during this and the previous Panama expedition will continue to benefit MBC and the scientific community at large for years to come.

The above article, first appeared in *The Montgomery News* **10**(1): 8–9 (2002). From time to time we will report interesting news items from the Montgomery Botanical Center. Photographs of the plants mentioned above can be seen in Whitelock's book, *The Cycads*, reviewed on page 8 See also ***ENCEPHALARTOS* 69**: 37 for an extract of T. Walters & S. Cuestas' article, *Montgomery Botanical Center's collection: a 2001 update on the collection*, in *The Cycad Newsletter* **24**(3): 9–11 (2001) - Ed.

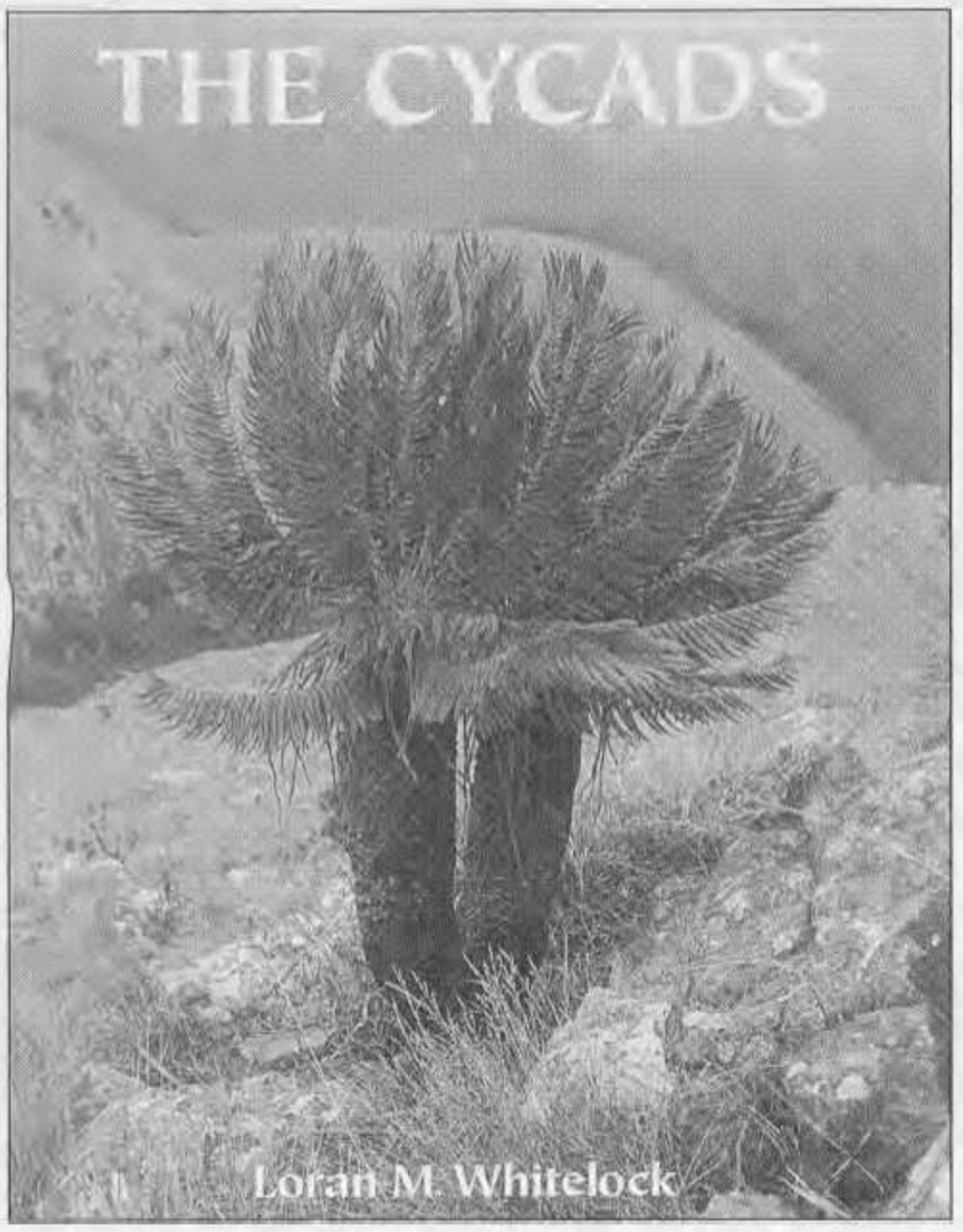
BOOK REVIEW / BOEKBESPREKING

WHITELOCK, LORAN M. *THE CYCADS*.
PORTLAND: Timber Press, Inc., 133 S.W. SecondAvenue, Suite 450, Portland, Oregon 97204, U.S.A., www.timberpress.com, 2002. 374 Pages, plus 156 pages with 505 colour photographs. Price U.S. $59.95 (R670 at current exchange rate) including postage if ordered directly from publishers, from above address or by E-mail at orders@timberpress.com

It was exactly 30 years ago that I first heard of Loran Whitelock (Colour Figure 6 on p. 14), and made his acquaintance. Already at that time there was talk about a book which he was writing. As the years wore on, rumours of the book persisted, and in the meantime a number of other books on cycads had appeared. Though a warm friendship with Loran developed, I never felt that it would be proper to ask him about the book, until relatively recently when he publicly made known that he was completing the book, and asked me if I could contribute a few photographs.

I don't want to compare this book with any other. Whitelock is the doyen of cycad collectors, having been collecting cycads and information on them since before most of us knew what a cycad was. His travels took him to the far corners of the earth to hunt cycads. Far more than anyone else, he can write with authority about cycads in natural habitat. Moreover, his field experience is matched by his experience in growing cycads in his garden in Los Angeles. This venue is not particularly favourable for gardening, having poor soils, a winter ranfall regime, and occasional killing frosts in winter. Yet, from photographs which I have seen, his plants are beautiful, attesting to his

skill as gardener and his understanding of the requirements of the plants.



How does the book then live up to these credentials? Comprehensive it certainly is. The first 40 pages contain short but adequate chapters on *past and present distribution, classification and names, morphology and reproduction, cultivation, propagation, conservation,* and *cycads in human activities*. These lack literature references but contain the basic information in an admirably concise form. Any reader seeking more detailed information can get it from Norstog & Nicholls' *Biology of the cycads* (reviewed in ***ENCEPHALARTOS* 55**: 19–21 (1998)). Many readers will be pleased with the section, *Cycads for specific purposes* (pages 345–354), containing lists of species under headings such as *cycads with subterranean stems, cycads with very long leaves, cycads that are deciduous, temperate to warm temperate cycads, cycads with rapid growth rates,* and *cycads that tolerate cold and frost, salt, or wind.*

There is also a bibliography to mostly taxonomic publications, mainly those in which new genera and species were originally described.

The main part of the book comprises the treatment of genera and species. These are all in alphabetical order, a minor irritant because similar species are not grouped together for comparison, but perhaps inevitable given our still poor understanding of the relationships between different genera and between different species. For every genus and species there is an indirect *reference to the place of original publication*, one of the most comprehensive *descriptions* I have ever seen - these really enable one to visualise the plants, something about *habitat* and *geographical distribution*, miscellaneous notes on *history* and *similar species, behaviour in cultivation*, and *conservation status*. For almost every species there are several photographs, usually taken in habitat, and mostly of excellent quality.

There are a few things which I don't like. There are no distribution maps, and many of the geographical names mentioned in the text would be unfamiliar to the average reader. Then the photographs are not opposite the relevant text, but grouped together in two groups. I suppose that to place them with the text would have meant printing the whole book in colour and added materially to the price, but still I feel that it would have been worth the higher selling price, and that the layout lacks imagination.. I am also disappointed that there are not photographs of leaf detail as well as male and female cones for all species - I suspect that the publisher is to blame because I cannot imagine that the author would not have had such photographs. The net result is a wonderful source of information if one starts off with a name, but it won't be easy to identify an unknown cycad from this book. The printing and binding is of the high quality synonymous with Timber Press, and the paper on which it is printed is a joy to behold.

This book is the result of painstaking work over a lifetime; in the field, the garden, and the library, and it shows.

I don't want to write more about this book, because there is no need. This is the book for which we have always been waiting. It only remains for me to thank the author for his untiring and painstaking work, and for sharing his knowledge and experience with us through this book.

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

FOCUS ON ...

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:

FOKUS OP ...

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:

BOWENIA SPECTABILIS Hook. ex J.D. Hook

Gary W. Wilson
School of Graduate Studies, James Cook University, Cairns, 4870. Queensland, and Queensland Herbarium, Mareeba, 4880. Queensland
E-mail: **Gary.Wilson@jcu.edu.au**

INTRODUCTION

In a previous "Focus on ..." I presented details of *Bowenia serrulata* and indicated that I would address *B. spectabilis*, the other and nominate species of the genus, in a future issue; this is that report. I have ordered the presentations in this way, as the story to be told about *B. spectabilis* is more complex and because work being conducted by me continues to reveal explanations of problems posed by this species.

Alan Cunningham first collected material of what was later to be named *B. spectabilis* in north Queensland in 1819 or 1820. The names of the genus and the species were suggested, but not formally published, by William Jackson Hooker, then Director of Kew Botanic Garden. His son, Joseph Dalton Hooker, described the genus and species in 1863 from material growing at Kew and collected from Rockingham Bay in north Queensland by Walter Hill. The younger Hooker was a botanical giant of his time and confidant of Darwin and Cayley. He travelled widely, including a trip to Antarctica with the *Erebrus* and *Terror* and botanised extensively in Tasmania and New Zealand. However, in Australia, he did not venture north of Sydney in New South Wales, and thus did not see *Bowenia* in its natural habitat.

Hooker named the genus after Queensland's first governer, Sir George Ferguson Bowen (1821–1899), of whom I have written previously. Bowen was governor of the colony between 1859 and 1868 and had a long and distinguished public service career; he was later governor of New Zealand (1869–73), of Victoria (1873–9), of Mauritius (1879–82) and of Hong Kong (1882–5). A range of features, including a town, a prominent mountain, and an important geological formation in Queensland, are also named after him, and other features in Queensland are named for members of his family. The specific epithet refers to the "spectacular" or "showy" nature of the leaflets.

The type of *B. spectabilis* has leaflets with entire margins and Hooker made specific reference to this in his description. This condition contrasts with that in *B. serrulata* where the leaflet margins are serrate. Some confusion has existed about the distribution of *B. serrulata* and the systematics of *B. spectabilis* as plants with leaflets with serrate margins also occur in north Queensland, occasionally mixed with "normal" *B. spectabilis*, but more commonly as descrete populations. These plants have, on occasion, e.g. Keto and Scott (1986), been referred to *B. serrulata*, and populations at Tinaroo and Kuranda on the Atherton Tableland, known in the nursery industry as *B.* Tinaroo and *B.* Kuranda respectively (P. Gummow pers. comm. 1997). In the Queensland Herbarium, collections from these locations and nearby Mt Haig were labelled as "Mt Haig L.W. Jessup 910", but as a result of resent work by Kokubugata *et al.* they have been relabelled as *B. spectabilis*. In my studies, I refer to these plants as putative *B. spectabilis*. Although it is inappropriate as Byfield is located some 1000 kms to the south, the name "Byfield Fern" is sometimes applied, as they are not easily distinguished from *B. serrulata*.

