

Journal of the Cycad Society of South Africa

ENCEPHALARTOS

Tydskrif van die Broodboom Vereniging van Suid-Afrika

No. 123

March 2016

ISSN 1012-9987



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ON THE COVER:

Encephalartos cycadifolius in the Winter Berg, Eastern Cape, producing ovulate cones. Photograph: Allan Tait.

CONTENTS

From the council / Van die raad

Van die President / From the President – J. Kloppers	2
The Cycad Society of South Africa: statement of financial position at 31 December 2014	3
Biography of John Kloppers / Biografie van John Kloppers	4
Sentraaltak van die Broodboomvereniging van Suid-Afrika – J. Kloppers	5
News from KwaZulu-Natal – D. Nel	6
News from the Lowveld – I. Vermaak	6
Nominations for the post of honorary Secretary-treasurer	8

Articles / Artikels

Reproduction in the Australian rainforest cycad <i>Bowenia serrulata</i> (Cycadales: Zamiaceae) – G.W. Wilson	9
Cycad Indaba Conference & Auction – R. van der Westhuizen.	14
Recent advances in the biological control of cycad aulacaspis scale – W. Tang and R.D. Cave	16
Report on an expedition to the Mangrove Islands and Northern Andes of Colombia in search of cycads: a pictorial report – P. Vorster and W. van Eeden.	19
Letters to the Editor/Briewe aan die Redakteur	23

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FROM THE COUNCIL / VAN DIE RAAD

VAN DIE PRESIDENT / FROM THE PRESIDENT

Hiermee wil ek graag die Raadslede bedank vir die vertroue wat hulle in my gestel het, om my as President te kies. Ek gaan my bes probeer om die pos van President met passie te vervul. Een van die belangrikste take van die Raad van die Broodboom Vereniging van Suid-Afrika is om die finansies van die Vereniging te beheer. Die hoofinkomste van die Vereniging is die ledegeld en skenkings, terwyl die grootste uitgawe die druk en verspreiding van ons kwartaallike joernaal, ENCEPHALARTOS is. Die ledetal is besig om jaarliks te krimp, dit beteken dat die huidige ledegeld amper nie die koste van die druk en verspreiding van die joernaal regverdig nie. Die ledegeld van R 250.00 per jaar, is nie eers een hamburger per maand werd nie. Omdat die ledegelde slegs eenmalig jaarliks betaal is baie lede geneig om dit te vergeet. Daar is tans die moontlikheid om jaarliks die ledegeld per debiet order te betaal wat heelwat probleme oplos. Ons lidmaatskap nommers is tans op 4123, en ons opbetaalde ledetal is hier om en by die 700 lede. Ek glo nie dat daar 3400 van ons ou lede oorlede of landuit is nie, tenminste 2000 lede moet nog bestaan. Met hierdie skrywe doen ek 'n ernstige beroep op ons bestaande lede om te help soek na die verlore skape, en ons moet hard probeer om hulle weer in die kraal te kry. Bring mense saam wat jy weet belangstel na die tak aangeleenthede, so kan ons heelwat nuwe lede te werf. Vir die lid wat die meeste lede werf skenk ek persoonlik aan die einde van die jaar 'n Encephalartos middelburgensis. Praat ook asb. met die lede van "Cycad Friends" ons wil hulle ook graag by ons intrek.

Soos julle reeds weet is ons in gesprek met die Staat wat betref wetgewing in die handel en verspreiding van Broodbome. Ons skakelbeampste Mnr. Japie Steenkamp verrig 'n reuse taak in die verband. Lede van die Vereniging het in 2015 'n paar vergaderings met die betrokke departemente bygewoon. Vir die eerste keer word ons insette by die vergaderings positief ontvang. As ons nie namens 'n paar duisend lede optree nie, beteken ons bydrae nie veel nie. As die drakoniese wette wat deur sommige individue voorgestel word ingestel gaan word, sal ons broodbome in tuine geen waarde hê nie. Daarom is dit van uiterse belang dat die Broodboomvereniging van Suid-Afrika met getalle ons stem dik maak. Soos ons ledetal tans daaruit sien, sal ons nie hond haaraf maak nie. Enige voorstelle of insette wat sal bydra om ons ledetal te vergroot sal hoog op prys gestel word.

'n Kommerwekkende saak is dat ons redakteur, Wynand van Eeden, sukkel om voldoende plaaslike materiaal te bekom om die joernaal elke keer vol te maak. Klagtes word ontvang dat daar te min oor ons eie broodbome verskyn, en dat daar te min artikels vir die beginner verskyn. Ek wil 'n beroep doen op ons ouer lede om hulle kennis te deel met jonger beginners lede. Dit hoef nie 'n tegniese artikel te wees nie, skryf oor uitkenning, bestuiwing, verplanting, suier verwydering, bemesting, besproeiing of selfs interessante broodboom staaltjies. Ook wil ek vra dat alle lede interessante broodboom foto's, of van broodboomverwant insekte instuur. Die voorskrifte aan outeurs asook die datums

I would like to thank the Board members for the confidence they placed in me by choosing me as President of the Cycad Society of South Africa. I shall do my best to fulfill the role with passion.

One of the most important tasks of the Board is to control the finances of the Society. The primary income to the Society is derived from membership fees and donations by members while the greatest expense is the printing and distribution of our quarterly journal, ENCEPHALARTOS. Membership numbers are busy decreasing on an annual basis and this means that the present income barely justifies the costs associated with the journal. The present membership fee of R250.00 per annum does not even constitute the cost of one hamburger a month. Because membership fees are a once-off payment annually, members are inclined to overlook the payment. There is the availability for local members to make their payments by debit order which could eliminate some challenges. The membership numbers which we are presently allocating are in the region of 4123, but our paid up local membership numbers are about 700. I do not believe that 3400 of our 'old' members have either passed away or emigrated. At least 2000 members should still be around. I urgently ask our existing members to help trace the 'lost sheep' and we should try our utmost to get them back in the pen. Please invite your friends who share your interest in cycads to attend branch activities so that we may recruit new members. I shall personally donate a specimen of *E middelburgensis* to the member who recruits the most new members by year end. Please also talk to the members of "Cycad Friends" so that we can get them to join us.

As most of you know, the Society is in discussion with Government regarding the legislation covering the trade and distribution of cycads. Our Liaison Officer, Japie Steenkamp is involved in this matter. Over the past year members of the Society attended a number of meetings with the relative department and it would appear as if our inputs are being positively accepted. If we cannot speak on behalf of a few thousand members, our contributions are meaningless. Should the draconian regulations, which are being proposed by some individuals, be implemented, it may mean that our cultivated cycads will become worthless. Therefore it is of the utmost importance that the Society has the numbers for the State to take notice. Any proposals or inputs which will contribute to the increase in numbers of members will be appreciated.

Another matter of concern is the fact that our editor, Wynand van Eeden struggles to obtain local material for publication in ENCEPHALARTOS. There are complaints that there are not enough articles relating to indigenous cycads and that there are also too few articles to be of assistance to beginners. I would like to ask our older members to please share their knowledge with the younger members. The articles do not have to be of a technical nature. They can cover species identification,

wanneer die bydraes moet in wees verskyn op die laaste bladsy van elke ENCEPHALARTOS.

Ons Sekretaris-tesourier, Ian Bassingthwaighte, verrig 'n reuse taak om die ledelys op datum te hou maar dit is baie moeilik as lede hom nie in kennis stel van adres of e-pos veranderings nie. Dit is ook belangrik dat ledegelde vroeg in die jaar te betaal word om sodoende aanmanings onnodig te maak. Besoek asseblief die webblad van die Broodboom Vereniging van Suid-Afrika, www.cycadsociety.org en lewer insette aan ons Webmeester, Pieter van der Walt. Sy taak is ook van uiterste belang om meer lede te werf en om lede op hoogte van sake te hou. Hy werk tans daaraan om lidmaatskap aansluiting op die webblad moontlik te maak.

Broodboom groete,
John Kloppers

fertilisation, transplanting, sucker removal or irrigation or even interesting stories relating to cycads. I would also like to ask members to submit interesting cycad photos or photos of cycad related insects. Before doing so, however, please read the 'instructions to authors' appearing on the inside of the back cover of ENCEPHALARTOS or contact Wynand for instructions.

Our Secretary-treasurer, Ian Bassingthwaighte has a massive task in trying to keep the membership list up to date and members can assist by remembering to let him know of any changes in addresses, cell numbers or e-mail addresses. It is also important that members pay their fees by cut-off date, as it is very expensive in deed to continually have to send out 'reminders' for payment. Please visit our website www.cycadsociety.org and send any comments/suggestions to our webmaster, Pieter van der Walt. His job is to keep members informed as to what is happening with matters relating to cycads and he is presently working on a system which will allow members to join the Society via the web page.

Cycad greetings
John Kloppers.

THE CYCAD SOCIETY OF SOUTH AFRICA STATEMENT OF FINANCIAL POSITION AT 31 DECEMBER 2014

Notes	2014 R	2013 R	2012 R
ASSETS			
Non-current assets			
Property, plant and equipment	2	6	6 268
Current assets			
Inventories	3	72 865	83 741
Cash and cash equivalents	4	665 161	686 516
		738 026	786 829
		738 032	776 525
Total assets			
EQUITY AND LIABILITIES			
Capital and reserves			
Accumulated reserves		698 703	705 820
Current liabilities			
Trade and other payables	5	39 329	70 705
		738 032	786 835
		738 032	776 525
Total equity and liabilities			

Members who want to see the complete financial report can request it in electronic form from Ian Bassingthwaighte, our secretary-treasurer.

BIOGRAPHY OF JOHN KLOPPERS / BIOGRAFIE VAN JOHN KLOPPERS

John Kloppers is a plant fundi par excellence as evidenced by his four hectare garden. He inherited his love of plants from his mother who acquired her first cycad in 1936 when she was resident in Pietermaritzburg. John was born there on 27 April, 1940 and in 1941 his parents moved to Marble Hall in order to assist his grandfather in running his store. In 1945 his parents moved to the adjacent village of Groblersdal and began farming on "Kleinwaterfontein".

John matriculated in 1957 at the Ben Viljoen High School in Groblersdal and he did his compulsory military training at the Air Force Gymnasium in Lyttelton. His tertiary education comprised of a two-year agricultural diploma gained at the Potchefstroom Agricultural College. In 1959 his parents took over the Ford Motor agency in Groblersdal and John joined the business. Through studies at the apprenticeship training school he was able to progress from mechanic, store man and salesman to being manager of the Marble Hall Ford agency.

In 1966 the Ford agencies were sold and John went into farming together with his father and brother-in-law on land irrigated under the "Loskop Dam" irrigation scheme. The main crops were citrus, tobacco, cotton and vegetables. John was a board member of the Loskop Dam Citrus Co-operative for many years and also served as vice chairman and Chairman. He was also a member of the Citrus Exchange and served as Secretary of the Loskop Agricultural Union. In 1968 John married Maryna and she is just as interested in plants and gardening as he is. In 1970 he began farming on his own on the farms "Kleinwaterfontein" and "Welgevonden" when his father retired. At that stage the garden on the farm continued to expand to such an extent that his father built a wall around it to prevent his mother from further encroaching on the farm lands. At about this time a keen interest was developed in the collection of cycads and John travelled to Rhodesia, Mocambique, Swaziland, the Northern Transvaal and Eastern Cape in order to expand his collection. He remembers doing deals with names such as Sally "Cycad" Geldenhuys, Sep Groenewald, Emden Pienaar, Pieter Wolmarans, Bruce Burse, Ita van der Walt, Bill Armstrong and Prof Nat Grobbelaar, amongst others, who are now considered as legends amongst the cycad fraternity.

