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CYCAD SOCIETY OF SOUTH AFRICA BROODBOOM VERENIGING VAN SUID-AFRIKA

www.cycadsociety.org

Contact: cycad@cycadsociety.org

COUNCIL MEMBERS / RAADSLEDE



President
Dirk van der Walt
Cell/Sel: +27 82 557 0943
Tel: +27 13 745 7290
E-mail/E-pos: vdwaltd@tsb.co.za



**Secretary-treasurer/
Sekretaris-tesourier**
**Back copies officer/Beampte
vir vorige uitgawes**
Ian Bassingthwaight
P.O. Box/Posbus 176
Montana Park 0159
Tel: +27 12 548 1152
Fax/Faks: +27 86 678 9807
E-mail/E-pos:
cycad@cycadsociety.org



**Editor of Encephalartos/
Redakteur van Encephalartos**
Wynand van Eeden
P.O. Box/Posbus 3489
Tygerpark 7536
E-mail/E-pos:
wynand@ananzi.co.za



**Co-opted member
(webmaster)/
Gekoöpteerde lid
(webmeester)**
Pieter van der Walt
P.O. Box/Posbus 913
Olivedale 2158
E-mail/E-pos:
pvdwalt@hotmail.com

Media Liaison Officer/ Skakelbeampte
Mark Crookes
Tel: 011 462 5059
E-mail/Epos: obeatery@mweb.co.za

REGIONAL BRANCH REPRESENTATIVES/STREEKTAKVERTEENWOORDIGERS



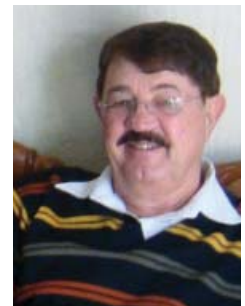
Western Cape/Wes-Kaap
Johan Kotze
Tel: +27 21 919 2434
Cell/Sel: +27 84 627 9645
E-mail/E-pos:
johankotze2305@gmail.com



Lowveld/Laeveld
Jan Joubert
Cell/Sel: +27 83 459 0516
E-mail/E-pos:
joubert@absamail.co.za



KwaZulu-Natal
Gerald Schofield
P.O. Box 1753, Hillcrest 3650
Tel.: +27 31 003 0940
Cell/Sel: +27 83 788 8661
E-mail/E-pos:
Gerald@thegardener.co.za



Central (Transvaal)
John Kloppers
Kleinwaterfontein, Posbus 24,
Groblersdal 0470
Cell/Sel: +27 83 701 3482
Fax/Faks: +27 86 610 9107
E-mail/E-pos:
cycad@mweb.co.za

Limpopo
Piet de Bruyn
P.O. Box/Posbus 3896, Mokopane 0600
Cell/Sel: +27 83 447 5979

Eastern Cape/Oos-Kaap
Vakant / Vacant

INTERNATIONAL CORRESPONDENTS/BUITELANDSE SKAKELBEAMPTES

Australia
Paul Kennedy
21 Sierra Road, Engadine
New South Wales 2233
Tel: 02 9520 7690
E-mail/E-pos: cycads@awwwesome.com.au

USA and Canada
Willie Tang
13320 SW 28 St.,
Davie, FL 33330, USA
E-mail/E-pos: wlm tang@bellsouth.net

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ON THE COVER:

Leidipozamia peroffskyana on the western slopes of Mount Tamborine, Queensland, Australia. The largest is a female specimen with a 4.5 meter trunk.



Roy Osborne stands next to the specimen for scale.

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FROM THE COUNCIL / VAN DIE RAAD

NUUS VANUIT DIE LAEVELD TAK/NEWS FROM THE LOWVELD BRANCH



Laeveld Tak / Lowveld Branch

Jan Joubert

Posbus 41, Malelane, 1320

Tel : 013 790 0880

Faks: 013 086 5548846

Sel: 083 459 0516

E-mail/ e-pos: joubert@absamail.co.za

Dalene Ludick

Sel: 082 327 9215

<i>Datum</i>	<i>Aktiwiteit</i>	<i>Koördineerder</i>	<i>Plek</i>
1 Februarie 2015	1st Kwartaallikse vergadering	Wim Struyf & Jan Joubert	Wim Struyf – Nelspruit
23–27 April 2015	Uitstappie saam met Gauteng	Jan Joubert	
24 Mei 2015	2de Kwartaallikse vergadering	Jan Joubert	Berg en Dal Sanpark
6–7Junie 2015	Uitstappie	Jan Joubert	Gauteng
2 Augustus 2015	3de Kwartaallikse vergadering	Fanie Vermaak	Fanie Vermaak – Nelspruit
28–30 Augustus 2015	Laeveld Broodboom verkope	Fanie Vermaak	Hall's Gate Way
8 November 2015	4de Kwartaallikse vergadering & Afsluiting	Jan Joubert & Dalene Ludick	Kwanyoni Lodge Nelspruit/ Marlin Pub & Grill

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4098 G	VORSTER, Mnr D	WONDERBOOM SUID, 0089

SOTETSU HERITAGE

CYCADS, SUSTENANCE AND CULTURAL LANDSCAPES IN THE AMAMI ISLANDS

P. Hayward* & S. Kuwahara**



Figure 1. Sotetsu crown with fruit, Tokunoshima, 2009 (source: Philip Hayward).