Bowenia spectabilis appears on the logo of the Wet Tropics Management Authority (WTMA), the body responsible for the management of the Wet Tropics of Queensland World Heritage Area.

DISTRIBUTION AND HABITAT

Bowenia spectabilis occurs in three discrete populations in north Queensland (Figure 1). In the Wet Tropics, it occurs from Cardwell to Cooktown, while populations at McIlwraith Range and Starke on Cape York Peninsula are restricted to isolated uplands with high rainfall. The McIlwraith Range population has been known of since 1948 but the Starke population was discovered in 1966 by local botanist Bruce Wannan and is limited to a single

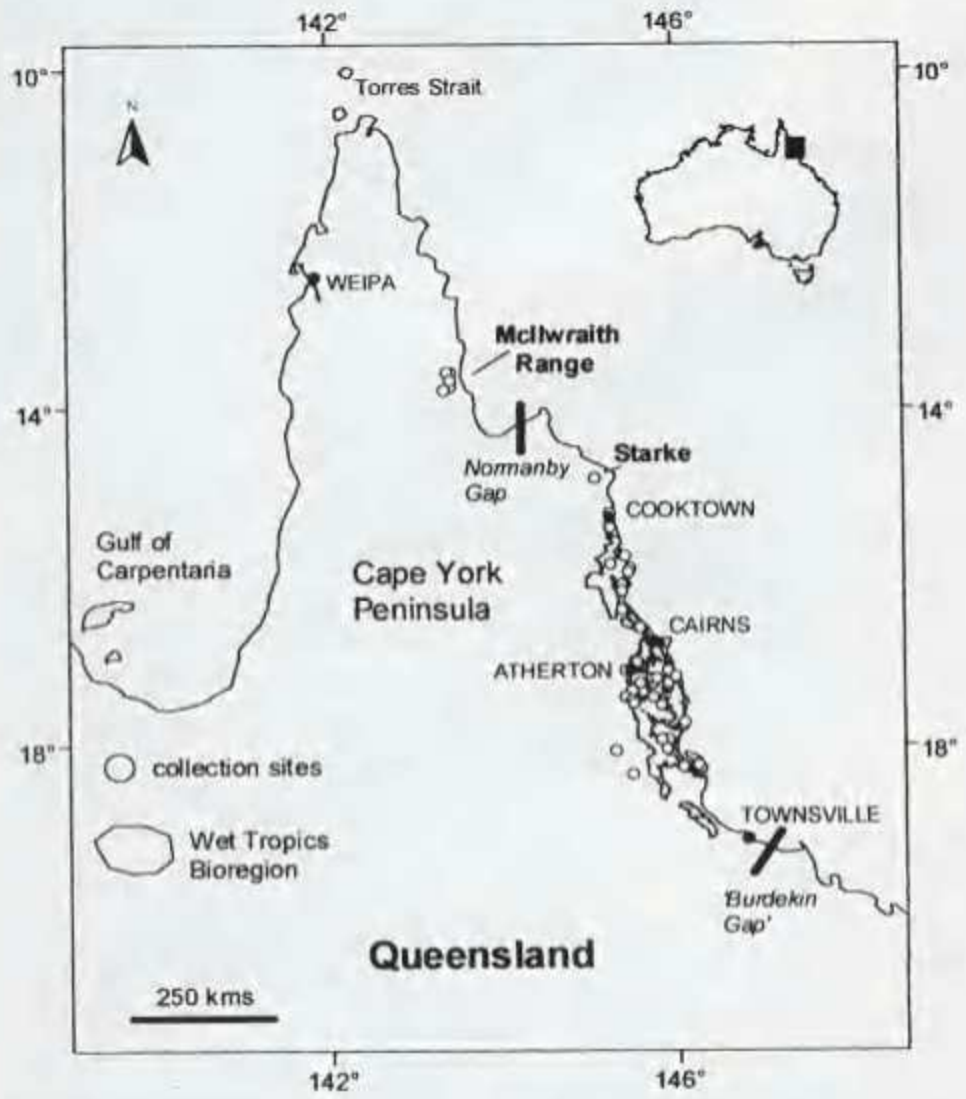


Figure 1 A map of the distribution of *Bowenia spectabilis* in northeast Queensland.

coastal upland site. Palaeoclimate data indicate that the low-lying warmer and less-humid (megathermal) Normanby Gap has separated the McIlwraith and Starke populations since the Pleistocene, but Starke and Wet Tropics populations are likely to have been in contact more recently. The Wet Tropics population ranges from sea level in the East to the western margins of the Atherton Tableland; this population has been fragmented and substantially reduced by land clearing during the past 100 years.

Bowenia spectabilis grows in rainforest and adjoining tall wet eucalypt forest ecotones (Colour Figure 1 on p. 15). Plants with pinnules with entire margins (Colour Figure 2 on p. 15) occur in Mesophyll and Complex Notophyll Vine Forest types. Plants in less complex rainforest and in the ecotones have pinnules with serrate margins.

The area of distribution of *B. spectabilis* has a Wet and Dry Season climate. Depending on location, the average annual rainfall is 1500–>4000 mm, the mean annual temperature (MAT) between 24.1 and 25.7°C, and the mean temperature range around MAT between 14.1 and 18.0°C. The lowest monthly minimum mean temperature within the distribution of *B. spectabilis* is 10°C, and occurs on the Atherton Tableland in the west of the range. The species does not occur above 800 m and appears to be limited by mean minimum temperature rather than other climatic or environmental parameters. Frosts occasionally occur on the western margins of the species range on the Atherton Tableland, but they are associated with cleared rather than forested areas and do not affect *Bowenia*. The core areas of habitat are not subject to wildfires, although past dry periods when fires were more frequent, restricted the species to mesic refugial areas that were shared with a suite of other endemic and ancient plant taxa. The margins of the western populations of *B. spectabilis*, e.g. at Tinaroo, are subject to occasional wildfires and controlled-burns conducted by forest management agencies.

DESCRIPTION

1. STEM

Subterranean and fleshy, and described in Jones (1993) as carrot-shaped and to 100 mm in diameter, and sparsely branched with a tuberous taproot. However, recent work by Atherton Tableland botanists Garry Sankowsky and Peter Radke and the author has revealed that plants with larger and much-branched stems, like those of *B. serrulata*, also occur. "Coralloid" apogeotrophic roots containing nitrogen-fixing symbiotic organisms commonly extend to the soil surface, particularly on plants growing on nutrient-poor soils and gravels. The leaves and cones are borne on 2–5 separate short branches.

2. LEAVES

These are erect and vary in number from 1–3 per branch and 1–6 (usually 2–3) per plant. The leaves are bipinnate with 5–11(13) pinnae (1st Order leaflets) per leaf and 7–30 opposite and non-articulate pinnules (2nd Order leaflets) on each. In mature leaves the petiole is bulbous at the base, woolly on the lower portion and thereafter glabrous, and up to 1500 mm in length - the length of them is, however, quite variable, both among and within plants. The rachis of the pinnae, the pinnule rachilla and the pinnules are hairy when juvenile but glabrous when mature.

Extensive sampling reveals that leaflet length, width and length/width ratio are also variable between (Table 1), and within (Table 2) plants, and statistical analyses indicate that populations cannot reliably be distinguished using these measurements. Leaflet shape is also variable, ranging from lanceolate through falcate to obovate, often on different pinnae of the same leaf or plant. The leaf apex usually is acute, forming a "drip tip" - a common feature on leaves of plants growing in areas with high rainfall. The stomata are superficial and unprotected and are found scattered on the upper face, and in bands between the veins on the lower face, of the pinnules. Their presence on both sides of the pinnules and the thin leaf epidermis is indicative of the low-stress environment in which the plants live.

Cataphylls are regularly present around emerging cones but are reduced and irregularly present about leaf bases. The cataphylls about emerging leaves are not obvious when present and are frequently covered by soils and leaf litter.

3. REPRODUCTIVE STRUCTURES

Bowenia spectabilis is dioecious with male and female cones on separate plants. Mature male cones are ovoid in shape, green-brown in colour, and *c.* 80 mm in height but extend further when dehiscing pollen. The microsporo-

Table 1 Mean length and width (±SE) of pinnules of plants in three populations of *B. spectabilis*.

sample taxon	number of plants & pinnules sampled	mean (±SE) length (mm)	mean (±SE) width (mm)	l:w ratio
B. spectabilis				
at Tarzali	10 x 16	107.77 (1.67)	23.78 (0.27)	4.53:1
at Kuranda	10 x 16	105.58 (1.21)	30.63 (0.41)	3.46:1
at Tinaroo	10 x 16	115.35 (1.40)	27.35 (0.39)	4.22:1

Table 2 Mean length and width (±SE) of pinnules on two leaves of one plant of *B. spectabilis*

leaf	pinnules sampled	mean length (±SE) (mm)	mean width (±SE) (mm)
1	16	141.62 (1.69)	22.75 (0.52)
2	16	92.75 (2.74)	24.31 (0.69)

phylls are about 20 x 12 mm in size and wedge-shaped. The cone peduncle is generally short and not visible below *in situ* cones, but in plants growing in boulder fields at Kirrama, they grow to 200 mm. Female cones are variable in shape and size but are generally barrel-shaped and to 150(200) mm in height (Colour Figure 3 on p. 16). The megasporophylls are 50 x 20 mm in size. The outer faces of both micro- and megasporophylls in cones have fine, short hairs.

Mature cones are thermogenic, males more so than females, with temperatures being raised 4–6°C above ambient with a maximum between 1200 and 1400 hours each day. The cones emit a "musty" bouquet during this period and it is hypothesised that this attracts the pollinating weevils but a chemical analysis of these volatiles has not yet been conducted.

Cone growth commences in the Dry Season, with male cones first obvious in August or September and about one month before female cones. Cones are produced earlier, and male cones dehisce pollen earlier, in populations in wetter locations, e.g. nominate *B. spectabilis* at Tarzali (mean annual rainfall, 3988 mm), than those in drier locations, e.g. putative *B. spectabilis* at Tinaroo (mean annual rainfall, 1749 mm). Male cones are produced more frequently on plants and in populations than female cones; indeed, a common comment made by rainforest researchers is how rarely they see a female cone.

Male cones commence dehiscing pollen before the first female cones are receptive and continue until after the last female cone is receptive. The microsporophylls change from pale green to light yellow in colour and relax as the cones mature. The pollen in the sori on the abaxial-surface of the micorsporophylls is released over a period of four or five days in the month prior to the onset of the Wet Seasonal Torrential rain has an immediate effect on male cone phenology, causing all mature cones in a population to immediately dehisce and to quickly disintegrate and decompose, this happened in nominate *B. spectabilis* at Tarzali in 1998.

In receptive female cones, the lower megasporophylls relax several millimetres for a period of 24–36 hours to allow the entry of pollen and/or pollination vectors. Female cones are often partially submerged in the soil or leaf litter at the time of pollination; a cone of putative *B. spectabilis* at Tinaroo was found almost buried in the coarse granitic gravel but a later analysis revealed 18 of 23 (78%) ovules had been fertilized. The female cones remain intact until the following Dry Season, 6–7 months after pollination, and grow to 250 mm and weight to 1000 g during that period. The fertilized ovules (seeds) become visible between the megasporophylls, and the sarcotesta of them changes in colour to pale pink/lilac/blue, as they mature. Few intact mature cones are found, as they are broken apart by foraging animals once the seeds mature.