There are presently 1350 cycads in the "Kleinwaterfontein" farm garden and the numbers are made up of species found world-wide. The nursery contains eight hundred *Encephalartos manikensis* from sixty different localities in Mozambique. There are three different leaf variations of *E. middelburgensis* and twenty four different variations of *E. natalensis*. There are also a number of variations of other species in the collection which has been built up with the utmost care over the past eighty years.



John Kloppers is by uitstek 'n plant-liefhebber waarvan sy vier hektaar tuin kan getuig. Hy het die liefde vir plante van sy moeder geërf wat reeds in 1936 haar eerste broodbome bekom het in Pietermaritzburg waar John ook gebore was op 27 April 1940. Sy ouers het in 1941 na Marble Hall verhuis om in sy oupa se winkel te gaan uithelp, hulle het toe in 1945 na Groblersdal verhuis om te begin boer op Kleinwaterfontein.

John het in 1957 gematrikuleer by Ben Viljoen Hoërskool, Groblersdal. Hy het sy weermag opleiding in die Lugmag Gimnasium te Lyttelton voltooi. Daarna het hy 'n twee jaar landbou diploma by Potchefstroom Landbou Kollege voltooi. Sy ouers het in 1959 die Ford agentskap in Groblersdal oorgeneem

en John het toe daar deur die motor opleidingskool homself opgewerk van werktuigkundige, stoorman, verkoopsman tot bestuurder in die Marble Hall Ford-agentskap.

In 1966 is die twee Ford Agentskappe verkoop en John het saam met sy vader en swaer in die boerdery bedryf op agt Loskopdam persele begin boer. Die hoof oeste was sitrus, tabak, katoen en groente. John was vir jare op die Loskopdam Sitrus Koöperasie se raad en het as Vise-voorsitter en Voorsitter gedien. Hy was ook jare lank op die Sitrus beurs en Sekretaris van die Loskop Landbou Unie. In 1968 is John met Maryna getroud, sy het net soos hy ook groot liefde vir tuinmaak en plante. In 1970 het hy op sy eie begin boer op die plase Kleinwaterfontein en Welgevonden toe sy vader afgetree het. Op daardie stadium het die tuin net aanhou groei, soveel so dat John se vader 'n muur daarom gebou het om sy moeder uit die lande te hou. Die familie het toe ernstig begin broodbome versamel. John het toe ook in 1970 in Rhodesië, Mosambiek, Swaziland, Noord Transvaal en die Oos-Kaap gaan plante versamel. Hy het plante uitgeruil en versamel saam met oud legendes in die bedryf soos Sally Cycad Geldenhuis, Sep Groenewald, Emden Pienaar, Pieter Wolmarans, Bruce Burse, Ita van der Walt, Bill Armstrong, Prof. Nat Grobbelaar en nog vele meer.

Daar is tans 1350 broodbome in die Kleinwaterfontein plaastuin. Dit sluit spesies van oor die hele wêreld in. In die kwekery is daar byvoorbeeld agthonderd *E. manikensis* van sestig verskillende lokaliteite in Mosambiek. Daar is drie verskillende blaarvorms van *E. middelburgensis* en vier en twintig verskillende blaarvorms van *E. natalensis*, van heelwat ander spesies is daar ook verskillende blaarvorms. Hierdie versameling en tuin is met liefde vir plante opgebou oor die afgelope 80 jaar.

Ander spesies wat in die boomryke tuin voorkom is 82 palm-spesies, 51 sansevieria-spesies, 50 aalwyn-spesies, 50 kaktus-spesies, 30 agave-spesies, ± 600 bromeliad-spesies, 150 orgideë-spesies en nog baie ander, te veel om op te noem. Heelwat plantverenigings het oor die jare die tuin besoek.

Other plants found in the garden are 82 different palm species, 51 *Sansevieria* species, 50 *Aloe* species, 50 cactus species, 30 *Agave* species, +/- 600 bromeliad species, 150 orchid species to name but a few. The garden has attracted numerous visitors from the various plant societies over the years.

John also took part in sport in his younger days and played first team tennis for his school. He boxed for the Defense Force in 1958 and 1959 and played hockey for the Western Transvaal in 1960. He played on a 6 handicap in golf, served on the Groblersdal Golf Club committee for 28 years and also served as Chairman and President of the Club.

In 1997 John retired from farming and now both he and Maryna are able to spend more time on their home and garden. He is still a member of 5 different plant organisations and attends most of their meetings. In 2000 John took over as Treasurer of the Central branch of the Cycad Society of SA and between 2010 and 2016 he also assumed the duties as Chairman of the branch.

John het ook aan verskeie sport soorte deel geneem en op skool het hy eerste span tennis gespeel, in 1958 en 1959 vir die weermag geboks en in 1960 vir Wes Transvaal hokkie gespeel. Hy het 'n ses voorged in gholf behaal en het 28 jaar op Groblersdal Gholfklub se komitee gedien en was vir jare die voorsitter en later ook president van die klub.

In 1997 tree John uit die boerdery en hy en Maryna spits hulle voltyds toe op die huis en tuin. Hulle sluit ook aan by vyf verskillende plant verenigings en woon al hulle byeenkomste by. In 2000 neem John oor as Tesourier van die Sentraaltak en van 2010 tot 2016 is John Voorsitter en Tesourier van die Sentraaltak.

SENTRAALTAK VAN DIE BROODBOOMVERENIGING VAN SUID-AFRIKA

John Kloppers

Op Saterdag 14 November het 72 lede van ons tak hulle jaarlikse afsluiting gehou by Exclusive Cycads te Pretoria. Ons Jaarlikse spitbraai is voorafgegaan met 'n tak vergadering waar die volgende op die agenda was:

Jaarprogram vir 2016

- Algemene Jaarvergadering by Exclusive Cycads op 16 Januarie 2016
- Tak Broodboomveiling 30 April tot 1 Mei 2016
- Toer na Limpopo 15,16 & 17 Oktober 2016
- Jaareinde Afsluiting by Exclusive Cycads 13 November 2016.

Verslae en Sprekers

- Verslag deur Japie Steenkamp oor vordering in verband met broodboom ordinansies
- Verslag deur Ian Bassingswaighete oor lede gelde en lede getalle
- Verslag deur John Evert oor afgelope lede toer na Natal
- Skyfievertoning deur Allan Tait oor die Wes-Kaapse lede toer na die Oos-Kaapse Broodbome.

Verkieping van nuwe Bestuurslede vir 2016 tot 2018

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Na die afsluiting was daar geleentheid om plante te koop van ons lede verkoping. Die tombola "raffle" was gehou waar lede geskenkte plante kon wen.

Hierna het ons lede weggelê aan die heerlike skaap op die spit met bykosse aangebied deur La Oma Slaghuis. Die ete het lede slegs R60.00 per kop gekos met gratis wyn ingesluit wat deur die tak voorsien is.

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NEWS FROM KWAZULU-NATAL

Danie Nel

Looking back over 2015 it was quite a fruitful year for our society. We had four meetings with guest speakers and during April the members from Gauteng surprised us with a visit. We joined them and visited five private gardens, two botanical gardens and the habitat of the Berg form of *Encephalartos ghellinckii*.

A large number of cycads were donated to the KwaZulu-Natal Botanical Garden in Pietermaritzburg and our members were involved in creating a cycad garden where these can be planted. This project is still going and we hope to finish it soon.

We were allocated a stand at the Garden Show held from 24 to 26 September and it won us a Gold Award. We are very happy with this achievement and want to thank everybody who helped to make this happen.

Our meetings are well supported by our members and one member was awarded Life Membership. The chairman said that 2016 will be an even better year for KwaZulu-Natal.

NEWS FROM THE LOWVELD

Ina Vermaak

In a previous edition of ENCEPHALARTOS we saw pictures of *Encephalartos* species from tropical Africa and here are a few more to illustrate these beautiful plants. These pictures were taken by Sten Culverwell in habitat. He gave a very interesting talk to our members on his adventures in Africa to see these plants.



Figure 1. *Encephalartos barteri* ssp. *allochrous*, Nigeria. The copper colour of the new emerging leaves is characteristic of this species. These plants occur in the northern part of Nigeria.



Figure 2. *E. barteri* ssp. *barteri*, these plants occur the southern part of Nigeria.



Figure 3. Chilindze, Tanzania. This is a new locality discovered about 40km west of the town of Chilindze in Tanzania. The appearance is very similar to *E. hildebrandtii* but there are clear differences.



Figure 4. *E. gratus*, Mozambique. Two beautiful plants photographed at a house in Mozambique.



Figure 5. *Encephalartos kanga*, Tanzania. A beautiful, robust specimen growing on Mount Kanga, an isolated hill of the Nguru Mountains.



Figure 6. *E. kisambo*, Kenya. The rocky outcrop is characteristic of the habitat of *E. kisambo*.



Figure 7. *E. turneri*, Mosambique. A granite hill, typical of its habitat.

NOMINATIONS FOR THE POST OF HONORARY SECRETARY-TREASURER

After more than ten years in the post, Ian Bassingthwaite has decided to lay down his pen as he feels that a younger person with fresh ideas should take over running of the Cycad Society. He has also recently developed some health issues which prevent him from giving the administration all the attention it requires. Should you wish to nominate a member of the Society or volunteer for the position, please contact Ian or Wynand van Eeden, the editor of ENCEPHALARTOS. You are also welcome to contact Ian in order to discuss the matter.

Ideally, the incumbent should be retired or semi-retired; have some knowledge of the various Microsoft

programs, some book keeping knowledge and be able to communicate in both Afrikaans and English.

As Ian has built up a support structure over the years in and around the area where he lives, in the northern parts of Pretoria, such as printers for the journal, processors of the debit orders and postal authorities, it would be beneficial if the 'new' incumbent also lived in the area, although this is not a requirement. Finally, if the person has some storage space where back issues of the journal could be kept, this would also be an advantage although, again, not a necessity.

REPRODUCTION IN THE AUSTRALIAN RAINFOREST *CYCAD BOWENIA SERRULATA* (CYCADALES: ZAMIACEAE)

Gary W Wilson *

ABSTRACT

This paper describes reproduction in the rainforest cycad *Bowenia serrulata* (W. Bull) Chamberlain (Cycadales: Zamiaceae). *Bowenia serrulata* is restricted to a mesotherm refugium at Byfield in central Queensland, Australia. It is dioecious and male plants produce cones annually and females produce cones supra-annually. Pollination occurs immediately prior to the onset of wet season and is entomophilic; the vector is *Miltotranes subopacus* (Lea) (Coleoptera: Curculionoidea), which has a mutualistic 'brood-site reward' association with *B. serrulata*. The weevil aestivates in the soil between reproduction events of the plant. Pollen viability in the plant is high ($\bar{x} \pm SD = 91.4\% \pm 1.64$); a mean 61% (range 30-95) of ovules in cones (N = 12) are fertilized and mean seed viability is 80% (N = 90). Intraseminal growth of embryos continues until germination of seed in the following wet season. Animals remove the sarcotesta of mature seeds and trials indicate this is necessary for germination to occur. Dispersal of seeds is limited and predation of them is <5% (N = 567); mast seeding does not occur. Despite being locally common, the small area of occupancy, species-specific pollination syndrome, loss of habitat to clearing, and long-term effects of harvesting of leaves and seeds are concerns in the persistence of this species.