ABSTRACT

This article addresses the cultural heritage and, thereby, socio-historical perception of the *sotetsu* plant (*cycas revoluta*)¹ in Tokunoshima, the Amami islands and the broader Ryukyu archipelago of southern Japan. The article addresses the plant's function as an emergency/resilience food resource, a field windbreak, a defining feature of a particular 'cultural landscape' and a potent symbol within Ryukyu history. While the Amami islands are (now) part of Japan, the article views them from a Pacific history viewpoint, as an underdeveloped archipelagic annex to a major, densely-populated regional power and whose use of botanical and other primary resources has much in common with the islands of Oceania, not the least in terms of the "derivative vulnerabilities" (Lewis, 2009) arising from Amami's history of colonial disruption and economic exploitation. The discussions advanced in the article engage with the *sotetsu*'s nature as a food source, a progenitor of

related 'foodways' and its complex role in the cultural landscape and heritage of the Amami islands and, in particular, southern Tokunoshima. The concluding section considers the heritage value and context of the plant and of the distinctive hedged 'fieldsapes' within the context of contemporary economic development.

KEYWORDS

Cycad, *cycas revoluta*, *sotetsu*, Kanamizaki, Tokunoshima, Amami, emergency foods, resilience, foodways

CYCADS: AN INTRODUCTION

The cycad (*Cycadophyta*) is a genus of gymnosperm that can be traced back to the Permian era. The genus flourished in the Jurassic period and is now present in a range of tropical and sub-tropical regions, including Micronesia, Melanesia and Australia (see Whitelock, 2002). The species *cycas revoluta* is native to southern Japan, where it is known as the *sotetsu* (the term by which we will subsequently refer to it), occurring in a range from the Yaeyama islands south of Okinawa up through the Ryukyu archipelago to Kyushu island.² The

*Southern Cross University
**Kagoshima University

plant is hardy and well-suited to island environments, since it is salt-tolerant, and is also common further north as a result of its cultivation as an ornamental garden and landscape plant.³ The *sotetsu* grows fairly rapidly (for a cycad) and progresses from a (single) crown of leaves and minimal trunk to a tree-like growth of up to eight metres in height, which may include several metre-wide leaf crowns on a branching trunk structure whose base may measure up to 0.9 metres in diameter. In mature female specimens, the feathery, convex centre of the crown is the location for up to several dozen plum-sized red fruits whose flesh covers seeds up to 7.5cm in length. The resemblance of the tree to species of palm has led it to be (incorrectly) referred to as a 'sago palm' or, less commonly, 'fern palm'.

There is considerable literature on the *sotetsu* and related cycad species that describes the toxicity of its various components in its unprocessed state (see Whiting [1989] for a compendium of these). The principal cause of this toxicity is the presence of the glucoside cycasin, which causes a range of symptoms from severe gastric reactions through to liver failure (and is also carcinogenic). Beta-methylamino-L-alanine, a form of amino acid with various toxic effects, is also present.⁴ Despite these aspects of its biochemical make-up, the pulpy interior stem of the plant and its seeds have been widely used in Australia, Melanesia, Micronesia and South East Asia as a food source for indigenous peoples—a usage that continues to the present, albeit in a more limited form (given the increased availability of other, less preparation-intensive, food materials).

SOTETSU AND AMAMI HISTORY

For much of its early history, Amami was an autonomous collection of island communities with varying degrees of connection with each other. In the 14th and 15th centuries the area came within the sphere of influence of the expanding Ryukyu kingdom, based in Okinawa before being seized by the Satsuma clan from Kyushu in 1609, which dominated the region until the Meiji Restoration of 1868 that incorporated Amami into the modern Japanese state. Despite this, the region remained a largely overlooked regional 'backwater' with many islanders continuing to live in thatched huts with no access to mains water until well into the 20th century and with modernisation (including the construction of paved roads, brick and concrete buildings and electrification) not occurring on a large scale until after the withdrawal of occupying American forces in 1953⁵ and the islands' incorporation into Kagoshima prefecture.

The Satsuma clan utilised their domination of the Amami islands to force islanders to abandon their subsistence lifestyle, based on agriculture and fishing, in order to cultivate sugarcane for export to Kyushu, requiring them to labour in harsh conditions for little local profit and to the detriment of cultivating food resources for local consumption. This created a vulnerability that became all too apparent when a series of severe cyclonic events in the mid-late 1700s deposited substantial amounts of sea salt on fields, causing a series of famines that resulted in a significant number of deaths from starvation and migration from the islands. James Lewis's theorisation



Figure 2. Sotetsu hedged field, near Kanamizaki village, Tokunoshima, 2009 (source: Sueo Kuwahara).

of island vulnerability and resilience to indigenous and exogenous hazards (2009) offers a number of significant insights into island resilience and vulnerability. Drawing on analyses of catastrophes arising from European colonial intervention into islands such as Tonga (where “the otherwise descriptively rich... folklore and legend” of the pre-colonial era “seemed unconcerned with environmental hazard,” [ibid: 4]); Lewis has identified a system of “disaster imperialism” at work. In this colonial mechanism the vulnerabilities created by imperial disruption served to reinforce imperial control by weakening local societies and undermining the senses of resilience and self-sufficiency that characterised their pre-imperial operation. But whatever lowering of morale may have occurred in Amami as a result of the community’s newly-developed susceptibility to a range of environmental pressures, local response to the events of the mid to late 1700s was both proactive and significantly effective. Local concern to protect the population against subsequent crises resulted in the decision to plant *sotetsu* throughout the islands, on account of its salt-resistant properties, its value as an emergency food resource, its ability to provide effective wind/sea spray breaks for fields cultivating other plants in coastal areas and the usefulness of its leaves as a restorative, nitrogen-rich fertilizer for other crops (such as sugarcane and rice).⁶