Five hundred (500) plants were surveyed at Tarzali and Tinaroo in September and November of 1994, 98 and 99 to ascertain the level of production and ratio of male and female cones. Production of both male and female cones in each population varied widely (Tables 3 and 4). It is interesting to note that no more than 5% of the plants in any population produced a female cone in any year. The data is insufficient to show long-term rates of production of or sex ratios of plants in populations.

Animals distribute the seed of *B. spectabilis*, but few data are available on what species are involved; seed in hollow logs and plants growing on tree stumps, indicates dispersal by animals. Most seeds found have the fleshy sarcotesta removed and teeth marks on the sclerotesta indicate that an animal has removed it, however, few seeds are found where the sclerotesta has been broached. Anecdotal data (J. Winter pers. comm. 1998 and A. Dennis pers. comm 1999) indicate that macropods, particularly the Musky Rat-kangaroo *Hypsipyrmnodon moschatus*, disperse the seeds of *B. spectabilis*. Despite systematic searching, there is no indication that the Southern Cassowary, otherwise an important rainforest seed dispersal vector, distributes the seed of *B. spectabilis*.

POLLINATION BIOLOGY

Studies (Wilson 1995, unpubl. data) show that pollination

Table 3 Cone production over three years in a population of *Bowenia spectabilis* in Simple Notophyl Vine Forest habitat at Tinaroo, North Queensland. (n=500).

Year	Male cones (% of plants)	Female cones (% of plants)	Male/female Ratio
1994	7.0	3.0	2.3:1
1998	5.0	0.5	10:1
1999	13.2	0.8	16.5:1

Table 4 Cone production over three years in a population of *Bowenia spectabilis* in Complex Mesophyl Vine Forest habitat at Tarzali, North Queensland. (n=500).

Year	Male cones (% of plants)	Female cones (% of plants)	Male/female Ratio
1994	50.0	5.00	10 : 1
1998	1.8	0.18	10 : 1
1999	7.5	3.00	2.5:1

in *B. spectabilis* is entomophilic. The pollination vector is the molytine weevil *Miltotranes prosternalis* (Lea), (Colour Figure 4 on p. 16), one of two species in the genus, the other being *M. subopaca* (Lea), the pollination vector of *B. serrulata*. *Bowenia spectabilis* employs a "brood site reward" pollination system, the weevil is provided with food and a brood site in the male cone in return for transferring the pollen to the female cone.

The weevil aestivates in the final larval instar stage in the leaf litter and soil between the reproductive events of *Bowenia* - the need for a continuously moist habitat is obvious, an extensive wildfire or a change in fire regime could destroy the next generation of the pollination vector. *Miltotranes prosternalis* does not use the female cone as a food source or as a brood site, but visits them, perhaps because they cannot distinguish between male and female cones, presumably attracted by their elevated temperature and/or the production of aromatic volatiles. At the female cone, the weevil feeds on the sugar- and amino acid-rich pollination drop of the ovules and transfers pollen to them.

AFFINITIES

The closest related species is *B. serrulata*, which is found a 1000 km to the south in coastal central Queensland (see *Encephalartos* **65**: 19–22). The two species are separated by the Burdekin Gap, which has persisted since the mid-Miocene 12–15 mya. Fossil material, including two named species, is known from the Eocene and Miocene of eastern and southeastern Australia - all of the fossil material has leaflets with serrate margins, as in *B. serrulata*. *Bowenia* is not closely related to any other Australian cycad.

PHYLOGENY AND CLASSIFICATION

The relation of *Bowenia* to, other cycads has proven difficult to resolve - the bipinnate foliage is certainly different from that in any other genus. Although the fossil record of *Bowenia* only extends to 54 million years B P. and although the genus is currently only known from Australia, it may be much older and more closely related to intermediate forms now extinct than to any other living genera. When talking of time spans of this magnitude, wider considerations, such as of continental drift and global climate change, must be taken into account.

Bowenia has in the past been placed in Zamiaceae, a family of genera with a Gondwanan distribution, i.e. *Lepidozamia* and *Macrozamia* in Australia, *Encephalartos* in Africa and all the American genera. More recently, Johnson (1959) placed *Bowenia* with the African *Stangeria*, (but in the subfamilies Bowenioideae and Stangerioideae respectively) in Stangeriaceae. Dennis Stevenson retained this classification in his 1992 "A Formal Classification of the Extant Cycadales". This suggests a common ancestor prior to the rifting of Africa and Antarctica, a potential age of *c.* 150 million years.

The greatest chance of revealing the phylogeny of *Bowenia* lies in the use of molecular analysis techniques. Initial molecular sequencing results in separate the two species of *Bowenia* and chromosome analysis by Kokubugata *et al.* confirm that the various north Queensland forms constitute one species, *B. spectabilis*, but further work (now in progress) is required to clarify the relation of this and the other cycad genera.

HORTICULTURAL USE AND POTENTIAL

Recent changes in Queensland legislation mean that collecting under permit of seed from wild-growing plants has ceased but nursery-grown stock should become more readily available within a few years. Illegal collecting of seed and foliage has been commonplace but the frequency of it is now much reduced. Despite some interest in harvesting foliage of *B. spectabilis*, permits to do so have not been issued by the Queensland Parks and Wildlife Service. The reason for this has, in part, been the confusion on the status of material in north Queensland with pinnules with serrate margins and the inability of enforcement staff to distinguish between the foliage of it and *B. serrulata*, for

which permits to harvest are issued.

B. spectabilis is a particularly attractive species and grows well, and will cone, in large pots, but it is not as robust or frost tolerant as *B. serrulata*. It is not common in private collectioins but is more frequently found in botanic gardens in tropical and subtropical areas and in green houses in other areas around the world - we should not forget that it was described from a specimen growing at Kew. In north Australia fine displays of this species are to be found in the Flecker Botanic Gardens in Cairns and on the Cairns campus of James Cook University, and elsewhere it is easily seen in the wild and from interpretative boardwalks in several areas. Some tour opereators, particularly those in the Daintree National Park, north of Cairns, make particular mention of this and other cycad species in their presentations.

USE BY AUSTRALIAN ABORIGINAL PEOPLE

The Rainforest Aboriginals called *B. spectabilis* jayur, julbin, gunyoo or chiroo. They roasted, crushed and soaked the roots and seeds in water for 24 hours, and cooked them again, before eating them. The local people also harvested, processed, and ate the seeds of *Lepidozamia hopei* and *Cycas media* but *Bowenia* is much more toxic than both of them and required more careful processing. Also, *Bowenia spectabilis* produces fewer cones and seeds than *L. hopei* and *C. media*, and it is likely, that it was consumed in lesser quantities.

CONSERVATION STATUS

In common with all cycads in Queensland *Bowenia spectabilis* is protected under Nature Conservation legislation where it is listed as COMMON. The species is currently included in CITES Appendix II. *Bowenia spectabilis* is generally well represented in national parks and the Wet Tropics World Heritage area but the McIlwraith Range populations is not currently included in a conservation area.

ACKNOWLEDGEMENTS

The information presented in this paper was drawn from the literature cited below, from my own fieldwork and from that of fellow botanists and cycad aficionados. I particularly thank Paul Forster of the Queensland Herbarium, Goro Kokubugata of the Tsukuba Botanic Gardens, and Bruce Wannan, Lou Randall and Roy Osborne for their contributions to my studies of this species and the production of this paper.

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WILSON, G.W. 2001. Focus on *Bowenia serrulata* (W. Bull) Chamberlain. *Encephalartos* 65: 19–23.

NEW CYCAD PUBLICATIONS

FORSTER, P.I. 2001. ***Cycas cupida* (Cycadaceae), a new species from Queensland.** *Austrobaileya* 6(1): 153–160.

[The new species *Cycas cupida* P.I. Forst. from sandstone substrates in central Queensland is described (together with illustrations) and compared to *C. couttsiana* K.D. Hill and *C. desolata* P.I. Forst. A key to the species of *Cycas* series Cairnsianosae K.D. Hill is presented.]

Author's address: Queensland Herbarium, Environmental Protection Agency, Brisbane Botanic Gardens, Mt Coot-tha Road, Toowong, Queensland 4066, Australia.

GORELICK, R. 2001. **Did insect pollination cause increased seed plant diversity?** *Biological Journal of the Linnean Society* 74: 407–427.

[The dominant paradigm for the disproportionate number of flowering plants is the unique coevolution that they underwent with pollinating insects. The theory underlying this biotic pollination hypothesis contradicts more generally accepted theory. Furthermore, various lines of empirical evidence falsify the biotic pollination hypothesis: (a) several lineages of plants were insect

Colour Figure 1 ***Bowenia spectabilis*** **in rainforest habitat in the Daintree National Park, coastal northeast Queensland (note the entire margins of the pinnules). Photo: Gary Wilson.**

Colour Figure 2 Leaf of ***Bowenia spectabilis*** **showing the pinnules with entire margins. Photo: Gary Wilson.**

Colour Figure 3 Female cone of "Tinaroo" form of *Bowenia spectabilis* found by Dr. Goro Kokubugata of the Tsukuba Botanical Gardens.

Colour Figure 4 Adult *Miltotranes prosternalis* (Lea) weevils on a mature male cone of the "Tinaroo" form of *Bowenia spectabilis*. Photo: Gary Wilson.

Colour Figure 5 *Encephalartos horridus* with three male cones. Photo: Mornè Frerreira.

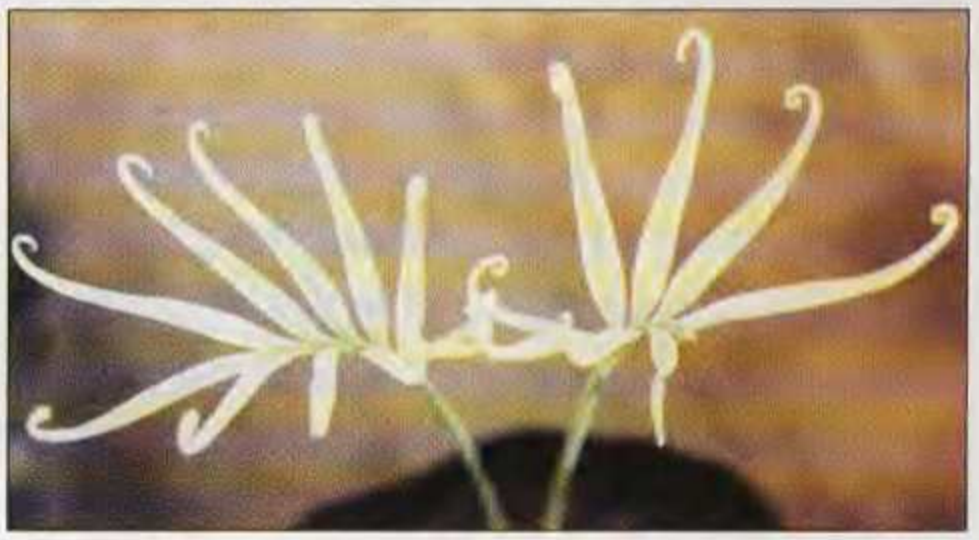
Colour Figure 6 Society member Loran Whitelock with advance copies of his book, *The cycads*, on the 9th of April at the Montgomery Botanical Center in Miami. Photo: Deena Decker-Walters.