INTRODUCTION

Cycads are 'flagship species' for conservation biology (Given 1994; Meffe and Carroll 1997). They are an ancient lineage of plants with unusual life histories including insect pollination mutualisms, generally restricted distributions, >50% of species are threatened (Donaldson 2003, 2004) and many are of interest to plant collectors. The Queensland Environmental Protection Agency (QEPA) reviewed the status of cycads in their *Back on Track Program* using the criteria described in Marsh *et al.* (2006). The program considers (a) the likelihood of extinction, (b) the effects of extinction, and (c) the social costs of extinction of species, and assigns a revised IUCN status to them. For an effective assessment of the likelihood of extinction of a taxon, knowledge of the ecology and success of reproduction is required; this paper presents this information for a previously data-deficient tropical rainforest cycad.

Bowenia serrulata (W. Bull) Chamberlain (Zamiaceae) is restricted to the understorey of rain forest and adjacent tall moist forest at Byfield in central Queensland (Figure 1). The area of extent derived from collections in the

Queensland Herbarium using minimum area convex polygon (MCP) analysis in ARCView 3.2 (ESRI 1992-1993) is 11700 ha. The area of occurrence of *B. serrulata* is 120 km². Some habitat previously occupied by this species has been cleared for horticultural and forestry purposes. *Bowenia serrulata* has a branching subterranean caudex, multipinnate foliage to 1.5 m, and leaflets with serrate margins and pungent 'drip tips'. The pollination vector is *Miltotranes subopacus* (Lea) (Coleoptera: Curculionoidea), which aestivates in the soil between reproduction events in the plant (Wilson 2002).

Reproduction is an energy-expensive activity and there is a paucity of data about it in cycads, which are non-flowering seed plants that produce cones that persist for many months. Plants in the understorey receive 0.5-3% of photosynthetically active radiation (PAR) incident on the canopy (Torquebiau 1988; Canham *et al.* 1990; Turton 1990; Leigh 1999), usually during brief periods due to shading by the canopy (Chazdon 1988; Chazdon and Pearcy 1991). As a result, light is a limiting resource for both understorey taxa and juveniles of canopy species in tropical rainforests (Stiles 1975; Chazdon 1986;

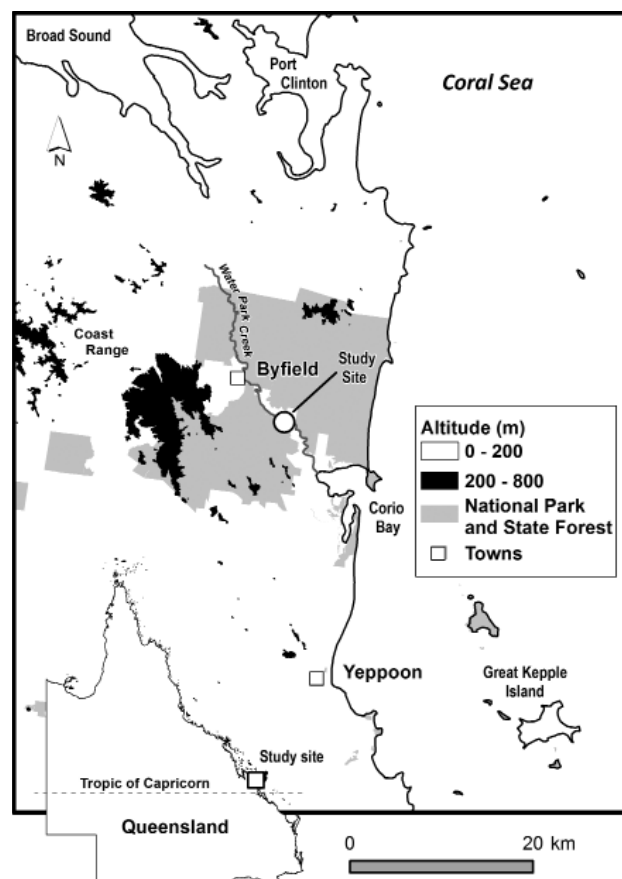


Figure 1. Map of the location of the *Bowenia serrulata* study site at Byfield in central Queensland in Australia.

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Chazdon and Fletcher 1984; Leigh 1999; Wright and van Schaik 1999). This is dramatically demonstrated in the latter by their rapid growth when 'light gaps' occur in the canopy but is less apparent in the former.

Effective reproduction in plants infers pollination and seed dispersal vectors are functioning, gene flow is occurring and populations display a range of age classes. In long-lived taxa such as cycads, the loss of pollination and/or seed dispersal agents or functioning metapopulations may not be apparent for many years and the species has entered an extinction vortex (Gilpin and Soulé 1986). A review by Foster (2004a) indicates this has occurred in some populations of species of *Cycas* and *Macrozamia* in Queensland.

Cycads contain toxins, including azoxyglycosides (De Luca et al. 1980; Siniscalco 1990), β -methylamino-L-alanine (Vega & Bell 1967; Charlton et al. 1992; Castillo-Guevara and Rico-Grey 2003) and phytoecdysones (Harborne 1988) and mucilage (Siniscalco 1990) that cause animal interactions with them to be specialized. For example, in Australia, pollination is euphilic in *Bowenia* spp. (Wilson 2002), *Macrozamia macdonnellii* (Mound and Terry 2001) and *Lepidozamia peroffskyana* (Hall et al. 2004), with the vector in a 'brood-site reward' association, *sensu* Faegri and Van der Pijl (1979), with the plant in each case.

Bowenia serrulata is protected in Queensland under the *Nature Conservation Act* (NCA) 1992, where it has a Least Concern status, a *Back on Track* (BoT) status of Critical, and is included in Appendix II of CITES. In Queensland, it is known as the Byfield Fern and foliage and seed has been harvested under permit for the 'cut flower' market and supply to nurseries. Queensland Forest Service records show 700 kg of seeds and c. 440,000 leaves were harvested in the period 1981-91 (Adams *in litt.* 1992). The impact of this harvesting on the persistence and population-dynamics of this species is unknown.

METHODS

A study of *Bowenia serrulata* was conducted in 1991-1998 in rain forest adjacent Waterpark Creek (22°52'00"S, 150°42'00"E) near Byfield in central Queensland. Preliminary surveys indicated the site was in core habitat of *B. serrulata*. Nursery and laboratory investigations were conducted in 1991-1995 at Central Queensland University in Rockhampton.

Site data

The site has a mean annual temperature of 21.4°C and coolest month (July) mean minimum of 10.6°C. The mean annual rainfall is 1745 mm (N = 45 years) with a warm Wet Season (>75% of rain) in December through April, and a cooler Dry Season in the remaining seven months. The site is in Regional Ecosystem 8.3.1b: *Evergreen notophyll feather palm vine forest*, with a Vegetation Management Act (1999) status of 'Of Concern', a Biodiversity status of 'Endangered' and the extent protected in reserves is Low (REDD 2015).

Field studies

Forty randomly selected plants were identified using numbered aluminium tags tied with copper wire to

steel posts driven into the soil. Due to the subterranean branching habit of *B. serrulata*, the caudex was exposed to confirm each was a single plant. Plants were inspected once a month from 1991 to 1994, bimonthly in 1995 and 1996, and in March and November of 1998. Production and development of cones, time of pollen dehiscence in male cones and receptivity in female cones, activities of insects, and production and dispersal of seed were recorded. Air movement about 10 dehiscing male cones was measured using an anemometer (Kestrel 1000, Nielsen Kellerman) on ten occasions in each of four years to ascertain if movement of pollen by air was likely. To ascertain if long distance i.e. >50 m, *sensu* Cain et al. (2000), dispersal of seeds occurs, a comparison of mean number of seeds in 10 intact cones and those within two metres of 10 collapsed cones was made using Student's T-test (SPSS, Coakes and Steed 1995). In addition, 500 plants were surveyed in November in 1991-98 to ascertain the production and ratio of male and female cones in the population.

Nursery and laboratory studies

Pollen viability was tested in germination trials in 1992 and 1993 to see if low viability is a limiting factor in reproduction in *B. serrulata*. Pollen freshly removed from mature cones from two plants in each year was incubated at 28.5°C for 24 hours on two plates of Brewbaker-Kwack medium (Brewbaker and Kwack 1963). Assays of pollen germination were made by scoring five samples of 50 pollen grains from each plant using a microscope at 100X and calculating a mean value for each year. To ascertain seed viability, germination trials were conducted of 10, 20, 40 and 30 seeds respectively in 1991-94. The seed was collected >500 m from the field site to avoid perturbation of the study population and the trials conducted *ex situ* to avoid the difficulties of locating and monitoring previously-marked seed that may have been dispersed or cached by animals. The sarcotesta was removed from seeds, except a control of 10 in 1992, to replicate the situation in seeds in the field immediately prior to their germination. The size, weight, volume, and percentage weight of the sarcotesta of the seeds was recorded. Seeds were planted to half their depth in coarse sand in trays in a greenhouse with 20% sunlight and a temperature and precipitation regime similar to the collection site. In addition, in 1995-6, seeds collected from mature cones were dissected at one-month intervals to examine infraseedling growth of the embryo.

RESULTS

Growth of cones commences in July or August, early in the Dry Season, when mean maximum and minimum temperatures are lowest for the year. Female cones are receptive and male cones shed pollen in mid-November through December, immediately prior to the onset of the Wet Season (Figure 2). Measurements detected low levels of air movement about male cones (\bar{x} = 0.26, range 0.0-1.5 m/s) and most pollen produced falls to the ground about them. The cones then collapse due to damage by *M. subopacus*, which breeds in and feeds on the tissue of them, and the effects of the first heavy rain of the Wet Season. No male cones are present in the period January through July. Female cones shed seed in April through July.

♂	cone growth				pollen dehiscence and cone death								cone growth				pollen dehiscence and cone death							
	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
♀	cone growth				pollination • fertilization • seed shed												seed germination —							
	infraseginal growth																							

Figure 2 The reproduction cycle of *Bowenia serrulata* (months in the wet season indicated by gray shading).

The surveys of 500 plants in each of eight years showed more males (range 8.5-35%) than females (1.25-4.0%) produced cones (Figure 3). Fourteen (35%) of the 40 marked plants produced male cones and four (10%) produced female cones in the study period. One female plant produced two cones in one year but none the next and a second plant produced one cone in successive years; both plants were growing in a higher light regime on an abandoned vehicle track. In 1991, 35% of 500 plants produced male cones following 127 and 138% of mean rainfall in the two preceding Wet Seasons but a similar increase in production of female cones did not occur in this or following years. Ten cones produced a mean of 23 ovules (range 11-42) and 61% (range 30-95) of them were fertilized. The sarcotesta of seeds changed from green to pink/lilac in colour and softened and emitted a 'fruity' bouquet reminiscent of ripe pineapple as they matured. Cones with coloured seed were broken apart by foraging animals or the pressure exerted by the maturing seeds. In respect of seed dispersal, there was no significant difference in the mean number of seeds in the 10 collected cones and those within two metres of 10 collapsed cones at the study site ($t = -0.60$, $df = 18$, $P = 0.5554$) and thus no indication of long distance seed dispersal.

Eighty seven percent (493 of 567) of seeds of *B. serrulata* examined at the study site had the sarcotesta partially or wholly removed by animals. Teeth marks on the sclerotesta indicated small marsupials or rodents were most often responsible but from canine tooth impressions it was determined the larger Common Brushtail Possum, *Trichosurus vulpecular*, was responsible in c. 5% of occasions. Predation of seeds is low with the sclerotesta broached in only 5% of the 567 seeds examined and <1% had endosperm removed.