The *sotetsu* proved a particularly useful resource during a series of adverse climate events in the early 1800s. Regional prosperity increased in the late 1800s, during the Meiji restoration, aided by a global rise in sugar prices and an unforeseen advantage to *sotetsu* cultivation, in the form of the export of its leaves to South East Asia and North America for use in floral displays. A slump in the sugar market in the early 1920s, and the global economic depression that followed at the end of the decade, caused severe hardship and famine to return to the Ryukyus and the *sotetsu* was once again accessed as a key foodstuff. Similar conditions recurred in Amami in the late 1940s and early 1950s during the US occupation. One term that came into broad circulation in Japan to describe the harsh conditions of these periods and, indeed, in some contexts, the Amami islands (and Ryukyus in general), was *sotetsu jigoku* (usually translated into English as ‘*sotetsu* hell’). Perceptions of the ‘hellish’ conditions of the time were strongly associated with the *sotetsu* itself on account of its predominance in diet, its intensive preparation requirements, the possibility of poisoning if not adequately prepared, and the bland, starchy nature of its stem pulp.

Kobayashi, who visited Amami in the early 1950s, described the lengthy preparation methods for the stem pulp in the following terms:

After removal of the outer scaly skin, the stem was cut into small pieces, 7–15 cm, and then left for some time under a straw mat so that it might become covered with fungi. The stem pieces fermented by the effect of the black fungi and others. Isolation of the starch was now easier and the toxic elements were removed. They were washed in water and then the starch was extracted. (Cited in Whiting, 1989: 228)

A series of photographs of this process taken by Hideo Hakari in the 1950s (reproduced in Thierret, 1958: 21) detail the chopping, drying and rinsing methods

involved and indicate the lengthy processing involved. Douglas Haring, a US scientific investigator who visited Amami in the immediate post-War period, noted that there was a “huge reliance” on *sotetsu* pulp, used as an ‘extender’ (to bulk out limited contents of other dishes) and that the *sotetsu* nut meal was the base ingredient in a local miso.⁷ He also noted that the *sotetsu* was “universally loathed” and that its consumers risked poisoning: “every now and then a batch of especial potency kills those who eat or drink the product” (1954: 227). Haring described a process of embarrassment and denial at work, with many locals identifying that while the poor might consume *sotetsu* products they were not themselves reliant on it (ibid).

Such local and external perceptions have established the *sotetsu jigoku* as a central element of much of Amami’s recent history; a history that has, in turn, served to define Amami identity. Community identity is not ‘given’, essential or static; it is *performed* in different ways in different places with different materials, different affective engagements and different outcomes. As Max Weber expressed, in a seminal attempt to define ethnicity, the “subjective belief” of a group “in their common descent because of similarities of physical type or of customs or both, or because of memories of colonization and migration” is fundamental to “the propagation of group formation” (1922/1978: 39). The performance of identity occurs in a number of contexts, and in socio-cultural terms these can include language, music, dance, cuisine, agriculture, traditional medicinal practice, and so on. These reinforce senses of shared customs and memories and produce tangible and intangible heritages. Individual acts of identity performance that define community identity are a product of locale, circumstance and of custom, reaction and/or innovation. In these senses, the *sotetsu*’s own growth from individual low crowned stubs to high, multi-branched field breaks is a performance of identity that produces a distinct cultural landscape through the plant’s growth, its interruption of wind force and saline dispersal, its creation of sheltered spaces for agriculture and its general construction of a ‘parcelled’ fieldscape and the network of laneways that humans have used to access and exploit its resources.

The cultivation of *sotetsu* and its preparation and consumption as an emergency food can be seen as common to Amami over the last three hundred years (at least) and the various ‘foodways’ identified with it are a key element in the performance of Amami heritage. As the subtitle of a seminal work of regional food research (Keller-Brown and Mussell [eds], 1984) stressed, foodways can be considered as [one type of] “performance of group identity”. In the preface to their recent volume of essays on Japanese foodways past and present, Eric C. Rath and Stephanie Assmann provide a similar emphasis in their inclusive definition of the field of research, emphasising that:

We can consider production, consumption and circulation of foods in the concept of foodways as well as political, economic, cultural, social, and religious dimensions to these. If we consider the subject chronologically, we can add disjunctures and continuities in practices, beliefs, and habits surrounding foods. (Rath and Assmann, 2010: 1)

Like any other element of the performed acts and outcomes that determine identity, foodways are complex in what they signify about local cultural heritage and ethnicity. Simply to be part of heritage is not grounds for valourisation.⁸ For Amami, *sotetsu* variously evokes the period of Satsuma oppression; the economic depression of the 1920s and 1930s; and/or the period of American occupation—all of which were periods when Amami society was adversely affected by external agencies and phenomena. Yet, for all its association with the ‘hell’ it is held to symbolise and exemplify, this association does not drown out or negate other possible engagements and reflections on performed identity. The ubiquity of the designation of *sotetsu jigoku* for Amami history, for instance, has tended to obscure the fact of the *sotetsu*’s demonstrable success and sustained resilience as an emergency food product and of the wisdom of the local enterprise to cultivate it widely across the region from the early 1800s on (at a time when global economic slumps, let alone American occupation were unimaginable future contingencies). In this regard we might just as accurately identify Amami and the wider Ryukyu islands as being characterised by *sotetsu kyuusai* (*sotetsu* rescue/salvation).⁹