Colour Figure 7 Leaf of *Encephalartos ferox* cross lacking pinnae on either side of the rachis. Photo: Mornè Ferreira.

Colour Figure 9 Double folded pinna on the lower rachis of an *Encephalartos ferox* cross. Photo: Mornè Ferreira.

Colour Figure 11 Crested *Cycas* seedling. Photo: Mornè Ferreira.

Colour Figure 8 A normal pinna for the *Encephalartos ferox* cross plant. Photo: Mornè Ferreira.



Colour Figure 10 A "golden" *Cycas*. Photo: Mornè Ferreira.

Kleurfiguur/Colour Figure 12 Broodbome wat by die Strydomtonnel gekonfiskeer is. / Cycads confiscated at the Strydom Tunnel. Foto/Photo: Gert van der Merwe.

Kleurfiguur/Colour Figure 13 Sommige van die *Encepha-lartos ferox*-plante wat in KwaZulu-Natal gekonfiskeer is. / Some of the *E. ferox* plants confiscated in KwaZulu-Natal. Foto/Photo: Gert van der Merwe.

Colour Figure 14 *Cycas revoluta* **plants in Japan, wrapped up in grass for the duration of winter to protect them against cold. Photo: Christa Holm.**

Colour Figure 15 *Dioon purposii*, **with an epiphyte covered trunk fully 5 m tall, in habitat in Mexico. Photo: Piet Vorster.**

Colour Figure 16 *Dioon purposii* **in habitat, with columnar cacti in the background. Photo: Piet Vorster.**

pollinated - angiosperms, Gnetales, Bennettitales, Medullosales, Cheirolepidiaceae and Cycadales - yet only the first four were ever diverse or underwent radiations; (b) the predicted rise in insect diversity, which was coupled with angiosperm radiation, does not appear in the fossil record; (c) the family Poaceae (grasses) are wind pollinated, yet are exceptionally diverse and species-rich; and (d) the family Formicidae (ants) were not pollinators, yet are exceptionally species-rich and ecologically dominant. I enumerate many alternate (and seldom investigated) hypotheses for these patterns of seed plant diversity, keeping in mind that although I show that insect pollination was neither a necessary nor sufficient condition for large numbers of species, it may have played a substantial role in both plant and insect speciation. Alternatively, existing theory regarding the biotic pollination hypothesis can be refined in an attempt to eliminate the aforementioned empirical anomalies and theoretical inconsistencies.]

Author's address: Department of Biology, Arizona State University, Tempe, AZ 85281-1501, USA.

HUANG, S., CHIANG, Y.C., SCHAAL, B.A., CHOU, C.H. & CHIANG, T.Y. 2001. **Organelle DNA phylogeography of *Cycas taitungensis*, a relict species in Taiwan.** *Molecular Ecology* 10(11): 2669–2681.

[The phylogeographic pattern of *Cycas taitungensis*, an endemic species with two remaining populations in Taiwan, was investigated based on genetic variability and phylogeny of the atpB-rbcL, noncoding spacer of chloroplast DNA (cpDNA) and the ribosomal DNA (rDNA) internal transcribed spacer (ITS) of mitochondrial DNA (mtDNA). High levels of genetic variation at both organelle loci, due to frequent intramolecular recombination, and low levels of genetic differentiation were detected in the relict gymnosperm. The apportionment of genetic variation within and between populations agreed with a migrant-pool model, which describes a migratory pattern with colonists recruited from a random sample of earlier existing populations. Phylogenies obtained from cpDNA and mtDNA were discordant according to neighbour-joining analyses. In total four chlorotypes (clades I–IV) and five mitotypes (clades A–E) were identified based on minimum spanning networks of each locus. Significant linkage disequilibrium in mitotype-chloroptype associations excluded the possibility of the recurrent homoplasious mutations as the major force causing phylogenetic inconsistency. The most abundant chlorotype I was associated with all mitotypes and the most abundant mitotype C with all chlorotypes; no combinations of rare mitotypes with rare chlorotypes were found. According to nested clade analyses, such nonrandom associations may be ascribed to relative ages among alleles associated with the geological history through which cycads evolved. Nested in networks as interior nodes coupled with wide geographical distribution, the most dominant cytotypes of CI and EI may represent ancestral haplotypes of *C. taitungensis* with a possible long existence prior to the Pleistocene glacial maximum. In contrast, rare chlorotypes and mitotypes with restricted and patchy distribution may have relatively recent origins. Newly evolved genetic elements of mtDNA, with a low frequency, were likely to be associated with the dominant chlorotype, and *vice versa*, resulting in the nonrandom mitotype-chlorotype associations. Paraphyly of CI and EI cytotypes, leading to the low level of genetic differentiation between cycad populations, indicated a short period for isolation, which allowed low possibilities of the attainment of coalescence at polymorphic ancestral alleles.]

First author's address: not available.

HURTER, P.J.H. & GLEN, H.F. 2001. ***Encephalartos relictus*: a new species from Southern Africa.** *Bothalia* 31(2): 197–199.

[An illustrated description of *E. relictus* from Swaziland is providedd. The species appears to be extinct in the wild but some garden specimens from the original habitat exists.]

First author's address: Lowveld National Botanical Garden, P.O. Box 1024, 1200 Nelspruit, South Africa.

JONES, D.L., FORSTER, P.I. & SHARMA, I.K. 2001. **Revision of the *Macrozamia miquelii* (F. Muell.) A.DC. (Zamiaceae section *Macrozamia* group).** *Austrobaileya* 6(1): 67–94.

[The *Macrozamia miquelii* group consists of seven species, *M. cardioacensis* P.I. Forst. & D.L. Jones, *M. douglasii* W. Hill ex F.M. Bailey, *M. longispina* P.I. Forst. & D.L. Jones, *M. macleayi* Miq., *M. miquelii* (F. Muell.) A.DC., *M. mountperriensis* F.M. Bailey and *M. serpentina* D.L. Jones & P.I. Forst. sp. nov., all occurring in eastern Queensland. The complicated typification of *Macrozamia douglasii* W. Hill ex F.M. Bailey and *Encephalartos douglasii* F. Muell. is resolved with lectotypes selected for both names. A key to the species in the group is provided and all species are illustrated. A partial electrophetic analysis of the complex is also presented.]

First author's address: Centre for Plant Biodiversity Research, Australian National Herbarium, G.P.O. Box 1600, Canberra, Australian Capital Territory, 2601, Australia.

KOKUBUGATA, G., HILL, K.D., WILSON, G.W., KONDO, K. & RANDALL, L.M. 2001. **A comparison of chromosome number and karyotype in somatic chromosomes of Stangeriaceae (Cycadales).** *Edinburgh Journal of Botany* 58(3): 475–481.

[Somatic chromosomes at mitotic metaphase of two species and two undescribed populations of *Bowenia*, and *Stangeria eriopus*, which are classified in Stangeriaceae, Cycadales, were compared using the standard aceto-orcein staining method. All *Bowenia* taxa showed a chromosome number of 2n=18, while *S. eriopus* showed a chromosome number of 2n=16. The chromosome number 2n=18 in *B.* "Kuranda" is reported for the first time. The present karyotype analysis indicates that . *B.* "Kuranda" and another undescribed taxon, *B.* "Tinaroo", are cytotaxonomically closer to *B. spectabilis* than *B. serrulata*, and that the karyotype of *Stangeria* is unlikely to have been derived from that of *Bowenia* by a simple chromosomalchange

such as centromeric fission and deletion.]

First author's address: Tsukuba Botanical Garden, National Science Museum, Tokyo, Amakuba, Ibaraki 305-0005, Japan.

MABRY, T.J. 2001. **Selected topics from forty years of natural products research: Betalains to flanonoids, antiviral proteins, and neurotoxic nonprotein amino acids.** *Journal of Natural Products* 64(12): 1596–1604.

[The elucidation by NAIR and chemical methods of the unique structure of betanidin, the aglycon of the red-violet beet pigment betanin, forty years ago at the University of Zurich, Switzerland, was the beginning of my plant chemistry research program. Many of the same chemical and spectral techniques developed in Zurich have been used at the University of Texas at Austin for the structure analysis of members of many other classes of natural products including especially flavonoids, terponoids, and alkaloids. Investigations at UT-Austin have concerned many topics such as biochemical and molecular systematics, biosynthetic pathways, structure-activity relationships, and the medicinal importance of natural products and included studies of antiviral proteins in the genus *Phytolacca* and neurotoxic nonprotein amino acids from cycads and other source. Following the betalain story and an account of the early development of my UT-Austin biochemical systematic program, the *Phytolacca* and neurotoxin investigations are discussed herein.]

Author's address: not available.

WILLIAMS, J.H. & FRIEDMAN, W.E. 2002. **Identification of diploid endosperm in an early angiosperm lineage.** *Nature* 415(6871): 522–526.

[In flowering plants, the developmental and genetic basis for the establishment of an embryo-nourishing tissue differs from all other lineages of seed plants. Among extant nonflowering seed plants (conifers, cycads, *Ginkgo*, Gnetales), a maternally derived haploid tissue (female gametophyte) is responsible for the acquisition of nutrients from the maternal diploid plant, and the ultimate provisioning of the embryo. In flowering plants, a second fertilization event, contemporaneous with the fusion of sperm and egg to yield a zygote, initiates a genetically biparental and typical triploid embryo-nourishing tissue called endosperm. For over a century, triploid biparental endosperm has been viewed as the ancestral condition in extant flowering plants (1–3). Here we report diploid biparental endosperm in *Nuphar polysepalum*, a basal angiosperm. We show that diploid endosperms are common among early angiosperm lineages and may represent the ancestral condition among flowering plants. If diploid endosperm is plesiomorphic, the triploid endosperms of the vast majority of flowering plants must have evolved from a diploid condition through developmental modification of the unique fertilization process that initiates endosperm.]

Author's address: not availbale.

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

LETTERS TO THE EDITOR / BRIEWE AAN DIE REDAKTEUR

Dear Editor

RE: EXPORT OF INDIGENOUS PLANTS FROM GAUTENG PROVINCE

In *Encephalartos* **69** of March 2002 an abridged copy of the draft "Policy to control the export of indigenous plants from Gauteng Province" was printed.

The amazing and rather naïve proposals embodied in these Draconian rules are obviously aimed at the commercial cycad grower. The concepts of "Conservation through Cultivation" and the Constitutionally guaranteed "Freedom of the Individual" seem to have slipped someone's mind.

Let us think the unthinkable and consider the position if such legislation were promulgated throughout all South Africa's Provinces. A new channel for the lawless and conscienceless would be opened for illegal operations. Prohibition of export or import of anything has never succeeded; take the days of Prohibition in the U.S.A. for example. Another case is the establishment of our giant South African tea industry with a plane load of seed that slipped away illicitly despite the edict of the parent country. Mr Derik Minnaar (*Encephalartos* **68**: 12, December 2001) holds much the same opinion as the Gauteng boys. My own standpoint differs drastically from these gentlemen and numbers of others with the same view regarding the cycad population. I am sure that no thief is going to steal a bouquet of Dandelions from my garden, it could happen if I had a rare orchid within his grasp. He has had equal opportunity, the only difference is the rarity, hence pecuniary value, of the object to be stolen. Now to the nitty-gritty, if we can attain the Utopian situation that cycads have only the scarcity value of the Dandelion, our problems are ended (I said Utopian, didn't I?).