Pollen viability was high ($\bar{x} \pm SD = 91.4 \pm 1.64\%$, $N = 1000$) and the germination trials indicated a mean seed viability of 80 % (range 70-95%, $N = 90$). In

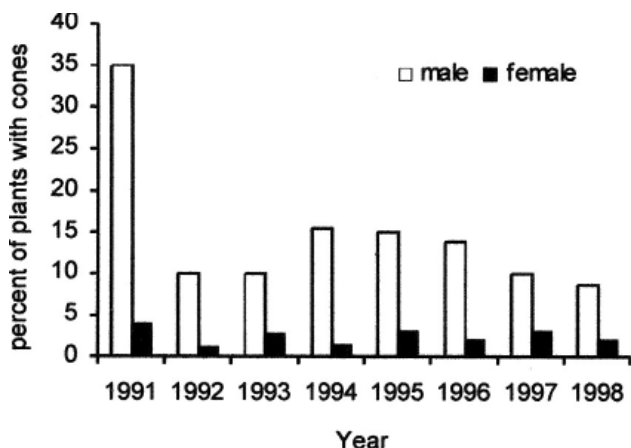


Figure 3 Production of male and female cones by plants of *Bowenia serrulata* at Byfield in the period 1991-98.

the nursery trials seeds with the sarcotesta removed germinated in November through March, that is, in the Wet Season, and in synchrony with those in the field. None of the ten seeds with the sarcotesta left intact germinated in the two years of trials and all rotted in the third. The 90 seeds in the germination trial had a mean ($\pm 1SD$) size of $31.0 \pm 3.4 \times 4.95 \pm 2.14$ mm and weight of 14.8 ± 5.05 g with the sarcotesta intact and 8.8 ± 2.01 g with the sarcotesta removed; the sarcotesta contributed a mean 40.7% of seed weight. Mean volume ($\pm 1SD$) of seeds after removal of the sarcotesta was 7.55 ± 0.83 mL. The dissection of seeds confirmed infraseginal growth of the embryo, with maximum size attained four months after seed shed and immediately prior to germination in the Wet Season.

DISCUSSION

The data show reproduction in *B. serrulata* occurs on an annual cycle at a population level but production of longer-retained and more energy-expensive cones by female plants is generally supra-annual. The latter fact suggests light is a limiting resource in the production of them. That the eight years of the study was insufficient to allow the ratio of male and female plants in the population to be determined emphasizes production of cones by female plants is a rare event. These results concur with those of Clark and Clark (1987) for *Zamia skinneri* (sic) in Costa Rica and are indicative of a shade-tolerant species in a late succession ecosystem.

The production on a regular cycle of cones maximizes the likelihood of pollination in this obligate-entomophilic species as the vector is involved in a mutualistic brood-site reward association with it. However, regular production of seed also presents opportunities for higher levels of predation. A potential response to this is to mast seed on a temporally irregular or widely spaced basis to both lessen expectation in potential predators and to satiate them when it does occur. Mast seeding occurs in some cycad taxa, e.g. *Encephalartos* in Africa (Donaldson 1993) and *Macrozamia* in Australia (Ballardie *et al.* 1986; Forster 2004b) but the data in this study indicate it does not occur in *B. serrulata*. This, and the low rate of predation of seeds, suggests the toxins in them are sufficient to dissuade potential predators and mast seeding is not necessary. It is likely the number of female cones available at any one time is so low that no predator species has had the opportunity or need to acclimate to them as a regular or important component of their diet.

However, the large, coloured propagules of *B. serrulata* are typical of those dispersed by animals. The trial results showing germination of seeds occurs only after removal of the sarcotesta indicates animals have long had a role in reproduction in this species and the sarcotesta provides is a substantial reward to them. The

current lack of long distance dispersal of seeds may be related to the demise of a previous dispersal vector or vectors. Given the age of the taxon, this may have occurred in the extinction in the Pleistocene of most of the Australian megafauna and much of the mesofauna (Roberts *et al.* 2001; Long *et al.* 2002). Snow and Walter (2007) propose this hypothesis to explain the low level of dispersal of seed in *Macrozamia lucida* in New South Wales and southeast Queensland.

The infraseedling growth of the embryo in seeds through the Dry Season allows the seedling to emerge at the commencement of the Wet Season at an optimum time for establishing and growth. The duration of infraseedling growth emphasizes *B. serrulata* grows in a rainforest ecosystem in a strongly seasonal climate on the southern limit of the tropics.

The higher than average percentage of male plants producing cones in 1991 after atypically wet years in 1989 and 1990 suggests available soil water may also be a limiting resource in reproduction in *B. serrulata*. However, the data presented here are minimal and care needs to be exercised in comparisons, particularly with species lacking the subterranean caudex of *Bowenia*, and further inquiry is required to ascertain if the observed effect occurs in other rainforest cycads. The lack of similar increase in production of cones by female plants after the high rainfall events indicates limitation of light-related energy resources has greater effect than those of available water.

The data presented here suggest removal of leaves from female plants will reduce their ability to accumulate sufficient stores of energy to produce and maintain cones, ovules and seeds. This concurs with the findings of Clark and Clark (1988) for *Z. skinneri* (sic), which lives in a comparable environment. As female plants cannot be distinguished from males except during reproduction, this raises concerns about the effects of harvesting of seed and foliage on the persistence of *B. serrulata* in its natural habitat. Büchi (1995) noted the source of exported leaves of this species as wild-collected and CITES (2005) reported it was still occurring in 2000. The amount of illegal collecting of leaves and seeds is unknown but personal observations suggest it is considerable. The results of this study suggest these activities will have a substantial effect on reproduction and recruitment in this species. The magnitude of the previous legal collecting of seed was such that large number of plants should now be established *ex situ* and collection from the wild should no longer be necessary.

In summary, the data indicate seed production and germination in *B. serrulata* is sufficient and predation of them is low enough to maintain the species if it is not otherwise perturbed. However, despite being locally common, the small area of occupancy in a regional ecosystem with an 'Of concern' status, loss of habitat to clearing, and effects of harvesting of leaves and seeds, are all concerns in the persistence of this species.

ACKNOWLEDGEMENTS

I thank the late Dr C. S. Low, and Professors K. Walsh, P. Gadek and B. Jackes for their guidance in this study. I thank Dr Paul Forster of the Queensland

Herbarium, Drs D. A. and D. B. Clarke of La Selva and Dr Roy Osborne, Lou Randal and Peter Machin of Brisbane for useful discussions on cycads. I also thank Tom and Sylvia Susans for access to the study site and Bruce Cullen of DPI Forestry, Bowenia Camp, Byfield, for climate data.

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CYCAD INDABA CONFERENCE & AUCTION

René van der Westhuizen *



Figure 1. A part of the cycad garden at Amafu lodge.

Steve and his team from Cycad Africa held their 7th Cycad Conference & Plant Sale the 16th, 17th and 18th of October 2015. It was held at his Hoedspruit Growing Facility near Amafu Forest Lodge, Kampersrus.

It was an absolute pleasure in welcoming all the delegates to the conference, with top Botanists, Cycad Academics and a host of other cycadophiles who attended the event. The conference was slightly different to the previous conferences in as much as it were preceded by an auction of beautiful cycads by Deon from Omniland.

The Friday night after dinner, the Conference commenced with a Slideshow of Exotic Cycads by Jan-Louis Bezuidenhout. On Saturday the gates were opened at 7am for all day visitors to preview all plants on auction and sale. After breakfast the auction started with 124 lots.

After a lovely lunch, the Conference started with several guest speakers. Interesting topics were covered, such as:

- Cycad 2018 by Wynand van Eeden
- Philip Rousseau shared his Travelogue to Mozambique.
- Geraldine Aves from Commrisk Insurance Brokers did a presentation on their new insurance product, specifically for insuring your cycads.
- Pricing Structure of Cycads by Steve Trollip.
- The Special Guest Speaker all the way from Cape Town, Dr Piet Vorster, shared with us his experiences of the Jungle Trip to Colombia.

This concluded all the formalities of the weekend and the fun started. Drinks were enjoyed at the pool deck and followed by dinner, after which the games began.

Steve set the quiz and was the quiz Master with Lelanie as the score keeper. René and Janet had to monitor the teams for whisperers helping their team mates, who were summarily disqualified. Participants in

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the “21 Quiz” were divided into two teams, with Japie Steenkamp as the captain of team Cupidus and Fanie Vermaak the captain of team Cerinus. Dr Piet Vorster was the Quiz Judge. He was a very fair but strict judge. Naturally there were a lot of objections from the teams, but Piet and Steve handled them easily.

Each team was determined to win but it all took place in good spirit with an abundance of laughter and cheering.

The first team to reach 21 points was Team Cerinus. They won a beautiful original painting by Douglas Goode worth R5000. The prize was awarded to the person who answered the highest value question, who was Dr Xander de Kock.

Steve then did the “Last Man Standing” draw. Everyone had a number, which were drawn out of a hat.

If you're number were called, you fell out of the game. The last 2 numbers standing each won a price.

First Prize: Adolf Fanfoni

Second Prize: Burgert Hartzenberg – Bottle of Dimple Whiskey

Due to this young chap, being under age, it was decided to auction the bottle of whiskey off and gave him the cash instead to invest in cycads. The evening was a roaring success and the day ended on a high note.

On the Sunday the Cycad Indaba were concluded with the Commercial Cycad Growers Meeting and all were invited to enjoy a trip up Mariepskop to enjoy the beauty of their surroundings.

Steve and his team would like to take this opportunity to thank everyone for their valued support during 2015.



Figure 2. Deon doing his thing at the auction.

RECENT ADVANCES IN THE BIOLOGICAL CONTROL OF CYCAD AULACASPIS SCALE

William Tang * and Ronald D. Cave **

Aulacaspis yasumatsui, commonly known as cycad aulacaspis scale (CAS), is an insect pest with the potential to inflict great damage on cultivated cycads and to cause extinction in wild populations of cycads. It is therefore of great concern to anyone with an interest in these plants. CAS is native to mainland Southeast Asia where it feeds on *Cycas* spp. In this region there appears to be a natural balance between this insect and its hosts. Host *Cycas* populations here typically exhibit a level of natural resistance to this pest (Tang et al. 1997, Tang, pers. observation) and in addition a range of insect predators appear to feed on the scale and keep its numbers in check. As a result CAS typically occurs in low to moderate numbers in *Cycas* populations in mainland Southeast Asia. However, when taken outside of its natural habitat CAS has exhibited the propensity to rapidly destroy ornamental plantings of *Cycas* and threaten wild populations of *Cycas* with extinction. This lethality was demonstrated in its outbreak in Florida in the 1990's when thousands of *Cycas revoluta* and *C. rumphii* plants died, after just two years of heavy infestation (Howard et al. 1999). CAS will attack a wide range of cycad taxa, including *Stangeria* and *Encephalartos*, and is a continuing threat to conservation collections of these plants, such as those at the Montgomery Botanical Center in Coral Gables, Florida. CAS spread to Guam in 2003 and has devastated wild populations of *Cycas micronesica*. Based on rates of decline, this species is projected to become extinct in the wild by 2019 (Marler & Lawrence 2012). CAS reached the wild population of *Cycas taitungensis* in Taiwan in 2004 and by 2010 had caused an estimated 37% mortality (Chao et al. 2010). Efforts have been made to stop the spread of this pest with pest alerts (see Tang 2006) and legislation, but CAS continues to spread, probably through the global trade of infected *Cycas revoluta* (Marler and Moore 2010). Recently, Roux & Millar (2014) reported that CAS has reached South Africa, a region of high cycad diversity and endemism.