SOTETSU CUISINE AND CULTURE

One of the most common characterisations of the deprivations of the *sotetsu jigoku* periods concerns the un-palatability of *sotetsu* dishes. This has led to routine repetition of this characterisation by many writers referring to Amami history, few (if any) of whom appear to have verified their contention with any direct experience of consuming *sotetsu* dishes. This is, in many ways, unsurprising since few writers and scholars working outside the area of Food Studies seem aware of the potential of taste and digestion as essential elements of research in food history. Indeed an indignant historian might well point to the difficulty of accessing *sotetsu* products when writing about the *sotetsu* as a symbol of Amami history primarily explored through broader socio-cultural analysis. Yet there is a problem here in the intensification of (ill-understood) secondary source characterisations combined with a peculiar under-estimation of human culinary skills and practices. It is a common human impulse to prepare food dishes that are palatable. Repeated experiences of food preparation and consumption—and experiment and communication with other producers and consumers—can identify techniques and recipes that produce food that is acceptable and, often, pleasant for consumers. There is no reason to assume that such practices did not influence patterns of *sotetsu* preparation and consumption over the last three hundred years and, indeed, significant evidence to the contrary. Such is the predominance of negative perceptions that the evidence is often in plain sight. Take, for example, the previously noted observations by the American scientific officer in Amami in the early 1950s who noted the “universally loathed” and frequently poisonous nature of the *sotetsu* as a food stuff, without noting the contradictory aspects of its widespread consumption, at a time of improving socioeconomic conditions, and, most pointedly, of its packaging and export to markets in main island Japan (Haring, 1952, cited in Whiting, 1989: 227). While Haring did not identify the off-island consumers who were purchasing and consuming the product, and while these may have been Amami

islanders who had relocated to Kansai and Tokyo; the simple fact of their purchase of *sotetsu* products suggests that “universal loathing” may have been something of an exaggeration. This is not to deny that the starchy trunk pulp, in particular, was commonly regarded as poor substitute for a range of other foods but rather that alternate perceptions were also present.

In terms of memories and cultural inscriptions of the taste of the *sotetsu*, the observations of external researchers are notable. Writing in the 1880s, J.E. Smith described the taste of roasted *sotetsu* nuts as possessing “the flavour of chestnuts, with less sweetness and a more watery consistence” (cited in Thierret, 1958: 1) while

W. Hooker observed in 1830 that the flavour was “sweet but insipid” (ibid). While these are hardly ringing culinary endorsements, they at least offer an alternative perspective to the hegemonic negativity of most Japanese characterisations. Local research has also begun to acknowledge the role of *sotetsu* in Amami cuisine. Tsuyu Fujii’s *Shima No Juri* (‘Foods and Recipes of Amami’ [1999]) includes details of preparation of ‘flour’ from the *sotetsu* trunk and ‘meal’ from the nuts. While the author accompanies her recipes for *narigai* (nut meal porridge) and *shingai* (stem flour porridge) with cautions about the palatability of the porridges to contemporary tastes, she also identifies the “strong leavening power” of the nuts as making a “tasty *nari miso*” (Fuji, 1999: 153), a product made by combining boiled soy beans and chopped prepared *sotetsu* nut in a preparation traditionally stored in large jars. The authors of this article

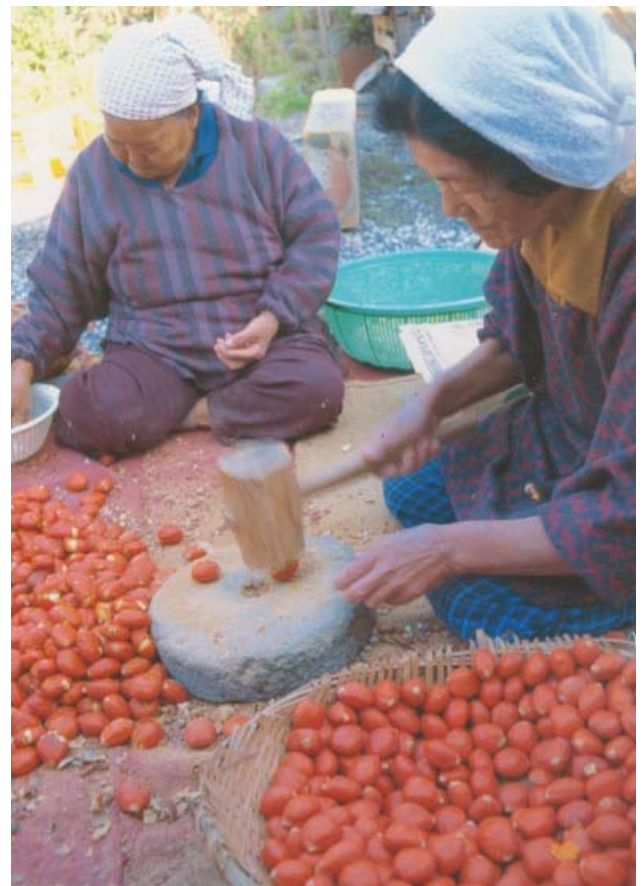


Figure 3. Splitting the *sotetsu* nut to extract ‘meal’ for miso preparation, Toguchi village, Amami Oshima, 1998 (source: Nishida [1998]: 112).

also found confirmation of local perceptions of the palatability of *nari miso* while researching in southern Tokunoshima in 2009. During one interview, for instance, Suma Yamamoto, a 93 year old woman from Kanamizaki village, who grew up during the economic depression of the 1920s, recalled her childhood memories of her family harvesting *sotetsu* fruit in the fields adjacent to the village and processing the seeds to make a year's supply of miso. She recalled the miso as a "delicious" element of her childhood cuisine and also remembered the attractive nature of the fruit when it was ripe and ready to be harvested.