This dream situation can be obtained (obviously over a period of years) by encouraging the propagation and distribution of guaranteed pure seed and plants. This object can only be attained by allowing the profit motive to enter. As the lady said "I'll do anything for love, but I'll do it twice for money". Our entire western civilization is built on the concept of "a day's pay for a day's work", why deprive the nurseryman of the incentive?

South Africa had a steady diminishing quantity of antelope and other wild game within its borders, some actually facing extinction until the concept of game farms emerged. The situation has changed, the game population has increased dramatically, and everyone is happy including the farmer who now can keep the wolf from his door while conserving the rest of his game on a rational and rewarding basis.

The cycad grower and nurseryman who has a commercial interest in these plants is obviously not the person who will contribute to the eradication of them, he is not the guy to kill the goose that lays the golden eggs.

I wish to make it clear that I have no axe to grind in writing this letter. I do not export cycad plants or seed. My only motive is in the hope that it may in some way or another help to stop the loss of our precious cycad inheritance.

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

Received 8 April 2002

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Dear Editor

ERRATUM

In *Encephalartos* **68**: 24, dated December 2001, I wrote a letter to the editor complaining about the new ethos of speculation in cycads. In a quotation from a national newspaper the "Printer's Devil" played havoc by changing the table to read "from the year 1900 to 2000" making nonsense of its concept. The dates should read, from 1990 to 2000, this clarifies the rate of inflation.

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

Dear Editor

WEEVILS ON CYCADS: RESPONSE TO ANDRÉ CILLIERS

In Encephalartos **68**: 22, December 2001, André Cilliers asked several questions about weevils he had observed on *Encephalartos trispinosus*. The weevil in the photograph is *Antliarhinus zamiae*, which develops only in the seeds of *Encephalartos* species and has been found on 14 species in the wild. In nature, *A. zamiae* extends from the Eastern Cape to northern KwaZulu-Natal and southern Swaziland where it attacks most cycads except those with woolly cones (*E. cycadifolius, E. friderici-guilielmi,* and *E. ghellincki*) but does not attack cycads in Mpumulanga, Gauteng, or Northern Province. However, it has been recorded from cultivated plants in Mpumalanga and Gauteng. Three other species of *Antliarhinus* also feed on *E. trispinosus*, one species feeding on seeds (*A. signatus*) and the other two feeding on the cone scales and central axis.

André asked whether these weevils were also pollinators. This question dates back to the beginning of the 20th century when Harold Pearson, Rudolf Marloth, and George Rattray suggested that beetles were important pollinators of South African cycads, and Marloth (1914) suggested that *A. zamiae* was the main pollinator. Research carried out on *E. villosus* (Donaldson 1997, *American Journal of Botany* **84**: 1398 – 1406) showed that *A. zamiae* was not an important pollinator because relatively few beetles visited the male cones. Instead, pollination was carried out by a different group of weevils in the genus *Porthetes*, together with other beetles in the superfamily Cucujoidea. Rolf Oberprieler did extensive research on the taxonomy of *Porthetes* indicating that these weevils are often specific to one or a few cycads. So, it seems that *A. zamiae* is only a seed predator and other beetles are involved in pollination.

John Donaldson*, Kirstenbosch Research Centre, NBI, Private Bag X7, Claremont 7735, RSA.*

SHORT COMMUNICATIONS / KORT MEDEDELINGE

WEBSITE OF THE CYCAD SOCIETY OF SOUTH AFRICA.

I was blissfully unaware of how much typing one has to do to get a website online, that looks good and has good content. My typing skills have much improved over the past year! From the positive responses received when the site was first launched, the general "look and feel" of the site is on target and members of the Society find it useful. I want to stress, however, that the site is for you, the members of the Society and as such, you are encouraged to contribute in anyway you want. Be it photographs, information or financially. I had responses from a few people already, thank you very much. These pages will be very boring indeed if I am to write them all and photographs are obtained from only 2 or 3 people! An upgrade of the site is underway and you should soon see more Species Pages appear and some other minor changes.

One of the useful aspects of the site must be the forum where people can post questions, opinions and small advertisements. It is getting rather long now and a search facility may be added soon to make it easier to find what you are looking for.

Based on the Forum, I have started work on a Q&A section and invite you all to submit your questions to me via e-mail, or snail mail, should you prefer that. One question, already being researched, is the current legislation and how it affects cycad ownership, trade and transport.

I look forward to receiving your suggestions how to improve our site!

Wynand van Eeden
20A Renville Village
Oranmore
County Galway
Ireland
e-mail: **wynand@ananzi.co.za**

AN INVENTORY OF CYCADS CURRENTLY HELD AT THE DURBAN BOTANIC GARDENS

Christopher Dalzell and Mark Mattson
Durban Botanic Gardens, P.O. Box 3740, 4000 Durban, R.S.A.

Received March 2002

In 1999, the Durban Botanic Gardens were surveyed. This meant, that for the first time, it became possible to establish, and document, what plants were in the Gardens' collection. Long-term efforts to increase the scientific value of our collections will rest on this fundamental first step. The spatial data from the survey have been used in conjunction with GIS mapping software (ArcView) to generate maps and inventories of the Gardens' major collections, i.e. Cycads, Palms and Trees. Data are currently being edited through a process of groundtruthing in the field, and 1355 trees, 912 palms and 291 cycads have been checked. Ultimately, the potential exists to link this information to computerised databases so that the Gardens' collections can be curated to enhance their scientific and educational value. This work has been made possible through a grant from the Unilever Foundation for Education and Development, and Unilever are thanked for their support and generosity.

In keeping with its new Mission Statement the Gardens' intention is to maintain the cycad assemblage listed below, and to advance its position amongst botanic gardens as a major holder of world cycads. Specifically, the Gardens will focus on the acquisition of documented, locally-collected specimens in the future. While current cycad holdings are of interest for their cosmopolitan flavour, most of the collection is comprised of undocumented, *ex-hort* specimens of little direct conservation value.

We hope that cycad enthusiasts will find this list useful, and would welcome any comments or inquiries. The list contains 49 species from 6 genera.

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PIENAAR, L. & JANSE VAN RENSBURG, P. 2001. Cycads of the world for the laymen. ***Encephalartos*** **65: 31–37.**

List of Cycads in the Durban Botanic Garden current to March 2002

Ceratozamia hildae	San Luis Potosi & Queretaro, Mexico
Ceratozamia mexicana	Hidalgo, Puebla, San Luis Potosi & Veracruz, Mexico
Ceratozamia kuesteriana	Tamaulipas, Mexico
Ceratozamia robusta	Oaxaca & Veracruz, Mexico; Belize; Guatemala
Cycas thouarsii	Madagascar; Africa
Dioon califanoi	Oaxaco, Mexico
Dioon edule	Mexico
Dioon mejiae	Honduras
Dioon spinulosum	Veracruz & Oaxaca, Mexico
Encephalartos altensteinii	Eastern Cape, South Africa
Encephalartos arenarius	Eastern Cape, South Africa
Encephalartos bubalinus	Tanzania; Kenya
Encephalartos cerinus	KwaZulu-Natal, South Africa
Encephalartos chimanimaniensis	Mozambique; Zimbabwe
Encephalartos cycadifolius	Eastern Cape, South Africa
Encephalartos eugene-maraisii	Northern Province, South Africa
Encephalartos ferox	KwaZulu-Natal, South Africa; Mozambique
Encephalartos friderici-guilielmi	Eastern Cape, South Africa
Encephalartos ghellinckii	KwaZulu-Natal, South Africa

Encephalartos gratus	Malawi; Mozambique
Encephalartos hildebrandtii	Kenya; Tanzania
Encephalartos horridus	Eastern Cape, South Africa
Encephalartos humilis	Mpumalanga, South Africa
Encephalartos inopinus	Northern Province, South Africa
Encephalartos kisambo	Kenya
Encephalartos laevifolius	Mpumalanga, South Africa
Encephalartos lanatus	Mpumalanga, South Africa
Encephalartos latifrons	Eastern Cape, South Africa
Encephalartos lebomboensis	KwaZulu-Natal & Mpumalanga, South Africa; Swaziland
Encephalartos lehmannii	Eastern Cape, South Africa
Encephalartos longifolius	Eastern Cape, South Africa
Encephalartos manikensis	Zimbabwe; Mozambique
Encephalartos middelburgensis	Mpumalanga, South Africa
Encephalartos msinganus	KwaZulu-Natal, South Africa
Encephalartos munchii	Mozambique
Encephalartos natalensis	KwaZulu-Natal, South Africa
Encephalartos ngoyanus	KwaZulu-Natal & Mpumalanga, South Africa; Swaziland
Encephalartos paucidentatus	Mpumalanga, South Africa; Swaziland
Encephalartos princeps	Eastern Cape, South Africa
Encephalartos senticosus	Mpumalanga & KwaZulu-Natal, South Africa
Encephalartos transvenosus	Northern Province, South Africa
Encephalartos trispinosus	Eastern Cape, South Africa
Encephalartos villosus	Eastern Cape, KwaZulu-Natal & Mpumalanga, South Africa
Encephalartos woodii	KwaZulu-Natal, South Africa
Stangeria eriopus	Eastern Cape & KwaZulu-Natal, South Africa
Zamia furfuracea	Mexico
Zamia integrifolia	Florida & Georgia (U.S.A.); Bahamas; Cuba; Caiman Islands
Zamia lindleyi	Panama
Zamia pumila	Dominican Republic; Florida (U.S.A.); Cuba

INTERESTING OBSERVATIONS ON CYCAS SEEDLINGS?

In my nursery I have observed many interesting leaf formations on seedlings, but recently I came across something, which I have never had before. Colour Figure 10 on p. 17 pictures a *Cycas* seedling with whitish-yellow pinnae. The midrib has retained its green colour, slightly more yellowish than normal. I wonder if this seedling will retain these leave characteristics to maturity and whether this is what a "golden" *Cycas* looks like. Or is this a form of variegation. In the same batch of seedlings I also picked up, what appears to be a so-called "crested" form. Colour Figure 11 on p. 17 shows the double pinnae of this plant. Again, I wonder if this characteristic would be retained to maturity.

Any comments would be appreciated.

Mornè Ferreira,
E-mail – **cycad@realnet.co.sz**
Cycad homepage : http://www.swaziplace.com/cycad

[The *Cycas* illustrated above is not really crested. Crested normally means that uncontrolled, cancer-like growth took place. What we have here, is dichotomously branched, split, or bifid leaves. Outside *Cycas* the only other living cycads to show this trait are a few species of *Macrozamia* including *M. diplomera* and *M. stenomera*.