Chemical management of this pest in ornamental plantings is difficult because expensive pesticides must be applied frequently and regularly (Hodges et al. 2003, Caldwell 2005, Webb 2009) and such a labor-intensive approach is not feasible in natural populations, where most plants are in steep or remote terrain and would be difficult to access, and damage to non-target organism (especially in nature reserves) is likely to be unacceptable. The best hope for controlling CAS infestations in areas where CAS has been introduced lies with biological control agents. For the most part, these are organisms that feed on CAS in its native range. Listed below are known biological control agents of

CAS, regions where they have been used and level of success. The effectiveness of these agents varies from region to region and is probably influenced by climate and complex interactions with other existing organisms.

1. *Cybocephalus nipponicus* (Cybocephalidae): First identified from surveys in Thailand by Richard Baranowski (University of Florida), with Banpot Napompeth (National Biological Control Research Center, Thailand), this natural predator of CAS was released in Florida, but has not provided adequate control on plants of *Cycas revoluta*.
2. *Rhyzobius lophanthae* (Coccinellidae) (Figs. 1-2): Introduced to Florida and Hawaii prior to the outbreak of CAS, this beetle does not provide effect



Figure 1. *Rhyzobius lophanthae* adult; this predatory beetle has been an effective biocontrol agent for CAS in Guam and Texas, but not in Taiwan and Florida; Photo by R. Cave



Figure 2. Larva of the predatory beetle *Rhyzobius lophanthae* with female and male CAS; the female CAS (white oval shapes) are 3 mm long; Photo by R. Cave.

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Figure 3. *Coccobius fulvus* larva feeding inside an adult female CAS; when parasitoid wasps such as this kill female scales they will reduce egg production in the scale population and slow the spread of CAS; unfortunately this species has not been successful in providing adequate protection for *Cycas* from CAS in Florida or Guam; Photo by R. Cave.



Figure 4. *Phaenochilus kashaya* larva; the larva of this ladybird beetle will typically eat between 13-21 CAS a day and between 144-420 CAS during the entire larva stage, with consumption rates of CAS varying with temperature (Manrique et al. 2012); photo by Veronica Manrique.

control of CAS in Florida (Cave 2006), but appears to provide effective control in Hawaii. In Taiwan it does not provide effective control of CAS in the wild population of *C. taitungensis*. In Texas, in conjunction with an aphelinid wasp, *Aphytis lingnanensis*, it provides effective control (Flores and Carlson 2009). Introduced into Guam in 2005 it provides some protection for mature plants, but not to seedlings near ground level (Marler et al. 2013).

3. *Arrhenophagus chionaspidis* (Encyrtidae): Ronald Cave (University of Florida) and Ru Nguyen (Florida Department of Agriculture) observed this parasitic



Figure 5. Adult *Phaenochilus kashaya* feeding on CAS on a wild *Cycas siamensis* in Thailand; this predatory beetle is estimated to consume 4700 scales during its adult stage (Manrique et al. 2012); Photo by R. Cave.

wasp attacking CAS in China, Thailand, and Vietnam. It was previously established in Florida to control San Jose scale, but was not detected attacking CAS until 2009. It now appears widespread throughout the southern half of the state, but provides no control since it attacks only the male scales. In Taiwan 37% of CAS in the wild population of *C. taitungensis* were found to be parasitized by this wasp.

4. *Coccobius fulvus* (Aphelinidae)(Fig. 3): First identified from surveys in Thailand by Richard Baranowski (University of Florida), with Banpot Nampoth (National Biological Control Research Center, Thailand), this wasp parasitoid of CAS was released in Florida. Although high rates of parasitism have been observed, it has not provided satisfactory control of CAS. This wasp was introduced into Guam in 2005 but did not become established.
5. Other aphelinid wasps: In Hawaii, *Pteroptrix* n. sp. near *leptocera*, and *Aphytis lingnanensis* have been observed attacking CAS. However, it is not yet clear how much they contribute to the control of CAS (Cave et al. 2013).
6. *Isaria fumosorosea* (entomopathogenic fungus): In laboratory trials, this fungus achieved over 70% infection rates of CAS (Castillo et al. 2011). Limited field trials have been inconclusive and it is uncertain how commercial products of this organism might be employed and whether or not it would also attack biocontrol organisms used to control CAS.

Promising new biocontrol agent:

1. *Phaenochilus kashaya* (Coccinellidae)(Figs. 4-5): Ronald Cave (University of Florida) and Ru Nguyen (Florida Department of Agriculture) found this beetle feeding on CAS on wild *Cycas siamensis* populations in Thailand (Giorgi and Vandenberg 2012). Laboratory trials (Manrique et al. 2012) have demonstrated that the larvae and adults of this beetle are voracious predators of CAS, with each individual beetle estimated to consume over 5000 CAS over its lifespan. Although the release of this predatory beetle has been denied in Florida, permission might be granted for its release on the island of Guam.

For further details please read Cave et al. 2013 (see link below) and the CAS pest alert at: http://entomology.ifas.ufl.edu/pestalert/Cycad_Aulacaspis_Scale_Pest_Alert.pdf

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REPORT ON AN EXPEDITION TO THE MANGROVE ISLANDS AND NORTHERN ANDES OF COLOMBIA IN SEARCH OF CYCADS

A PICTORIAL REPORT

Piet Vorster* and Wynand van Eeden**

The *Conference on Cycad Biology* in Medellín, Colombia in August 2015 afforded a rare opportunity to join an expedition to see Colombian cycads in habitat. These plants are seldom seen in collections, especially in South Africa, which makes one think that they have special requirements and are difficult to grow. We were hoping to see how they grow in nature, and why their requirements seem to be different from the more familiar cycads which we grow. We operated in two separate areas: the mangrove islands off the south-western coast, and the northern extremity of the Andes range.

We were a small group of eight cycadologists. Our leader and guide was Christopher Calonje, who knows the area well as he habitually leads ornithological safaris in Colombia.

Our expedition started with a short early morning flight from Medellín to Cali on the south-western coast. After spending our first day visiting local gardens, we headed for the coast to board a small boat which would be our mode of transport for the duration of the expedition. We also realised that we would be wet: we boarded our boat in a deluge of biblical proportions, which seemed to continue for the whole period. Estimates of the annual rainfall varied, but were between 7 and 20 meters per annum.

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** Honorary (i.e unpaid/voluntary) editor of ENCEPHALARTOS

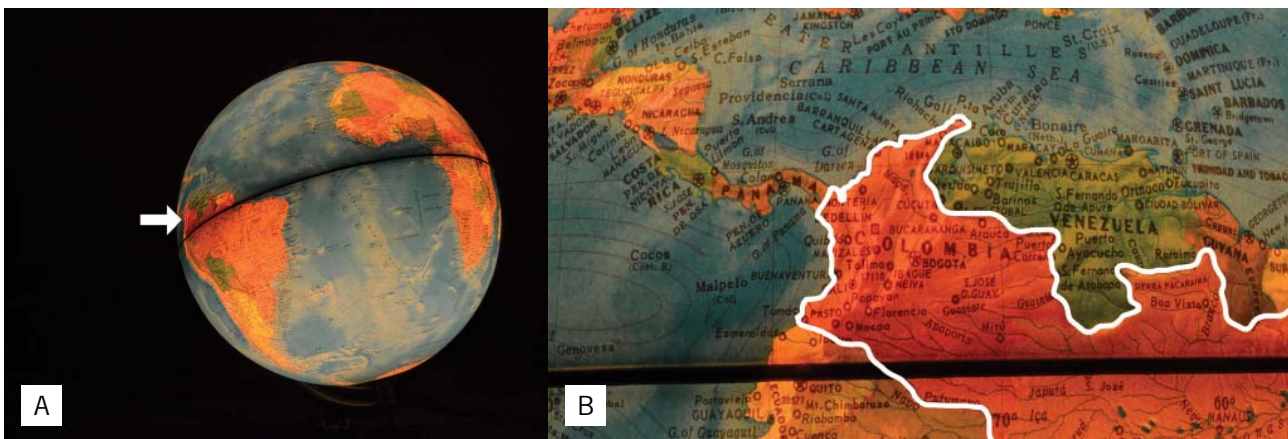


Figure 1. Where is Colombia?



Figure 2. Our boat at the pier in Buenaventura, under a leaden sky.

The area of our operations was the Bahia Malaga. This consists of an archipelago of a hundred or more islands, some obviously being the tops of drowned mountains, others being mere mudflats almost on the high water mark and overgrown with mangroves.

While we sailed, it rained, and we soon discovered that the canopy and any amount of rain clothing are totally insufficient to keep one dry.

This area is managed as a national park. The philosophy behind it is interesting: the area has been inhabited, albeit sparsely so, for many years by people who lived off the ocean and the forests, with practical no agriculture. When the area was declared a national park, they were then trained as park rangers, guides, and hoteliers, and they keep money generated through these activities.



Figure 3. Some of these little islands would make ideal retirement retreats. Water would be no problem, as it rains all the time.



Figure 4. This is where we berthed and where we headquartered for the duration of the expedition.



Figure 5. Suppertime at headquarters.

Next morning, our first day in the field, opened with the sound of rain drumming on the metal roof, and twilight gloom outside.

For those of us familiar with cycad habitats in Africa, Australia, Asia, and Mexico this looked like an unlikely place for cycads. Nevertheless, it is home to no less than four species of *Zamia*, these being *Zamia amplifolia*, *Z. chigua*, *Z. obliqua*, and *Z. roezlii*. All these grow on very wet and fine-grained soil, sometimes close to the high water mark where conditions must be saline. All grow in shade, which may or may not signify that they prefer shade, because a dense canopy of small trees covers all the land. These cycad species all grow close together, sometimes directly next to each other. Although the species are morphologically markedly different, which may be a sign that they are not closely related to each other, something must prevent wholesale hybridization. This can be something as simple as different cone odours which attract different pollinators. Being close to



Figure 7. *Zamia obliqua* in its rainy habitat.



Figure 6. A bleak prospect.

the equator, we have been told that there are no discrete coning times but that the plants produce cones any time of the year. On both males and females several cones of different sizes and thus ages can often be seen. And indeed, at one place we did find a plant which appeared to be a hybrid.

Our first cycad appeared ghost-like out of the rain as our boat drifted closer. Our anticipation sort of evaporated: are we really expected to relinquish the next to useless canopy of the boat and get out into the pouring rain, get up that slippery slope without falling down and drowning with camera and all? Worse, it soon became clear that, in spite of every precaution, our cameras had got wet with even the insides of the lenses misted over. Still, we came all the way to see these plants, and so we resolved to record all we could for our less fortunate kinsmen.

Once we had wiped the water out of our eyes, we realised that our quarry was *Zamia obliqua*.

Zamia obliqua develops a long but slender trunk, up to 2.5 or even 5 m tall but only 7 to 15 mm thick, amply crowned with fronds which can be up to 1.3 m long. The leaflets can be up to 30 cm long and 8 cm wide.

Further inland it is said to occur at altitudes of up to 600 m, but in the mangrove islands we found at right at the edge of the saltwater, 2 or 3 meters above the high water, on a steep and slippery slope on (perpetually) soggy wet mud. The plants were growing in fairly dense shade; in fact, all the *Zamias* which we saw in Colombia were growing in shade. This does not necessarily mean



Figure 8. *Zamia obliqua*: a watery view of the leaflets.



Figure 9. *Zamia obliqua* in its rain forest habitat, seen in a rare rainless moment. Photo: Santiago Valencia.



Figure 10. *Zamia obliqua*: a dramatic skyward view, taken during a momentary lapse of the rain. Photo: Santiago Valencia.



Figure 11. *Zamia roezlii* in habitat. Note the well-developed stem.