While Yamamoto's recollections might (all-too-easily) be dismissed as the result of nostalgia for a long-lost youth, her account has a major advantage over broader historical characterisations in that it reflects sustained knowledge and consumption of *sotetsu*. In this regard it is also relevant that she did not present her perceptions as contradictory to local perceptions but rather complemented them with reference to cultural inscriptions of the *sotetsu* in song. Referring to the attractive *sotetsu* fruit, she recalled a line from a mid-20th century Amami song which proclaims that "The redness of the *sotetsu* fruit is beautiful". In itself the line is significant, at least within the general derogatory discourse concerning the plant detailed above, but its production context is also significant. The line derives from a song entitled 'Sotetsu no Nari' ('Sotetsu Fruit'), a prize-winning poem by author Tadashige Shigeyama set to music by Hozo Matusda and popularised by singer/*sanshin*¹⁰ player Miyoko Nakai on a 7 inch vinyl recording issued by an Amami recording company in 1956. The song was released at an important time in Amami: American forces had recently withdrawn, the deprivations of the immediate post-War period were softening and the island was reasserting itself at the same time as it was engaging with reconstruction-era main island Japan. Tokunoshima-born entrepreneur Yoshihiko Ibusuki opened Central Gakki music store in 1949 in the Amami capital of Naze and began recording and releasing local music, mainly in the traditional local *shima uta* (island folk song) style, in 1956. Ibusuki's initiative aimed to retain and revive traditional Amami music at a time of cultural trauma and transition. The writer's choice to build a tender poem around the imagery of *sotetsu* fruit (and the label's subsequent choice to release a musical adaptation as one of its first singles) suggests a readiness to (re-)embrace an iconic local plant in a more celebratory context than common characterisation of periods of *sotetsu jigoku* suggest. The song's opening lyrical couplet produces a striking image of passion: "The redness of the *sotetsu* fruit is beautiful/ [It is] just like the colour of my lover's heart" (authors' translation¹¹); and the song goes on to conjure images of moonlit beaches and bird song as conducive to love making. Suma Yamamoto's reference to the song to reinforce her youthful memory can thereby be understood not so much with reference to a single snippet of verbal (and melodic) imagery but rather in terms of the song's broader affective dimensions and the context of an earlier era of local cultural reassertion.

MODERN CONTEXT

Since the reversion to Japan in 1953 the Amami islands have experienced a steady increase in prosperity and amenities, together with a rural-urban drift from

outlying islands and villages to the Amami capital, Naze, and to major Japanese cities such as Osaka, Tokyo and Kagoshima. While far from prosperous (in comparison to either main island Japan or Okinawa) in the last half-century the islands have not experienced any of the environmental or socio-economic pressures that caused them to rely on *sotetsu* as an essential foodstuff as in previous periods and, with little immediate prospect of such hardships returning to the region, the *sotetsu* has faded from consciousness as an essential and/or emergency food source. In this new context, the cultural landscape created by *sotetsu* hedged fields and laneways, such as that around Kanamizaki, has been 'lapsed' as a resilience resource and now serves other functions. One of these is relatively contiguous with its historical use, providing small cultivation patches for local residents to grow vegetables to supplement their purchased groceries (or, in some instances, to neglect as weed choked enclaves within a more actively cultivated area). Another is a product of both the lapsing of resilience function and the arrival of tourism in the islands. The latter has been a somewhat volatile phenomenon. Following the reversion to Japan in 1953, and particularly during the economic boom years of the 1960s–early 1970s, the Amami islands experienced a surge in tourism as Japan's most southerly islands, with Yoron, in the far south of the group, being a particular beneficiary of holiday-makers' impulses to head as far south as possible. This situation persisted as long as the US administration in Okinawa retained barriers against movement between "its" islands and main island Japan, which finally dissolved in 1972 when the administration returned control of Okinawa to Japan. With their most southerly status lost, tourism declined in Amami. A partial revival in the 1990s proved short-lived. Evidence of this is clearly ap-



Figure 4. View of *sotetsu* 'tunnel' laneway outside Kanamizaki village, Tokunoshima, 2009 (source: Sueo Kuwahara).



Figure 5. View of sotetsu hedged field outside Kanamizaki village, Tokunoshima, 2009 (source: Suelo Kuwahara).

parent close to Kanamizaki village in the form of the foundations and access roads of the now-demolished Hotel New Otani at the end of an overgrown track on a nearby bay. During the latest peak in tourism, the laneways of the *sotetsu* fields were resignified as a botanical attraction through their laneways' designation as *sotetsu tonneru* ('sotetsu tunnel'), and the overall aggregation of mature plants as a "jungle". Accompanying this (attempted) resignification of the area was the erection of a gift shop adjacent to the fields, which still operates, although with a low volume of trade, selling seashells, trinkets and clothing. Given the area's nature as an aggregation of individually-owned small field parcels with no coherent identity or management, it is perhaps unsurprising that its owners have not yet identified or explored the option of securing a heritage status for the area.

One heritage status directly relevant to the Kanamizaki *sotetsu* fields is that of 'Globally Important Agricultural Heritage Systems' (GIAHS), a category identified, advocated and administered by the United Nations' Food and Agriculture Organization (FAO). While this initiative is far less well known than UNESCO's world heritage scheme, the Kanamizaki *sotetsu* fields exemplify many of the characteristics of GIAHS identified by the FAO, in that they are "ingenious agri-cultural systems" based on "complex and innovative land-use/management practices" that have evolved "due to geographic isolation, fragile ecosystems, political marginalisation, limited natural resources, and/or extreme climatic conditions" and exhibit "ecosystem resilience and robustness" premised on "generations of accumulated dynamic knowledge and

experience" that constitute a "valuable cultural inheritance" (Koohafkan and Cruz, 2011: 22–23).