It would seem that this trait is more common in *Cycas* than one may think. Certain species characteristically have branched leaflets, including *C. bifida, C. micholitzii, C. multipinnata*, and *C. debaoensis*. In other species it appears sporadically, for instance in *C. revoluta* as a very rare abnormality. It seems as if the gene(s) for this trait may be present in various species but its expression is uncommon. For instance, in Chen & Wang's *Cycads in China*, p. 248 (1996) an artificial hybrid between *C. revoluta* and *C. miquelii* with forked leaflets is shown, whereas neither of the parent species has forked leaflets. -**Piet Vorster**]

DEFORMED LEAVES ON AN *E. FEROX* CROSS.

Somewhere in the early 90's I bought a seedling of an *E. ferox* crossed with an unknown *Encephalartos*. From the first push of leaves it became clear that the plant had deformed leaves. With each new flush of leaves I have expected them to return to normal, but now as an adult plant I would guess that any new ones would, in future, probably be deformed. Some of the pinnae of this plant are double folded pinnae (Colour Figure 9 on p. 17), and most of the leaves lack many pinnae on either side of the rachis (Colour Figure 7 on p. 17). In Colour Figure 8 on p. 17 a normal pinna for this plant is pictured. I have heard from other growers that it is quite difficult to cross *E. ferox* with other *Encephalartos*. I wonder if this indicates that *E. ferox* is not closely related to most other *Encephalartos* species and that such a cross is just not meant to be. According to Nat Grobbelaar's article in *Encephalartos* **66**: June 2001, *E. ferox* is most closely related to *E. gratus* using the cladogram provided by Miss M.E. Coetzer.

Have any other grower experienced similar *E. ferox* crosses? Any comments would be appreciated.

Mornè Ferreira,
E-mail – **cycad@realnet.co.sz**
Cycad homepage : http://www.swaziplace.com/cycad

ENCEPHALARTOS HORRIDUS – CONE RECORD?

I believe that most cycad owners, like me, are always looking forward to the coning of their plants. It was, therefore, with great excitement when I noticed the coning of an *E. horridus* in my collection recently. What made this coning event even more pleasurable was the fact that three male cones had pushed their egg-heads through the crown (Colour Figure 5 on p. 16). As far as my knowledge of coning for these plants go, this is the first record of such a large number of male cones for this species. In Cynthia Giddy's "Cycads of Southern Africa" as well as in David Jones' "Cycads of the world", reference is made to solitary male cones. Douglas Goode does, however, state in "Cycads of Africa" that two male cones have been observed. I wonder if these authors were referring to plants coning in habitat and whether it may somehow be different for cultivated plants. Mention must also be made that the specific plant had undergone relocation, 8 months prior to coning. I have heard suggestions that stressed plants could react to such stresses by producing an abundance of cones.

Mornè Ferreira
E-mail – **cycad@realnet.co.sz**
Cycad homepage : http://www.swaziplace.com/cycad

DIOON THEFT IN OAXACA, MEXICO

It is with much sadness that I must report the following: while travelling in Oaxaca, Mexico in mid-January, 2002 I discovered that someone had recently stolen a dozen or so *Dioon purpusii* (Colour Figures 15, 16 on p. 18 show specimens of this species photographed by Piet Vorster in August 1999), from a locality near the highway leading into the Biosphere Reserve of the Canada de Cuicatlan. The remaining cut leaves were still somewhat green indicating that the poacher/s were there only days/weeks prior to my visit. If memory serves, the plants stolen were in the range of 15–40 cm tall. It was either the work of locals or someone travelling in Mexico sometime in December or January. The remaining leaves were clearly cut with pruning shears, not a machete, which suggests foreign rather than domestic perpetrators. This locality has been known since the seventies and is often referred to as the "road purpusii" locality. The original population probably consisted of no more than 50 plants and many of those were collected years ago. Now, after this latest theft, only a handful of plants is all that remains. While although the number of plants removed from habitat is not considerable, the great loss is the now critically-endangered population. Each and every separate cycad population in the wild represents both a genotypic and phenotypic outpost which can contain much valuable information on the natural history, biology, biodiversity, and evolution of the cycads. Thus, the extinction or near extinction of any cycad population can represent a serious loss to the world's cycad database. The loss of any independent population is a huge blow to the progress of present and future cycad research.

Perhaps, as some folks have suggested the poachers were local and not going to smuggle the plants abroad. Cycads in Mexico are not very popular ornamental items at present but I have heard first hand reports recently about street vendors and nurseries within Mexico selling wild collected plants. Such stories are becoming more frequent which is disturbing to say the least. The consequences to wild cycad populations from increased popularity within the country of origin can be devastating. Without international trade restrictions as a deterrent and with increased demand internally, rare cycads quickly become rarer and more

threatened *in situ*. I learned about a nursery in Cuernavaca, Morelos Mexico that was selling *Dioon spinulosum* with stems up to 3 meters tall! They were also selling huge *Dioscorea macrostachys*, the remarkable "turtle plant". Both species come from the same habitat in the state of Oaxaca which is currently under severe pressure. Obviously, such specimens were not grown from seed. Reports also confirmed that thousands of *D. edule* were being sold on the streets of Cuernavaca without roots or soil. Sadly, Cuernavaca is known as the garden city of Mexico and is the trend leader in tomorrow's nursery fashion throughout the country. Fortunately, the authorities were alerted to both the nursery and the street vendors and actions are being taken.

I just received a letter from the USDA informing me that as of January 2002, the USDA finally intends to enforce a regulation that has long been on the books but heretofore ignored. The regulation requires that a phytosanitary certificate from the country of origin must accompany all restricted plant materials such as CITES II seed for import into the USA. With respect to Mexico, this effectively means that no more *Dioon*, or *Zamia* seed can be imported into the USA without the documented permission and approval of agricultural officials; which effectively means that the unrestricted flow of *Dioon* and *Zamia* seed from Mexico into the USA has just ended. *Ceratozamia* is of course, CITES I and thus is subject to much greater restrictions.

I hope that I have not been complicit in the theft of these plants by leading cycad ecotours and showing people this locality. However, until such time as I can determine who is to blame, I feel compelled to suspend any further cycad ecotours into Mexico that would visit endangered populations of plants. It is appalling to think that anyone would so selfishly collect plants that were under no threat whatsoever. More remarkable is that they would take the chance to collect plants illegally in Mexico and then risk smuggling them across an international border especially in light of the recent cycad arrests and incarcerations. It is my intention to publicize this outrageous action in the hope of flushing out the perpetrator/s and hopefully prevent further such poaching of wild cycads. If anyone has information about this action, please contact me privately:

jchemnick@prodigy.net tel. (805) 965-0895 **Jeff Chemnick** 114 Conejo Rd. Santa Barbara, CA 93103

BESLAGLEGGING VAN ONWETTIG VERSAMELDE BROODBOME

Eenheid vir die Beskerming van Bedreigde Spesies
Tel: 012 8039900/7; Faks: 012 8038379

Ontvang 24 April 2002

OPERASIE STRYDOMTONNEL, LIMPOPO PROVINSIE

Die Eenheid vir die Beskerming van Bedreigde Spesies (EBBS) slaan toe op onwettige broodboomhandelaars by die Strydom-tonnel.

Gedurende Desember 2001 het lede van die EBBS onder bevel van Kaptein Gert van der Merwe met die hulp van Tzaneen Speurtak, lede van die Nasionale Parkeraad, Limpopo Provinsie Natuurbewaring asook lede van die gemeenskap 'n gesamentlike optrede geloods. Dit was al vir 'n geruime tyd bekend dat die plaaslike gemeenskap broodbome uit die Blyderivier Park steel en aan toeriste langs die R36 roete verkoop.

Die lede wat as voornemende kopers opgetree het is deur die verdagtes na verskeie wonings in die Laboeng gebied geneem. Tot ontsteltenis van almal was groot hoeveelhede broodbome, aalwyne en orgideë reeds uitgehaal en in die ruie bos langs die pad versteek. Die broodbome se blare was afgesny en gereed om verkoop te word.

Op een plek skaars 50 meter van die hoofpad het die wetstoepassers tot hulle ontsteltenis op sowat 300 aalwyne afgekom wat reeds in hope van 100 gepak was, gereed om gelaai te word.

In die daaropvolgende optrede is 12 persone gearresteer en beslag is gelê op sowat 94 broodbome, 326 aalwyne en 20 orgideë wat met boomstomp en al uit die natuur verwyder is. Sewe sake dossiere is by die Laboeng Polisiestasie geopen. Op die betrokke dag is die Polisiestasie se nuwe gebou deur die Nasionale Kommissaris van die SAPD, Komm. Selebi, geopen.

Weens die feit dat die broodbome blaarloos was is die plante eers deur die Limpopo Provinsie Natuurbewaring uitgeplant en sal dit so gou moontlik weer hervestig word. Op hierdie stadium word daar vermoed dat die plante *Encephalartos cupidus* en *E. inopinus* spesies was (Kleurfiguur 12 op p. 17).

Verskeie leidrade word opgevolg deur die EBBS van selfoonnommers wat in die besit van die verdagtes gevind is van persone wat in die verlede broodbome by die verdagtes gekoop het en na Gauteng vervoer het.

Kaptein Gert van der Merwe doen 'n beroep op die publiek om onder geen omstandighede broodbome aan te

koop van persone wat broodbome langs die pad verkoop. Die publiek word versoek om enige inligting in hierdie verband na die EBBS of die betrokke Provinsiale Natuurbewarings-organisasie deur te gee.

OPERASIE MAKETINI - KWAZULU-NATAL

Die EBBS het sedert Junie 2000, in samewerking met die KwaZulu-Natal Parke, 'n uitgebreide operasie geloods om smokkelaars met ivoor, renosterhorings, asook broodbome (Kleurfiguur 13 op p. 17) in KwaZulu-Natal te arresteer

Die grootste uitdaging was om die plaaslike bevolking en plaaslike hoofmanne te oorreed om inligting aan wetstoepassers te verskaf wat die broodboomstropers sou aan bande lê. Die bome wat uit die natuur gesteel word en aan versamelaars verkoop word vir hervestiging in tuine, is verlore vir die natuurlike kolonies en bedreig die voortbestaan van die broodbome in hul natuurlike habitat.

Onder bevel van inspekteur Enoch Matlaila het die EBBS en KwaZulu-Natal Parkeraad daarin geslaag om verskeie broodboomstropers te identifiseer en te arresteer voordat die broodbome die natuurlike gebiede kon verlaat.

Die volgende arrestasies het voortgevloei uit die harde werk van inspekteur Matlaila en sy span:

1. In die Mkuze-omgewing is beslag gelê op 84 *Encephalartos ferox* plante op 15 Junie 2000 en twee (2) persone is gearresteer.

2. Op 20 Augustus 2000 is beslag gelê op 162 *E. ferox* plante en een (1) verdagte gearresteer naby Emanguzi.

3. Op 6 April 2000 is een (1) persoon gearresteer en beslag gelê op 30 *E. lebomboensis* plante.

4. Gedurende Julie 2001 is beslag gelê op sowat 13 *E. ngoyanus* plante en een (1) persoon gearresteer

5. Een maand later is nog 'n persoon in dieselfde gebied van Ingwavuma gearresteer en beslag gelê op 'n verdere 15 *E. ngoyanus* plante.

6. Sedert September 2001 tot April 2002 is beslag gelê op 'n verdere 184 *E. ferox* plante en ses (6) persone is gearresteer.