Figure 12. *Zamia roezlii*: a developing female cone in habitat, about 25 cm long. Note the extremely prickly petioles.



Figure 13. *Zamia roezlii*: at least five female cones, the largest about 25 cm long, are visible on this plant grown in the botanical garden in Quindio.

that they won't grow well or even better in full sunlight if given the opportunity, but (like with *Macrozamia* in Australia) there are simply no unforested places under natural conditions.

This species has been known since 1875, yet it is still rare in cultivation. Whitelock (*The cycads*, 1st ed., p. 323, 2002), found it undemanding in Los Angeles, and reported that 37 cm long cuttings grew stems more than 60 cm tall in 14 years.

Our next species was *Zamia roezlii*. In the past some serious collectors occasionally were able to obtain seeds which germinated readily enough, but these were heartbreakingly difficult to keep alive. The reason for this may be the reports of its natural habitat, such as '...often just above the mangrove line and inundated by sea water at the highest tides' (Whitelock, *op. cit.* p. 333). These led growers to keep their seedlings wet *with fresh water*, not understanding that for plants salt water means physiologically dry. Yet we know of seed-grown plants which grow well under conditions under which many other cycads thrive, in Zimbabwe; and Whitelock (*loc. cit.*) wrote that, once the difficult seedling stage have past, they are easy to grow. Indeed, in a botanical garden in Medellín it grew very well indeed under ordinary garden conditions.

Z. roezlii is a striking and magnificent species, albeit with extremely prickly petioles.

The plant which we saw in habitat (fig. 12) bore only a single female cone, but one grown in the botanical garden in Quindio had at least five. We know from other cycads that plants which normally produce only single



Figure 14. *Zamia roezlii*: multiple male cones, up to about 10 cm long, on another plant grown in the botanical garden at Quindio.



Figure 15. *Zamia roezlii*: seedling emerging at recently cleared site.



Figure 16. *Zamia roezlii*: a young plant, showing the bare stem without leaf remains which is characteristic for *Zamia*.



Figure 17. *Zamia roezlii*: the conspicuously corrugated leaflets.



Figure 18. *Zamia roezlii* (right) growing together with a very similar-looking palm (*Pholidostachys dactyloides?*) at left. The palm was closer to the camera than the *Zamia*, but in reality the leaflets are almost the same size.

cones, often produce multiple cones when grown in gardens.

We found these plants right at the edge of the salt water, in fairly shady conditions. Yet on another island, inhabited by people, we found many seedlings coming up in full sunlight and growing on barely moist white sand where the people cleared the forest to grow crops.

The stems may be up to 7 m tall and 25 to 30 cm thick. When eventually they fall over they tend to root from the prostrate stems.

The fronds may be up to 3 m long, and the conspicuously large leaflets can be up to 40 cm long and 3.5 m wide. The leaflets are strongly corrugated.

In neighbouring Panama we previously noticed that often little understory palms grow together with *Zamias*, and that these mimic *Zamias* so well that it is often very difficult to spot the *Zamias*. With *Zamia roezlii* in Colombia we noticed something similar: a little palm (*Pholidostachys dactyloides?*) with pleated leaflets and often growing together with *Z. roezlii*. It looks so similar to *Z. roezlii* that one really has to look sharply.

One of the most beautiful cycads in the world must be *Zamia chigua*. It is also one of the rarest in cultivation. Though one of us (P.V.) has been trying for 45 years to get it, we have never heard of any seed distribution or material for sale. Yet we saw many plants on the mangrove islands, where it must be the commonest



Figure 19. Our Editor suffering to take photographs of *Zamia roezlii* for the less fortunate members of our Society.



Figure 20. *Zamia chigua* emerging from a dense growth of *Dicranopteris* ferns which had to be cleared to expose the *Zamia*. Photo taken from a rocking boat in bad light.



Figure 21. *Zamia chigua*: another plant emerging from the dense undergrowth along the water's edge, photo again taken from a rocking boat in bad light.



Figure 22. *Zamia roezlii*: leaf detail.

species. The reason for its scarcity in cultivation seems to be its cold sensitivity. Whitelock (*op. cit.*, p. 296) wrote: 'Plants will suffer considerable damage or die if their ... soil is allowed to dry out ... Not only are the plants frost sensitive, they also strongly resent any temperature below 10° C'.

The stems are said to grow up to 2 m tall and 15 cm thick, but those which we saw were only a third of that length. However, what they may lack in stem stature, they make up for with their magnificent and dense crowns of fronds which may be up to 3 m long,



Figure 23. *Zamia amplifolia* in habitat.

more or less erect, and straight. The leaflets are strongly reminiscent of those of *Lepidozamia peroffskyana* or some of the tropical Asian *Cycas* species, but overlap to some extent. We did not see any cones.

The exquisite plants in the photographs above were growing 2 to 3 m above the salt water level. We saw others at 30 m above the water, but these were not so luxuriant.

At the latter locality, well above the water line, *Zamia amplifolia* was found intermingled with *Z. chigua*. This one's stem is underground or only slightly emerging. There are only one or two leaves which may be up to 2 m long. The leaflets, however, are huge, measuring up to 40 cm long and 12 cm wide, and are corrugated. We did not see any cones.

Whitelock (*op. cit.*, p. 292) reported that it is 'somewhat difficult to cultivate' and that it 'will develop root rot if not provided with proper drainage'. While again we found no cones, we did find something very interesting in the form of a single plant intermediate between *Z. amplifolia* and *Z. chigua*, which is almost certainly a hybrid between the two. Whitelock (*op. cit.*) also reported large-scale hybridizing between the two species on the mainland.

Thus ended our expedition to the mangrove islands. However, we were not yet finished with the Colombian



Figure 24. *Zamia amplifolia*: leaf detail. Notice the corrugated leaflets.



Figure 25. A putative natural hybrid between *Zamia chigua* and *Z. amplifolia*.

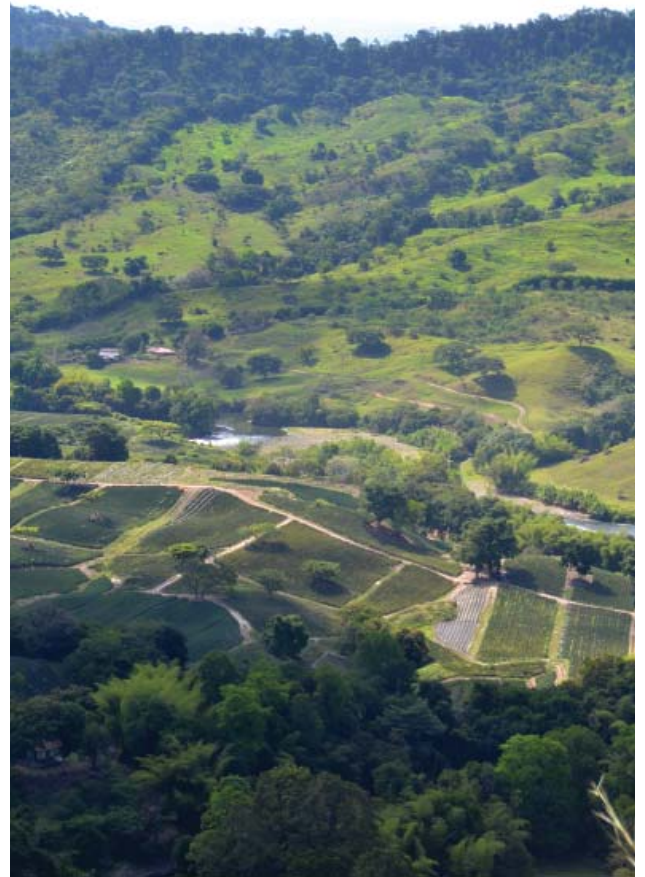


Figure 27. A typical scene between Medellín and Bogotá, highlighting the scale of deforestation.



Figure 26. Leaf detail of a putative natural hybrid between *Zamia chigua* and *Z. amplifolia*.



Figure 28. In the cloud forest, on our way to *Zamia oligodonta*. Note the muddy track. There are no dry places in Colombia, and the mountains consist of soil rather than rock.



Figure 29. *Zamia oligodonta* grows in very dense scrubby forest, where it is difficult to operate.

cycads, and we proceeded inland along the Cauca Valley in search of *Zamia oligodonta*.

It is in Colombia that the massive Andes mountain chain has its northern end. Here it splits into three parallel branches, and the result is a wide mountainous area. It is just north of the Equator, and gets a very high rainfall which means that the natural vegetation is almost exclusively evergreen forest. However, the mountainous terrain and resulting higher elevations result in an even and moderate climate throughout the year, very different from the sweltering tropical lowlands. It also means that this area is very attractive to farmers of all kinds; and in turn this led to very severe deforestation. Especially when seen from the air, it is clear that very little of the original forest vegetation is left.

Nevertheless, a number of species of *Zamia* have survived in the remaining forest fragments, including some new and some undescribed species. One can only wonder how many went extinct before they could be discovered.

One of these recently (2003) described species is *Zamia oligodonta*, which occurs in cloud forest at an altitude of about 1600 m. This name was synonymised under *Z. montana* (see Osborne *et al.*, The world list of cycads, in *Memoirs of the New York Botanical Garden* **106**: 506, 2012), but since then it was demonstrated that *Z. oligodonta* is in fact a good species (M. Calonje *et al.*, A taxonomic revision of *Zamia montana* and *Zamia oligodonta*, with notes on their conservation status, in *Phytotaxa* **192**: 279–289, 2015).



Figure 30. *Zamia oligodonta* in habitat.



Figure 31. *Zamia oligodonta*: another plant, its leaves overgrown with mosses.

In *Z. oligodonta* the stem is usually underground, but very old specimens, especially on steep slopes, may show shortly emergent stems. Each plant has only one or two leaves, but the leaflets are quite big, probably to absorb sufficient light on the dark forest floor.

The leaflets are surprisingly large, probably to catch enough light for photosynthesis in the forest gloom where



Figure 32. *Zamia oligodonta*: an old plant on a steep soil bank, showing an exposed, reclining, well-developed trunk. Note the female cone.



Figure 33. *Zamia oligodonta*: Society member Anders Lindström from the Nong Nooch Tropical Botanic Garden in Thailand lending scale to a leaf, while Tim Uebergang from Melbourne University looks on in disbelief.



Figure 34. *Zamia oligodonta*: leaf detail. Note corrugations, and the lichen-like growth on the surfaces.



Figure 35. *Zamia oligodonta*: young leaves have an arresting appearance before they fold open and harden.

it grows. Furthermore, they tend to be covered with mosses and what looked like lichens, a phenomenon indicating very wet conditions.

The female cones take very long to develop, perhaps as long as 18 months. The cone in fig. 36 is rather dull greyish which may indicate that it has been sitting there for a while already, but another cone seen was orange and probably is a younger example.

We were fortunate enough to find male cones. These are also quite tiny, no more than 12 cm long.

Zamia oligodonta was the last of the five species which we saw in habitat in Colombia. However, there



Figure 36. *Zamia oligodonta*: a female cone. The mosses creeping up the cone and the adjacent petiole, a sure sign of a very wet place.



Figure 37. *Zamia oligodonta*: another, probably younger, orange female cone. Both this and the one in fig. 36 were only about 10 cm long.

are several more scattered over that variable and rugged country, including at least one still undescribed species. When compiling this report we did not have all the latest literature at hand, but species like *Z. amazonum*, *Z. chigua*, *Z. disodon*, *Z. hymenophyllidia*, *Z. incognita*, *Z. lecointei*, *Z. manicata*, *Z. melanorrhachis*, *Z. montana*, *Z. muricata*, *Z. obliqua*, *Z. pyrophylla*, *Z. roezlii*, *Z. tolimensis*, *Z. wallisii*, and *Z. bernalii*, and *Z. restrepoi* (previously in the separate genus *Chigua*) testify the the richness and diversity of *Zamia* in Colombia. It is not inconceivable that the ongoing research of Cristina Lopez-Gallego, her students, and the colleagues which she inspired, will find even more species resulting in a cycad flora comparable in size to those of the famous hot spots of cycad diversity in South Africa, Mexico, Australia, Vietnam, and China.