The lack of quest for heritage status for Kanamizaki fields reflects a number of factors. The principal ones concern both the functionality of the area as a used agricultural space and the lack of pressure for clearance and/or redevelopment of the fields, given the low density of population in the area. This has failed to create the kind of pressures on the Kanamizaki *sotetsu* fields that the FAO has identified as key to its strategic designation of particular traditional agricultural systems as GIAHS and the various 'Pilot' and 'Candidate' systems identified to date (including the Wannian traditional rice culture system of Heqiao village in China¹² and the 'lemon gardens' of Sorrentina-Amalfitana in southern Italy¹³). Another factor that might be identified is a sense of cultural ambivalence towards a plant and agricultural system inextricably associated with times of oppression and famine.

Similarly to the physical space of the fields and the botanical resource, *sotetsu* products are no longer produced as emergency foodstuffs but now occupy one of two positions in a small but significant contemporary 'foodway'. The first is as a locally-produced and privately consumed product and the second is as a specialist food, packaged and marketed for both local consumers and, increasingly for tourists. Contemporary production of *sotetsu* products has arisen in both Tokunoshima and Amami Oshima. In the former instance, a popular *ryokan* (traditional inn) in Kanamizaki village stocks lo-



Figure 6. Shigeko Yoshida of Aji-no Sato Kasari showing sotetsu products on sale in the shop, 2011 (source: Sueo Kuwahara).

cally-made *nari miso* alongside a range of other local products in its restaurant. In Amami Oshima the *miso* is more widely available, selling in a supermarket in Naze, at a gift kiosk at Amami airport and at a shop in northern Amami Oshima named Aji-no Sato Kasari. The latter is particularly significant. Founded in 2002 by a group of eleven women from northern Amami Oshima, it represents a local heritage enterprise designed to preserve, produce and promote traditional recipes and foodstuffs to the local community and tourists (Figures 6 and 7). The operation makes approximately 200kg of *sotetsu miso* per month¹⁴ and produces additional *miso* for special events promoted by the organisation. Amami communities around Osaka and Tokyo also provide a limited but steady export market and the company has recently acquired additional main island customers following the broadcast of a television item that commented on *sotetsu's* high mineral content and (alleged) ability to prevent the onset of dementia.¹⁵

As will be apparent, the production, marketing, purchase and consumption of *sotetsu* food products in the contemporary period reflect a significantly different perception of the product than the reviled plant conjured by the expression *sotetsu jigoku*. With regard to its highly specific connection to locality and processed *sotetsu's* status as a heritage product, its marketing has similarities to the revival of local product in areas such as Iwate (at least prior to the 2011 tsunami disaster) discussed in Love (2010) in the context of the attempted *kasseika* ('vitalization') of regions experiencing economic contractions following the economic downturn of the 1990s. As Love details, this process involved accessing the memories of senior community members as to traditional food sources, cultivation, preparation and culinary techniques. But while Love notes that producing Iwate heritage vegetables as a premium product involved an acknowledgement that local vegetables "are no longer

dietary necessities borne of deprivation but a reflection of refined food sensibilities" (2010: 228); Iwate food producers were not faced with the significant stigma that is still attached to the *sotetsu* product. In this regard, the marketing and packaging of Amami *sotetsu* products is significant. There is no attempt to erase the image of the *sotetsu* plant but rather a foregrounding of it; a resilience of commodity and imagery that is finding a new – albeit niche – market.

CONCLUSION

Well after its period of frequent reliance on the *sotetsu* as emergency food source, the Amami islands continue to benefit from its durable and versatile indigenous cycad. Along with the continuing export of their dried leaves for funerary displays, the plant, which has been characterised as the most internationally "popular and widely used cycad... used as a garden plant in every country that has a tropical to Mediterranean climate" (Lovelock, 2002: 139) is now a profitable export, with seeds and potted plants being dispatched to a variety of international locations, where it is marketed and promoted by international aficionado networks¹⁶ and local retailers free of any of the stigma of its homelands. As the distance from the *sotetsu jigoku* years increases the product has been increasingly (re-)considered as a viable crop. As a survey of uses of *sotetsu* in Amami in the late 1990s conducted by agricultural researchers from Kagoshima University identified, *nari miso* had gained positive responses in consumer tests on account of "its unique taste and low salt content" (Kira and Miyoshi, 2000: 31) and tests were underway to evaluate *sotetsu's* potential as an ingredient in noodles and confectionery. While the latter have not developed into significant products, the recent sales of *nari miso* in main island Japan identified above suggest that *nari miso* has the potential to succeed in a context that Kira and Miyoshi



Figure 7. Sotetsu products on sale in Aji-no Sato Kasari, 2011 (source: Sueo Kuwahara).

identified as important for a region with population decline and an ageing demographic:

In the future, it will be necessary to develop products which consumers outside the local area will accept as products for their specific taste rather than products for general use, so that they may come into commercial production as specialty products of the Amami Archipelago. (ibid)

As the base for regional specialty products, *sotetsu* has the capacity to combine with other local elements to influence regional branding. In this context the development of products that actively utilise the *sotetsu* as an asset in packaging and marketing has the opportunity to dovetail with the promotion of areas such as the Kanami-zaki *sotetsu* fields as important heritage assets, worthy of tourist visitation (both in themselves and within the framework of GIAHS identified by the FAO). A successful integration of these initiatives would thereby allow the much-maligned, versatile and dependable *sotetsu* to enter a new stage of usefulness for Amami, free from the elaborated stigma of regional deprivation triggered by the Satsuma clan's introduction of sugar plantations and the "derivative vulnerabilities" that subsequently became entrenched in the islands and from which they are only now beginning to emerge as they seek a new position in the Japanese economy.