Uit die gegewens kan duidelik gesien word watter aanslag op die natuurlike kolonies in Noord KwaZulu-Natal gedoen word.

Summary

CONFISCATION OF ILLEGALLY COLLECTED CYCADS BY THE UNIT FOR THE PROTECTION OF ENDANGERED SPECIES (UPES)

Members of the UPES under leadership of Captain Gert van der Merwe, with the aid of the Tzaneen Criminal Investigation Unit, members of the National Parks Board, Limpopo Province Nature Conservation and members of the local community confiscated 94 cycads (Colour Figure 12 on p.), 326 aloes and 20 orchids near the Strydom Tunnel, (probably poached in the Blyde River Park) Limpopo Province and arrested 12 persons. The leaves of the cycads were cut off by the poachers, but they are probably *Encephalartos cupidus* and *E. inopinus* species.

Since June 2000 the UPES in collaboration with KwaZulu-Natal Parks confiscated illegally collected cycads in Operation Maketini. Under leadership of Inspector Enoch Matlaila several cycad poachers were identified and arrested before they were able to remove the cycads from their natural area. In total 430 *Encephalartos ferox* (Colour Figure 13 on p.), 30 *E. lebomboensis* and 28 *E. ngoyanus* plants were confiscated and 12 persons were arrested.

Captain Gert van der Merwe appeals to the public not to buy cycads from persons selling them next to roads, and to pass on any information in this connection to the UPES or the relative Provincial Nature Conservation Authorities.

PROBLEMS WITH NATURE CONSERVATION AUTHORITIES / PROBLEME MET NATUURBEWARINGSOWERHEDE

THE CYCAD ENTHUSIAST AND CONSERVATION AUTHORITIES

Members of our Society often complain about the treatment they get from conservation authorities. Letters go unanswered, applications for permits get delayed or ignored, and sometimes officials are rude or outright threatening. In ***ENCEPHALARTOS*** **.64**: 5 (December 2000).we asked that members with such grievances contact Eric Heine who undertook to try and normalise relations.

What follows, are two items of correspondence between Maurice Levin who runs an import business in California, and Gauteng Department of Nature Conservation. This is not untypical of what happened to more than one of our

members in recent times.

This is not a declaration of war on conservation authorities, but as taxpayers who pay the salaries of government officials we are entitled to respect and to certain services.

We would be happy to print any responses or other expressions of views from conservation authorities.

REFERENCE

Anon. Problems with Nature Conservation. *Encephalartos* **64**: 5 (December 2000).
Vorster, P. Us and nature conservation. *Encephalartos* **62**: 10–11 (June 2000).

April 14, 2002

Ms. Joanne Yawitch
Gauteng Department of Nature Conservation
Diamond Corner Building, 68 Eloff & Market Street
Johannesburg, 2000
South Africa

Dear Ms. Yawitch,

Thank you for your letter dated April 4. I understand this letter was drafted by Leon Lotter.

Ms. Yawitch, I am working with a group of cycad growers, exporters, importers and hobbyists whose goal is to spread the message of artificial propagation to preserve cycads and educate people about them. One of my key associates, Douglas Goode, is the world-renowned author of Cycads of Africa, Volume I, which book I distribute in the USA. Douglas has consistently put forth a message of conservation and preservation. Our group furthers that message.

We are also members of the Cycad Societies of the USA and South Africa, which put forth a message of conservation and artificial propagation as a means to ensure the survival and thriving of these special plants. Just as you would shun poachers and illegal exporters, so do we. Moreover, in addition to the enforcement efforts your Department undertakes, we believe that the best way to save cycads is to meet demand for them through artificial propagation and legal export of plants, pursuant to the dictates of the Convention on International Trade in Endangered Species (CITES).

We are concerned, therefore, that Mnr. Lotter's letter, while well-intentioned, is replete with inaccuracies, factual misstatements and illogical conclusions. While his intention is hopefully to preserve cycads, unless we can all operate on a basis of factual accuracy and correct assumptions, an open an honest dialogue will be difficult, and your department, by being overly restrictive based on faulty assumptions, will motivate the very illegal activities you hope to prevent. I hope that you did not, in fact, review the letter's statements and assumptions carefully for their accuracy, because I am sure you would not want to be associated with a letter whose claims often have little basis in reality.

I will attempt, below, to clarify the current situation for you. Separately, I have attached my point-by-point responses and refutations of some of Mnr. Lotter's erroneous claims in the attached Appendix to this letter.

1. Our mission is to promote the beauty of South Africa, legally and morally, by bringing legally-acquired beautiful plants to the USA. Please don't punish us for the transgressions of others. In conjunction with a number of prominent United States citizens of African-American and European-American descent, we bring the wonders of South Africa to the U.S.A. We do so in a manner that conforms with all pertinent international laws, and which supports conservation, improved international relations, and mutual economic benefit to both countries. Our method of doing so, Ms. Yawitch, as decent, law-abiding cycad enthusiasts, is to trade in legally-obtained artificially-propagated plants. This legal trade has long been the goal and vision of CITES. While it is true that there have been a few people who have violated laws, others' transgressions does not validate your Department penalizing my colleagues and me by preventing legal exports of non-wild plants. I must say I was shocked when, in a telephone conversation on April 4, Mnr. Lotter accused me of "stealing our national heritage!" That he equates my CITES-endorsed trade in artificially-propagated species with theft is not only ridiculous, and an insult to my colleagues and me, it shows that Mnr. Lotter is either ignorant of international law, or willing to operate in callous disregard of it. How can you let this happen?

MAURICE LEVIN
9560 Gloaming Drive, Beverly Hills, CA 90210-1715 ◆ (310) 276-0137 ◆ Fax: (310) 859-0137
Website: http://CycadPalm.com ◆ Email: MauriceLevin@CycadPalm.com

2. Nature conservation, by overly restricting legal trade in cycads, harms the Gauteng economy and its workers. During my stay in your wonderful country, I visited numerous growers. I can safely state that, by unfairly restricting trade in these special plants, Nature Conservation harms the local economy and tragically encourages more poaching and illegal exports. People want these plants, and we can easily provide them legally through artificial propagation, if you will just allow this to take place. Moreover, further restricting or banning legal, CITES-approved, trade in artificially-propagated cycads harms South African citizens from all racial backgrounds who work in this industry. Do you really want Gauteng Nature Conservation to have the economic suffering of many poor citizens on its hands?

3. The export permit process has not been well-handled by Gauteng Nature Conservation. In addition to our application there are numerous pending applications that have been submitted to the Gauteng Nature Conservation Department for legal export of artificially-propagated cycads. However, not only have these applications not been approved, most have not even received the courtesy of a response! During my stay in your country, I have been generally quite impressed with how well your wonderfully multicultural South Africa works. What therefore amazes me is the unfortunately backward approach of Gauteng Nature Conservation, in this instance. Plants have not been inspected, phone calls have not been returned, and letters have gone unanswered. Only after months of inquiry, and numerous phone calls, emails and letters, have we gotten one response! And that response, indicates a virtual paralysis, and inability/unwillingness to proceed per the dictates of CITES, regarding artificially propagated plants. How can you allow this to happen?

4. Gauteng Nature Conservation's inaction and/or unfair actions will directly result in foreign exchange loss and unemployed workers. I know I can speak on behalf of many non-South Africans, who have sent money to growers, when I tell you that at least 1,000,000 Rand has been advanced for legally-grown cycads, currently exportable from Gauteng under CITES, with applications pending at your department. If these applications can't be processed, your department's inaction and/or unfair enforcement will result in all of these monies needing to be refunded to overseas buyers, and we will take our investment dollars to other countries and/or provinces where the authorities are willing to enforce CITES in a fair manner. This will mean a direct loss to the Gauteng economy. The affected Gauteng growers will have every right to hold your department directly responsible for their loss of income, and for the loss of foreign exchange to your country. To whom will their laid-off employees turn when they have lost their jobs?

5. The national and international cycad community will not stand by and allow a few well-intentioned but misguided individuals to cause this harm. Members of the U.S. and South African Cycad Societies, are well-known for our efforts to preserve species through artificial propagation. It is common knowledge that more cycads have been propagated artificially in the past 10 years than nature has produced in the last 1000 years! I would hope that your department is aware of these efforts, even though no mention was made of this in Mnr. Lotter's letter. Please understand that those of us who are committed to following the dictates of CITES, in terms of trade in artificially-propagated, legally-obtained cycads, will continue to question Gauteng Nature Conservation if your department elects to pursue unjust policies. We are prepared to appeal these unjust actions on a national and international level, until fair treatment is given to the decent, law-abiding and hard-working members of the cycad community.

Please re-evaluate your department's action and inaction in this regard, to remedy this problem to benefit nature conservation and the South African economy. . .

If, within the next week, an inspection of the plants has not been arranged, and the permit process re-activated, it will unfortunately become necessary for us to bring this matter to the attention of additional Provincial, S.A. National and International Authorities, as well as the local and national media, and the relevant trade and industry groups, in order to promote a public review of this issue. While I have no doubt that the permits for these artificially propagated plants will ultimately be approved, I hope we can do so in a mutually co-operative manner, to the benefit of all parties involved.

Sincerely,

Maurice Levin
Managing Partner

Cc: Ms. Sonja Meintjies
Dr. Patrick Matlou
Dr. Trish Hanekom

MAURICE LEVIN
9560 Gloaming Drive, Beverly Hills, CA 90210-1715 ◆ (310) 276-0137 ◆ Fax: (310) 859-0137
Website: http://CycadPalm.com ◆ Email: MauriceLevin@CycadPalm.com

Appendix—Response to Leon Lotter Letter Received Via Fax on April 5, 2002

1. In point #1, Mnr. Lotter makes an assertion regarding illegal exports and what Gauteng and the nation are doing to address this problem. A number of us are aware that you in South Africa have had problems in the past with illegal exports and poaching of endangered plants from the wild. However, I must emphasize that this problem you have does not have any bearing on us, as we have neither committed any of these illegal activities you mention, nor do we plan to. I must say that I am saddened that you paint us with the same brush as those vile poachers. Quite to the contrary, our goal is to encourage worldwide awareness and conservation through trade in legal, artificially propagated cycad plants. When Mnr. Lotter, over the phone, accused me of "stealing our national heritage," I was quite offended. Here I am, endeavouring to preserve these wonderful ancient plants through artificial propagation, and I get lumped in with the very criminals that the government should be chasing!

   As an aside, I question what quantitative data Mnr. Lotter possesses to back up his assertions that there has been a "serious increase in the illegal export of especially South African cycads." What hard data do you have to back up this claim, or is this merely a personal assertion being made based on solely anecdotal information?

2. In point #2, Mnr. Lotter introduces us to the "Biodiversity Working Group." Thank you for updating me regarding your inner workings. I appreciate that this is an important matter for discussion.

3. In point #3, Mnr. Lotter discusses further important inner workings of his groups. I appreciate that you need to get your hands around this problem.

   I question why individual decisions (or, indecisions) by a few officials are allowed to paralyze the entire Gauteng process for legal exportation of cycads. This reminds me of an exasperated parent, who decides to punish all the children because of the misbehaviour of one. What you are telling me here is that the situation is gone so out of control that you don't know what to do, so you propose to shut the whole thing down. Is it really that bad? Can't we address this as mature professionals?