As to our quest to find out what makes them grow, we found that they tolerate or perhaps prefer environmental conditions which are completely different from anything which we ever saw elsewhere. While it remains a challenging ambition to grow them in cultivation, we have to acknowledge that Colombia is very different from South Africa, Australia, Mexico, Vietnam, Thailand and China. One can only hope that the ongoing deforestation will not lead to the loss of these beautiful and tantalising plants.

We are very grateful to our expedition leader Christopher Calonje who showed us not only a tantalising glimpse of the Colombian *Zamias*, but also guarded us babes in the woods from some very real dangers.



Figure 38. *Zamia oligodonta*: a mature male cone, about 12 cm long.

LETTERS TO THE EDITOR / BRIEWE AAN DIE REDAKTEUR

Dear Editor,

I thought you might find this of interest. It's the "famous" *Encephalartos middelburgensis* at Mpumalanga Cycad Trails (never was sure if this is the so-called "monument plant" or if it's a different one). Anyway, the first picture is of me alone with the plant in 1992 on my first visit to South Africa; then Satie and I on our honeymoon in 2003; and then me alone with the plant, both of us older and drooping more. The photograph was taken by John Donaldson.

Jeff Chernick
California

Hello Jeff!

The key to your question is, I think, in Nat Grobbelaar's book *Cycads*. To quote from that book is likely to be troublesome, because it is a 'book on demand' which was continually updated. My copy, said to be the first edition and dated 2002, has it on page 233. However, I have another copy said to be the first revised edition, also dated 2002. It is thinner, on a more glossy paper, with better reproduction of photos, and the treatment of *E. middelburgensis* is on page 240. Both have the photo of your plant on the front cover. I suspect that there was a multitude of slightly differing editions after these. Anyhow, with Grobbelaar's treatment there

are two photos (figure 6.27.1.a and b), one of your plant and another one of the national monument plant.

The interesting aspect of all these photos is how much the smaller stems grew over this relatively short period. The distressing aspect is how so many of the smaller stems on your plant vanished during the same period.



More photographs which may be of interest in this matter are:

Jeff's plant:

- Dyer, The cycads of southern Africa (*Bothalia* **8**: 43 (1965). I cannot help feeling that this photo represents Jeff's plant in better days. It may be possible to date this photo, probably taken in the late 1940's.
- Giddy, *Cycads of South Africa* ed. 1: 86 (1974) (green cover).

- Giddy, *Cycads of South Africa* ed. 2: 76 (1984) (black cover).

The monument plant:

- Jones *Cycads of the world* ed. 2: 289 (2002). My own photo, taken in 1972.
- There are more photographs in ENCEPHALARTOS, accessible through the cumulative index of issues no. 1 to 100.

Piet Vorster, President *emeritus*

New cycad book release "Using cones to identify the indigenous cycads of South Africa". Please contact Cornia Hugo at 082 944 2341 or corniahugo@gmail.com.

The book will also be available on www.cycadid-sa.co.za, www.takealot.com, Exclusive Cycads Nursery, Graffiti Lynwoodbridge, Botanical Society Bookshop at Kirstenbosch Botanical Garden and Katina Nursery in Montana.



THE AUTHOR

Cornia Hugo was born in Naboomspruit in 1967. She obtained her National Diploma in Nature Conservation at the erstwhile Pretoria Technikon in 1987.

She is currently employed as Assistant Director of General Investigations North at the Department of Agriculture and Rural Development. Cornia has also assisted with investigations of the illegal trade in indigenous cycads and has represented the Department in several successful court cases.

Her passion for cycads led to the publication of her first book "Identification of indigenous cycads of South Africa".

The book became hugely popular in the Cycad community and has prompted Cornia to present training courses on Cycad identification to members of the public, the South African Police Services as well as to Provincial and National Nature Conservation officials.

In working with cycad enthusiasts it became clear that the additional use of cones to identify cycads assisted with improving the correct identification.



Using cones to identify the indigenous cycads of South Africa

Cornia Hugo



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Plot 238, Corner of Phyllis and Veda streets, Montana Park, Pretoria

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CYCAD-O-METER

New 50 cm Model now Available

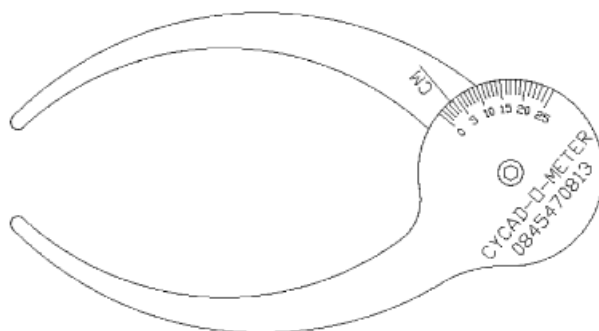
With the new legislation you will be required to list the diameter of all your plants, the new 50 cm Cycad-O-Meter makes this an easy task. With this instrument you will be able to measure the diameter of your cycads from 0 cm to 50 cm in 1 cm increments. The instruments are made from 2.5mm durable, laser cut, stainless steel.

Selling price of the 50 cm Large Plant Owners Cycad-O-Meter – R 625 (Add R50.00 for postage and packaging)

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Contact Russell:074 134 2149 or Andy 082 900 8624

Or lasertecstreetluge@gmail.com



JOIN THE CYCAD SOCIETY

TCS Membership information

The annual membership fees for TCS are listed below. For your convenience, you may join or renew your membership online using PayPal (see www.cycad.org/members/membership-info.htm), and you may pay your dues up to three years in advance, except for student memberships, which can only be paid one year at a time.

Two of the most important benefits of TCS membership are the Cycad Newsletter and the Cycad Society Seedbank.

- Student Memberships: \$25.00 per year
- Non-US Student Memberships: \$35.00 per year
- US Memberships: \$35.00 per year
- Non-US Memberships: \$45.00 per year

INHEEMSE BROOBBOME TE KOOP / INDIGENOUS CYCAD FOR SALE

- *Encephalartos eugene-maraisii*, Waterberg & Kransberg
- *E. middelburgensis*
- *E. laevifolius*, lang blaar vorm / long leaf form

Kontak / Contact:
Hennie
082 902 6669



CYCAD SOCIETY OF SOUTH AFRICA

www.cycadsociety.org

MEMBERSHIP FORM 2016

I/We _____

Title, initials and surname, and name by which person is known or name of institution in
BLOCK LETTERS

Membership number of existing member
for membership renewal

Of postal address _____

Post Code _____

E-mail _____

Tel _____

Fax _____

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.

- Membership fee for **2016***

In addition to the membership fee I/We would like to make the following donations

- Cycad Society research fund
- General donation

Total (Membership fee and other donations)

YES

NO

By ticking YES I/We hereby give permission to the Society to publish my/our contact and address details in the member list of the society to other members.

Signature _____

Date _____

*MEMBERSHIP FEES FOR 2016:

Local members (residents of South Africa)	R 250			
Southern African members (Namibia, Swaziland, Zimbabwe, etc.) <i>Air mail delivery</i>	R 365	Southern African members (Namibia, Swaziland, Zimbabwe, etc.) <i>Surface mail delivery</i>	R 325	Foreign members <i>Air mail delivery</i>
				Foreign members <i>Surface mail delivery</i>
			R 400 US\$ 56 AU\$ 55 € 40 £ 34	R 355 US\$ 49 AU\$ 48 € 38 £ 29

Local members must send their dues together with this form to Ian Bassingthwaighte, and all cheques and postal orders are to be made out to: *Cycad Society of South Africa*. American and Australian members must send their dues in American or Australian dollars respectively together with this form to the appropriate address listed below. Foreign Members of other countries may send their dues together with this form either in South African Rand by international money order or SWIFT, in favour of the *Cycad Society of South Africa*, and not by a personal cheque, to Ian Bassingthwaighte; or in American dollar to Willie Tang; or in Australian dollar to Paul Kennedy.

The appropriate addresses are:

- **Ian Bassingthwaighte:** P.O. Box 176, 0159 Montana Park (Pretoria), South Africa.
- **Paul Kennedy:** 21 Sierra Road, Engadine, NSW 2233, Australia.
- **Willie Tang:** 13320 SW 28 St., Davie, Florida 33330, U.S.A.

Payments in South African Rand can be made at:

Bank	Standard Bank	Branch	Hatfield	Branch code	01-15-45	Account number	011943300
SWIFT	SBZAZAJJ						

Reference of payment: Name of member and membership number.

Proof of payment must be sent to: Fax: +27 086678 9807 (fax to e-mail)

e-mail: cycad@cycadsociety.org

New members receive all issues of *ENCEPHALARTOS* magazine for the year in which they join provided that issues are still in stock.



CYCAD SOCIETY OF SOUTH AFRICA

www.cycadsociety.org

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0159 Montanapark
Pretoria, Suid Afrika

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Pretoria, South Africa

Tel/Faks: +27 12 548 1152
E-pos: cycad@cycadsociety.org

Tel/Fax: +27 12 548 1152
Email: cycad@cycadsociety.org

DEBIT ORDER FORM

PERSONAL DETAILS OF CLIENT						
Surname / Company Name:						
Full names / Trading Name:						
ID number / Registration Number:						
Physical Address:						
Postal Address:						
Contact details:	HOME	WORK	MOBILE	e-MAIL	FAX	
Client reference number:						
BANK DETAILS OF CLIENT						
Name of Account Holder:						
Account Type:	CHEQUE	TRANSMISSION	SAVINGS	OTHER		
Name of Bank:						
Account Number:						
Branch Name:						
Branch Code:						
Credit Card type:	MASTER			VISA		
Last 3 digits of credit card:						

COLLECTION INSTRUCTION - please tick the applicable						
R	Annual Deductions	<input checked="" type="checkbox"/>	Complete only date of 1st deduction	d	d	m m y y
Annual escalation thereof	See no. 7 below					

I/We, the client or the duly authorised representative thereof ("the CLIENT"), hereby authorise the entity mentioned below ("Cycad Society of SA"), STRATCOL LTD and/or its agents, to collect by means of electronic debit from the above account in the name of the CLIENT at the same or any other bank, all or any monies due by the CLIENT to Cycad Society of SA, as principal debtor or for any other reason, and to pay same to Cycad Society of SA. The authority so given is restricted to the amount mentioned above and may be deducted on any mentioned 7 working days hereafter.

I accept the following to be applicable hereto:

- This authorisation may only be withdrawn with 30 (thirty) days written notice to Cycad Society of SA at its physical address.
- I and/or the CLIENT, individually and collectively hold harmless Cycad Society of SA, STRATCOL LTD and/or its agents against any claim of any nature arising from the electronic debit or transfer or from any other cause following this authorisation and irrespective whether such authorisation had been withdrawn or not;
- In the event of the relevant account not having sufficient cleared funds to meet any debit, I am aware that a unpaid fee will be debited against the CLIENTS account by its bank and an additional unpaid fee of R50 will be charged by Cycad Society of SA relating to the return of the debit. I accept the responsibility to ensure sufficient cleared and available funds to the minimum of the limit above (or as amended from time to time).
- Any reference to the entities above includes a reference to any successor in title or in appointment;
- This authorisation is not an amendment to any specific arrangement regarding payment of accounts and serves merely as an arrangement as the method of payment, in part or in full and any account with Cycad Society of SA will only to be credited once actual payment is received by the Cycad Society of SA, and
- Should any dispute arise about Cycad Society of SA's right to collect any amount in terms hereof, the CLIENT shall have the onus to instruct his bank to refuse or return any debit as unpaid.
- Annual fee to be advised in *Encephalartos* prior to the annual collection date.