ACKNOWLEDGEMENTS

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ENDNOTES

- ¹ It is also (misleadingly) referred to in English as the 'sago palm'.
- ² See Kyoda (2010) for a discussion of its distribution and low genetic diversity.

- ³ See Osborne and Tomiyama (1995) for a discussion of its cultivars.
- ⁴ While there is not extensive evidence of its harmful impact on humans in Ryukyu, this amino acid has been extensively documented for its impact on residents of Guam who consume the local cycad variety *cycas circinalis* (see Spencer et al., 1987). Also see Sachs (1997) for a discussion of its relationship to various health conditions on Pingelap island.
- ⁵ US forces occupied Amami between 1946 and 1953, effectively cutting it (together with Okinawa and Ogasawara) off from main island Japan.
- ⁶ See, for instance, Nagoya, 1984: 141, for historical reference. In addition to these intended uses, the plant later became a valuable export commodity, with dried leaves being exported to South East Asia, Europe and North America for use in funerary rites from the late 1800s on (see Thierret, 1958: 28); seeds were also processed for laundry starch from the 1930s on and the plant was used for various medicinal purposes (K. Nishia, cited in Whitelock, 2002: 139).
- ⁷ Both of which are products resulting from fermentation affected by the *aspergillus oryzae* fungal mold.
- ⁸ As Kalcik has identified, for instance, criticism of particular traditional dishes as unpalatable and/or tasteless is not uncommon as an 'in-group' practice (1984: 56).
- ⁹ Aside from food resource properties, *sotetsu* leaves also formed a useful cash product for the islands in the early 20th century, when its leaves were exported to Java for use in funeral rituals (Haring, 1952, cited in Whiting, 1989: 226).
- ¹⁰ The *sanshin*, a three string fretless banjo-like instrument, is an icon of Ryukyu culture.
- ¹¹ See Ibusuki, Ibusuki and Ogawa (2011: 678) for a full Japanese translation of the original Amami language lyrics.
- ¹² See <http://www.fao.org/nr/giahs/pilot-systems/pilot/rice-culture-system/maasaiagropastoral-summary00/en/> (accessed April 2011).
- ¹³ See <http://www.fao.org/nr/giahs/candidate-system/candidate/lemon-gardens/lemongardens-summary/en/> (accessed April 2011).
- ¹⁴ Figures provided by Shigeeko Yoshida of Aji-no Sato Kasari to the authors (interview May 2011).
- ¹⁵ Ibid.
- ¹⁶ See, for instance, The Cycad Society, <http://www.cycad.org/>.

BIBLIOGRAPHY

- FUJII, TSUYU 1999. *Shima No Juri* ('Foods and Recipes of Amami'), Kagoshima: Nanpo-shinsha
- HARING, DOUGLAS G. 1954. 'Comment on Field Techniques in Ethnography Illustrated by a Survey in the Ryūkyū Islands', *South-western Journal of Anthropology* v10 n3 Autumn: 255–267
- IBUSUKI, MASAKI, IBUSUKI, KUNIHICO & OGAWA, HISAO 2011. *Amami Minyo Souran: Amami Shima-uta Zen-Kashi, Kyoutsugo-yaku, Zen-Kyokumoku* ('Comprehensive List of Amami Folk-songs: All Lyrics of Amami Shima uta, Translation into Standard Japanese with Commentaries'), Kagoshima: Nanpōshinsha
- KALCIK, SUSAN 1984. 'Symbol and Performance', in Keller-Brown, Linda and Mussell, Kay (eds) (1984) *Ethnic and Regional Foodways in the United States: The Performance of Group Identity*, Knoxville: The University of Tennessee Press: 37–63
- KELLER-BROWN, LINDA & MUSSELL, K. (eds) 1984. *Ethnic and Regional Foodways in the United States: The Performance of Group Identity*, Knoxville: The University of Tennessee Press