4. In his point #4, again, Mnr. Lotter brings up claims of illegal export of wild cycads and/or cycad seeds. Aren't we talking about a very few incidents? Isn't someone exaggerating here a bit? Again, I must remind Mnr. Lotter that his illegal exporters have no bearing on or my associates. We're not poachers, and should not be treated as if we are. The inability to distinguish between our activities and those of criminals who truly are stealing your national heritage is a clear symptom that your Department's decision-making process must be re-evaluated.

5. In his point #5, Mnr. Lotter brings up, again, others' efforts to illegally export cycads. I must remind you and him, again, that we are not poachers or illegal exporters. We are a group of a United States and South African business persons trying to communicate the beauty of cycads by exporting garden-propagated seedlings and suckers from South Africa to the USA. Our goal is to spread the message about these beautiful ancient plants, while contributing to your country's employment of citizens of all races, and improving your balance of trade. Can't someone in your department please understand the difference?

6. Mnr. Lotter asserts that, as South Africa is a party to CITES, it must uphold the CITES agreements. That is a worthwhile goal, and I agree with him in totality. However, please inform Mnr. Lotter that CITES specifically includes provisions for the legal export and trade in cycads. Can't Mnr. Lotter and your department please abide by the provisions of CITES while you are all conducting your internal meetings? Why must you shut down your operation in the interim, harming numerous legal South African (Gauteng) business people in the process. At this very moment, I am aware of numerous other (at least 10) applications that have been made by other legal exporters of cycads which Mnr. Lotter's office is "sitting on". This is harming legitimate business people in your province and is harming your own government's efforts to expand overseas trade. Why?

7. Mnr. Lotter asserts in his point #7 "all South African species of cycad are classed as belonging to (CITES) Appendix I, which means that no trade in wild cycads may be allowed." May I remind Mnr. Lotter that the applications we are discussing, submitted on February 11, nearly two months preceding Mnr. Lotter's response letter, are for export of garden propagated cycads, not wild ones. I hope that Mnr. Lotter realizes that trade in artificially propagated cycads is deemed by CITES to be Appendix II, not Appendix I, for purposes of trade. CITES specifically allows trade in artificially propagated specimens. We all know that the February 11th application is for artificially propagated plants.

8. Mnr. Lotter addresses the requirement for nursery propagation of cycads to be traded. May I remind him that nursery conditions may be replicated by a private individual, i.e. garden plants where conditions similar to those in a nursery may occur.

MAURICE LEVIN
9560 Gloaming Drive, Beverly Hills, CA 90210-1715 ◆ (310) 276-0137 ◆ Fax: (310) 859-0137
Website: http://CycadPalm.com ◆ Email: MauriceLevin@CycadPalm.com

9. Mnr. Lotter asserts that "a wild cycad which has been planted in a garden or nursery is still a wild plant and may in terms of CITES not be traded with internationally." **This is factually incorrect.** To quote the CITES text:

> ***Article III, Part 2.*** *The export of any specimen of a species included in Appendix I shall require the prior grant and presentation of an export permit. An export permit shall only be granted when the following conditions have been met:*
>
> > *(a) a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of that species;*
> >
> > *(b) a Management Authority of the State of export is satisfied that the specimen was not obtained in contravention of the laws of that State for the protection of fauna and flora;*
> >
> > *(c) a Management Authority of the State of export is satisfied that any living specimen will be so prepared and shipped as to minimize the risk of injury, damage to health or cruel treatment; and*
> >
> > *(d) a Management Authority of the State of export is satisfied that an import permit has been granted for the specimen.*

While I have never traded in or requested permits to trade in any wild plants, I must question here whether the statement Mnr. Lotter makes is symptomatic of your entire department's view towards enforcement, or is his personal agenda to reinterpret CITES regulations in the most stringent manner. Or, is it just lack of information on what is to be enforced?

10. Mnr. Lotter makes assertions regarding the burden of proof on a nursery owner regarding artificial propagation. Please note that this burden applies to more than just commercial nursery owners. Per CITES, any other person who can prove that a cycad has been legally acquired and was artificially propagated may also trade in such. Mnr. Lotter implies that one must be a commercial nursery to be permitted for export. This is not so. In fact, any individual should be able to buy artificially-propagated plants from a nursery and export them.

11. Mnr. Lotter mentions the potential that there may be a requirement for compulsory registration of any nursery wishing to export cycads, with Provincial Authorities. However, that is not the rule now. Your province is currently paralyzing the export process by refusing to deal with export permits, which is not the professional way to implement the existing laws. Until such laws ore changed, I believe you should enforce the existing ones, including allowing the export of garden-propagated cycads.

12. Mnr. Lotter implies the future potential that only registered nurseries may be allowed to export cycads, and states the rules potentially enforceable there under. This has no bearing on our current situation, where we are wishing to export legal, artificially-propagated plants.

    Then Mnr. Lotter makes the most preposterous statement of the entire letter, claiming, "It is clear that we can not proceed with the export of cycads as before, due to the increased smuggling of cycads and the lack of effective and efficient control measures." Ms. Yawitch, this statement by Mnr. Lotter is an incorrect conclusion based on faulty reasoning. Not only is there no evidence presented to support Mnr. Lotter's statement regarding increased cycad smuggling, there is absolutely no logical connection between (a)increased smuggling and (b)the legal export of garden or artificially propagated plants. None whatsoever!

Later, reference is made to South Africa's risking its membership in CITES. I would fully expect that South Africa comply with the dictates of CITES. However, as you can see from my analysis above, it is clear that supporting artificial propagation efforts and trade in artificially propagated plants is in conformance with CITES. What South Africa has not done well enough, apparently, is to deter criminals from poaching and illegally exporting cycads. I venture that you are jeopardizing your CITES trade status by not doing enough to apprehend and punish illegal actions.

Regarding Mnr. Lotter's statement regarding my payment for a shipment, we did our research in advance, and, knowing CITES, we specifically arranged for artificially propagated plants, which are allowed for trade under CITES. This permit application is 100% in compliance with CITES conditions. I've had it reviewed by other officials, who have confirmed this. That Nature Conservation is "sitting on" our export application, and numerous others, is no excuse for contravening CITES dictates. Permitting artificially-propagated plants (my plants) to be exported will not incur you any risk. If it becomes necessary for us to appeal your department's decision to the national and international authorities, it will be proved that we have acted in a totally legal manner. You know this and I do, too.

MAURICE LEVIN
9560 Gloaming Drive, Beverly Hills, CA 90210-1715 ◆ (310) 276-0137 ◆ Fax: (310) 859-0137
Website: http://CycadPalm.com ◆ Email: MauriceLevin@CycadPalm.com

AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS

Office of the Head of Department

Diamond Corner Building, 68 Eloff & Market Street, Johannesburg
P O Box: 8769, Johannesburg, 2000

Telephone: (011) 355-1900
Fax: (011) 355-1459
Email: leoni@gpg.gov.za
Enquiries: Mr. Leon Lötter

A&A Cycads
9560 Gloaming Drive
Beverly Hills
CA 90210-1715

For attention: Mr. Maurice Levin

Dear Mr. Levin

APPLICATION FOR CITES PERMITS

I refer to your letter dated 19 March 2002 in the above regard, as well as the telephonic discussions you had with Mr Lötter and Ms Yawitch.

In general response to your letter, the following:

1. Over the past few years there has been a serious increase in the illegal export of especially South African cycads and cycad seeds, with the results of law enforcement and compliance operations reaching the media on a regular basis. For this reason the Law Enforcement and Permits Offices of the nine provinces were invited by the National Department of Environmental Affairs to a workshop during November 2001 where, *inter alia*, these issues were discussed and where some proposals concerning the future export of South African cycads were made.
2. The results of this meeting were forwarded to the Biodiversity Working Group, where they were further discussed in order to contribute to the formulation of national policy on the future export of South African cycads.
3. Two rounds of further meetings remain before we will be able to know the way forward on the export of South African cycads.
4. It is also clear to us that the theft of wild cycads out of their natural surroundings similarly has continued unabated, and this is being addressed together with our colleagues in other provinces, the SA Police Service and other law enforcement agencies.
5. Similarly the illegal export of cycad seeds is continuing, and the successful arrest at Johannesburg International Airport by Nature Conservation staff of a cycad seed smuggler during November 2001 supports this. Our law enforcement staff will be taking further steps to combat illegal trade in not only cycads but other natural commodities.
6. South Africa is a party to the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) and therefore has to uphold the CITES agreements.
7. According to CITES all South African species of cycad are classed as belonging to Appendix 1, which means that no trade in wild cycads may be allowed.
8. CITES provides that commercial trade in cycads may only occur in artificially propagated specimen, that is specimen which have been propagated under nursery conditions from approved and legally acquired parental stock.
9. It needs to be taken into account that a wild cycad which has been planted in a garden or nursery is still a wild plant and may in terms of CITES not be traded with internationally.
10. The burden of proof that cycads have been artificially propagated in a nursery rests with the nursery owner, that is to prove to the Management Authority that the parental stock has been acquired legally, and that the cycads for commercial use have indeed been artificially propagated.
11. Depending on the direction of the further discussions as referred to above, South Africa may well in the foreseeable future introduce measures as proposed by CITES to improve

the control of the export of artificially propagated cycads, by requiring compulsory registration of nurseries with the Provincial Nature Conservation authorities.

12. This may mean that only registered nurseries will be allowed to export artificially propagated cycads in future, that nurseries will have to prove legal acquisition of parental stock, that parental stock will have to be present in the nursery, and so forth. It is clear that we can not proceed with the export of cycads as before, due to the increased smuggling of cycads and the lack of effective and efficient control measures.

South Africa as a party of CITES has to ensure that the CITES requirements are fully met, otherwise CITES might ban all trade with South Africa. Such a ban will of course effect all traders in any CITES species. It is clear that CITES is very serious about this, as the existing trade bans against countries such as the Democratic Republic of the Congo, United Arab Emirates, Fiji, Yemen and other parties to the Convention indicate.

Referring specifically to your letter, I fully understand your concern that you have already paid for this consignment, and this is an unfortunate state of affairs, to pay for a consignment before the permits are approved and issued. As explained above we have experienced specific and serious problems with the export of cycads, which means that we have to revise our approach in this regard, especially since we do not wish to run the risk of facing a complete trade ban from CITES. Unfortunately the issuance of any kind of permit never is an automatic occurrence, and we are obliged to make sure that the CITES conditions as well as the other legal requirements are fully met.

In the light of the above reasons it will therefore unfortunately not be possible to process the application any further at this stage, until the policy issues have been resolved.

This office will keep your application in a file for this purpose, and will let you know of future developments regarding the future export of artificially propagated South African cycads.

Any inconvenience in the above regard is regretted.

Yours sincerely

J. Yawa H

Achng HEAD OF DEPARTMENT: AGRICULTURE, CONSERVATION, ENVIRONMENT AND LAND AFFAIRS
Date: 4/4/02

MAURICE LEVIN
9560 Gloaming Drive, Beverly Hills, CA 90210-1715 ◆ (310) 276-0137 ◆ Fax: (310) 859-0137
Website: http://CycadPalm.com ◆ Email: MauriceLevin@CycadPalm.com