DATE: _____

SIGNATURE: _____

STRATCOL REF:

0	0	0	0
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BROODBOOM VERENIGING VAN SUID-AFRIKA

www.cycadsociety.org

LIDMAATSKAPVORM 2016

Ek/Ons _____

Titel, voorletters en van, asook noemnaam van persoon of naam van inrigting in BLOKLETTERS _____

Lidmaatskapnommer van bestaande lid
vir lidmaatskaphernuwing _____

van posadres _____

Poskode _____

E-pos _____

Tel _____

Fax _____

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 gereëlde publiserings 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.

- Ledegeld vir 2016*

Addisioneel tot die ledegeld wil ek/ons ook graag die volgende bydraes maak:

- Broodboomvereniging Navorsingsfonds
- Algemene donasie

Totaal (Ledegeld en donasies ingesluit)

J A

N E E

Deur JA te selekteer, gee ek/ons toestemming aan die Vereniging om my/ons kontak en adres besonderhede op die Vereniging se ledelys aan ander lede te publiseer.

Handtekening _____

Datum _____

*LEDEGELD VIR 2016

Plaaslike lede (inwoners van Suid-Afrika) R 250			
Suider-Afrika lede (Namibië, Swaziland, Zimbabwe, ens) R 365 <i>Lugposaflewering</i>	Suider-Afrika lede (Namibië, Swaziland, Zimbabwe, ens) R 325 <i>Landposversending</i>	Oorsese lede R 400 US\$ 56 AU\$ 55 € 40 £ 34 <i>Lugposaflewering</i>	Oorsese lede R 355 US\$ 49 AU\$ 48 € 38 £ 29 <i>Landposversending</i>

Lede ontvang 'n kwartaalike kopie van die vereniging se tydskrif *ENCEPHALARTOS*. Plaaslike lede moet hulle ledegeld en die voltooid vorm stuur aan Ian Bassingthwaighte en alle tjeks of poswissels moet uitgemaak word aan die "Broodboomvereniging van Suid-Afrika".

Ian Bassingthwaighte, Posbus 176, 0159 Montanapark, Pretoria, Suid-Afrika.

Betaling in Suid-Afrikaanse Rand kan ook gemaak word by:

Bank	Standard Bank	Tak	Hatfield	Takkode	01-15-45	Rekeningnommer	011943300
SWIFT	SBZAJJ						

Betalingverwysing: Lidnaam en lidnommer.

Bewys van betaling asook aansoekvorms moet gestuur word aan: Faks: +27 086678 9807 (faks na e-pos)

e-pos: cycad@cycadsociety.org

Nuwe lede ontvang 'n eksemplaar van al die uitgawes van *ENCEPHALARTOS* vir die jaar waarin hulle aansluit op die veronderstelling dat daar voorraad is.



CYCAD SOCIETY OF SOUTH AFRICA

www.cycadsociety.org

Posbus 176
0159 Montanapark
Pretoria, Suid Afrika

Tel/Faks: +27 12 548 1152
E-pos: cycad@cycadsociety.org

P.O.Box 176
0159 Montana Park
Pretoria, South Africa

Tel/Fax: +27 12 548 1152
Email: cycad@cycadsociety.org

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PERSOONLIKE BESONDERHEDE VAN KLIËNT					
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Fisiese Adres:					
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Kliëntverwysings nommer:					
BANKBESONDERHEDE VAN KLIËNT					
Naam van rekeninghouer:					
Rekening tipe:	TJEK	TRANSAKSIE	SPAAR	ANDER	
Naam van Bank:					
Rekening Nommer:					
Taknaam:					
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Kredietkaart:	MASTER			VISA	
Laaste 3 syfers van Kredietkaart:					

TREKKINGS INSTRUKSIE - merk as van toepassing									
R	Jaarlikse aftrekkings	X	Voltooi alleenlik datum van 1ste aftrekking	d	d	m	m	j	j
Verhoogings	Sien nr. 7 onderaan								

Ek/Ons, die kliënt of behoorlike gemagtigde verteenwoordiger daarvan ("die kliënt"), gee hiermee goedkeuring aan die entiteit hieronder genoem **Broodboom Vereniging van SA**, STRATCOL BPK en/of sy agente, om d.m.v. 'n Elektroniese Debietorder van die bogenoemde rekening te vorder, en om genoemde gelde oor te betaal aan **Broodboom Vereniging van SA**. Die goedkeuring gegee is beperk tot enige maksimum bedrag en trekkingsdatum gestel of binne 7 dae daarna.

Ek aanvaar die volgende om van toepassing te wees hiertoe:

- Hierdie goedkeuring mag net teruggetrek word met 30 (dertig) dae skriftelike kennis aan die gebruiker by sy/haar fisiese adres;
- Ek en/of die KLIËNT, afsonderlik en/of gesamentlik, vrywaar **Broodboom Vereniging van SA** en STRATCOL BPK en/of sy agente teen enige eise van enige aard wat kan ontstaan a.g.v. die elektroniese debiet of oordragte d.m.v. hierdie goedkeuring hetsy reeds teruggetrek of nie;
- In die geval waar die relevante rekening nie genoegsame beskikbare fondse het om enige debiet te dek nie, is ek bewus dat 'n addisionele fooi van **R50** gehef sal word teen die KLIËNT se rekening deur **Broodboom Vereniging van SA** vir hierdie terugsending, asook 'n onbetaalde fooi deur die KLIËNT se eie bank. Ek aanvaar die verantwoordelikheid om genoegsame en beskikbare fondse gelykstaande aan die minimum bedrag soos hierbo genoem, te verseker (of soos aangepas van tyd tot tyd)
- Enige verwysing na die entiteite soos hierbo genoem sluit in 'n verwysing na enige opvolger in titel of in aanstelling;
- Hierdie goedkeuring is nie 'n verwysing van 'n spesifieke betalingsooreenkoms van rekeninge nie en dit dien slegs as 'n ooreenkoms vir die manier van betaling, gedeeltelik of ten volle en enige rekening met die gebruiker sal net gekrediteer word wanneer die werklike betaling deur **Broodboom Vereniging van SA** ontvang is;
- Sou enige dispuut ontstaan insake **Broodboom Vereniging van SA** se regte om gelde te vorder in terme hiervan, is die onnus op die KLIËNT om sy bank die instruksie te gee om enige debiete terug te stuur as onbetaald.
- Jaarlikse fooi sal aangekondig word in *Encephalartos* alvorens die jaarlikse kolleksie datum.

DATUM: _____

HANDTEKENING: _____

STRATCOL VERW.

0 0 0 0

INSTRUCTIONS TO AUTHORS

Contributions may be written in English or Afrikaans. Manuscripts must be typed. Short communications and letters to the editor may either be typed or in legible handwriting. All pages of a manuscript must be numbered consecutively. Photographs should be of excellent quality with clear details and adequate contrast. Authors are welcome to send illustrations in electronic format with the following requirements:

- Scan at 300 dpi.
- Save as jpeg, using maximum file size (i.e. minimum compression).
- Send by e-mail to wynand@ananzi.co.za and mark 'For Encephalartos'.

The tables and figures/photographs of a manuscript should be numbered and all tables should have a heading. All figures and photographs should have a legend. All figures/photographs should bear written on the reverse the name of the author, figure number and the top of the figure or photograph.

Formal descriptions of new cycad taxa and new name combinations may be published in ENCEPHALARTOS. Authors are however, advised to rather publish such articles in the journal *Novon* which has been established especially for such articles. Articles on potential new cycad taxa, without formally describing them as new taxa, may also be published in ENCEPHALARTOS. To avoid any possible confusion of names of such taxa in future, they should be designated for example by terms such as Species A or Species 99. Do not ascribe provisional names to potential new cycad taxa.

Contributions should reach the editor not later than:

March issue	: First week of January
June issue	: First week of April
September issue	: First week of July
December issue	: Last week of September

One copy of the ENCEPHALARTOS issue in which a contribution appears, will be supplied gratis to all non-member authors.

Note: If applicable, all figures and photographs will be reduced or enlarged to fit over either one, two or three columns when printed.

Tariffs for advertising in ENCEPHALARTOS:

Page size	Black and white	Colour
Quarter page	R175	R250
Half page	R350	R500
Full page	R700	R1000

Members: up to quarter page free of charge—black and white only.

To advertise in ENCEPHALARTOS, contact the Secretary Treasurer and/or Editor.

VOORSKRIFTE AAN OUTEURS

Bydraes kan in Afrikaans of Engels geskryf word. Manuskripte moet getik wees. Kort mededelings en briewe aan die redakteur mag getik of in duidelik leesbare handskrif wees. Nommer alle bladsye van 'n manuskrip opeenvolgend. Foto's moet van goeie gehalte wees, voldoende kontras besit en besonderhede duidelik toon. Skrywers is welkom om illustrasies in elektroniese formaat te stuur, met die volgende vereistes:

- Skandeer teen 300 dpi.
- Stoor as jpeg, maksimum lêergrootte (d.w.s. minimum kompressie).
- Stuur per e-pos na wynand@ananzi.co.za en merk 'Vir Encephalartos'.

Die tabelle en figure/foto's van 'n manuskrip moet genommer wees en elke tabel moet 'n opskrif hê. Alle figure en foto's moet 'n onderskrif hê. Agter op elke figuur/foto moet die naam van die outeur en die nommer van die figuur/foto geskryf word en die bopunt van die figuur of foto moet aangedui word.

Alhoewel die formele beskrywing van nuwe broodboom taksons en nuwe naamkombinasies in ENCEPHALARTOS opgeneem kan word, word daar aanbeveel dat sodanige artikels eerder in die tydskrif *Novon*, wat spesiaal vir sodanige artikels in die lewe geroep is, gepubliseer word. Artikels oor potensiële nuwe broodboomtaksons kan ook opgeneem word in ENCEPHALARTOS sonder dat die artikels die nuwe takson formeel beskryf. Om latere moontlike naamsverwarring van sodanige taksons tot die minimum te beperk, moet die potensiële nuwe takson in die artikel deur terme soos byvoorbeeld Spesie A of Spesie 99 aangedui word.

Bydraes moet die redakteur voor of op die volgende datums bereik:

Maart-uitgawe	: Eerste week van Januarie
Junie-uitgawe	: Eerste week van April
September-uitgawe	: Eerste week van Julie
Desember-uitgawe	: Eerste week van September

Een eksemplaar van die ENCEPHALARTOS uitgawe waarin 'n bydrae verskyn, sal gratis aan alle nie-lid outeurs voorsien word.

Nota: Waar van toepassing, sal alle finaal gedrukte figure en foto's verklein of vergroot word om oor óf een, twee óf drie kolomme te pas.

Tariewe om in ENCEPHALARTOS te adverteer:

Bladsy grootte	Swart en wit	Kleur
Kwart blad	R175	R250
Half blad	R350	R500
Vol blad	R700	R1000

Lede: tot 'n maksimum van 'n kwartblad gratis—slegs swart en wit.

Om in ENCEPHALARTOS te adverteer, kontak die Sekretaris-tesourier en/of Redakteur.