- KIRA, KESAYOSHI & MIYOSHI, AKI 2000. 'Utilization of SOTETSU (*Cycas revoluta*) in the Amami Islands', *Kagoshima University Forests Research Bulletin* v22: 31–37
- KOOHAFKAN, PARVIZ & CRUZ, JANE 2011. 'Conservation and Adaptive Management of Globally Important Agricultural Heritage Systems (GIAHS)', *Journal of Resources and Ecology* v2 n1: 22–23
- KYODA, S. 2010. 'Phylogeography of *Cycas revoluta* Thumb. (Cycadaceae) on the Ryukyu Islands: very low genetic diversity and geographical structure', *Plant Systematics and Evolution* n288: 177–189
- LEWIS, J. 2009. 'An Island Characteristic: Derivative vulnerabilities to indigenous and exogenous hazards', *Shima: The International Journal of Research into Island Cultures* v3 n1: 3–15
- LOVE, B. 2010. 'Mountain vegetables and the politics of local flavor in Japan', in Rath, Eric and Assmann, Stephanie (2010) *Japanese Foodways: Past and Present*, Champaign: University of Illinois Press: 221–240
- NAGOYA, SAGENTA 1984. *Nanto Zatsuwa: Bakumatsu Amami Min-zokushi* ('An Ethnography of Amami at the End of the Edo Period'), Tokyo: Toyo-Bunko Nishida, Teruko (1998) *Sei naru Shima Amami* ('Amami—A Holy Island'), Kagoshima: Hoshi-Kikaku
- OSBORNE, R. & TOMIYAMA, HAJIME 1995. 'Focus on *Cycas revoluta*', *Encephalartos* n41: 5–15
- RATH, E. & ASSMANN, S. (eds) 2010. *Japanese Foodways: Past and Present*, Champaign: University of Illinois Press
- SACHS, O. 1997. *Island of the Colorblind*, New York: Vintage
- SPENCER, P.S, NUNN, P.B, HUGON, J. et al. 1987. 'Guam amyotrophic lateral sclerosis-parkinsonism-dementia linked to a plant excitant neurotoxin', *Science* v31 n237: 517– 522
- THIERET, J. 1958. 'Economic Botany of the Cycads', *Economic Botany* v12 n1: 3–41
- WEBER, M. 1922/1978. *Economy and Society* Volume 2, Berkeley: University of California Press
- WHITELOCK, L.M. 2002. *The Cycads*, Portland: Timber Press
- WHITING, M. 1989. 'Neurotoxicity of Cycads: An Annotated Bibliography for the Years 1829–1989', *Lyonia—Occasional Papers of the Harold L. Lyon Arboretum* v2n5: 201–270

COULD FORENSIC TRACERS HELP SAVE OUR WILD CYCADS?

K. Retief, M. Pfab & Dr. A. West



Figure 1. Twenty-four *Encephalartos lehmannii* plants confiscated from poachers. This species is listed as Near Threatened in the IUCN Red List.

THE CURRENT EXTINCTION CRISIS

Cycads are the most threatened group of plants on Earth, with 62% classified as threatened in the 2010 IUCN global assessment. South Africa is a cycad diversity hotspot with 37 species in the genus *Encephalartos*, yet 78% are threatened with extinction. The greatest threat to our cycads is illegal harvesting from the wild (see Figure 1). Three species are already extinct in the wild, four are close to extinction and another seven have fewer than 100 individuals remaining. The rate of loss has placed the existence of wild cycads on a knife's edge.

CYCAD FORENSICS: A SOLUTION TO THE CRISIS?

One of the greatest challenges to regulating this illicit trade is providing proof of wild origin once cycads are removed from the wild. A collaborative study between the South African National Biodiversity Institute and the University of Cape Town is developing a solution to this problem by using stable isotopes to distinguish between wild and cultivated cycads. Stable isotopes have been used in numerous forensic studies, such as determining the origin of drugs and ivory, and are now being applied to cycads.

So how do stable isotopes work?

Stable isotopes of an element have the same atomic number, but differ in atomic mass. They are called “stable” as they do not radioactively decay, and so can act as a permanent tracer. Importantly, geographic locations differ in their composition of stable isotopes, leading to a distinct chemical signature that can be identified in the tissue of a plant from that growing location. This allows us to identify growing localities and potentially link formerly wild cycads back to their populations. Practically, we sample the oldest section of the stem (possibly representing wild tissue) and leaves (grown in the current location) of a suspicious cycad and compare these stable isotope signatures with those of the wild population (see Figure 2). Radiocarbon dating is also used to determine when a cycad was removed from the wild.

Stable isotopes are advantageous forensic tracers because they cannot be removed from the plant. Thus a plant carries its history with it and can be examined *in situ*, without the need to have marked the plant beforehand in the wild. This history can be compared with a reference database of plants from the wild to determine the likelihood of a wild origin, or compared with specific locations to test the veracity of claims of origin. This technique is currently being tested in specific investigation case studies.

BOX 1: LEGAL FACTS ABOUT CYCADS

- Cycads are listed as Threatened or Protected Species (TOPS) in terms of the National Environmental Management: Biodiversity Act (NEMBA) of 2004, therefore permits are required for possession and translocation of all indigenous cycads or cycad material. (Note these are not the only restricted activities requiring permits for cycads.)
- Harvesting of wild cycads without a permit has been illegal since the 1970s.
- As from May 2012, it is prohibited to harvest, trade, sell, buy, donate, import, export, convey or receive any wild indigenous cycad (even plants that have possession permits).
- Possession of wild origin cycads is also prohibited, unless they form part of legally obtained parental stock where permits were issued prior to May 2012.
- CITES permits are required for all imports and exports of cycads and cycad material. (South

Africa has been a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1975. Cycads are listed in Appendix I, meaning that commercial trade is not allowed. However, artificially propagated specimens are exempt from this ban. CITES has defined strict criteria for deciding when a specimen is “artificially propagated”.)

- Artificially propagated cycads with a stem diameter of more than 15 cm (or for dwarf species more than 7 cm) may not be exported from South Africa.
- Penalties for contraventions of any of the above laws (e.g. collection, possession and trading in illegal cycads) are up to 10 years in prison, or a R10 million fine, or both.
- If you suspect: The responsible action is to report any suspicious cycads or activities to the Department of Environmental Affairs’ Environmental Crimes Hotline on 0800 205 005

Other advances in cycad forensics

Another new technology is the use of microdots, which are invisible to the naked eye. Microdots are similar to microchips in that they have a unique reference tag, but instead of being inserted into the stem, hundreds are sprayed onto the outside of the stem. DNA fingerprinting of wild populations has also been done for some species, thus there is a unique DNA reference for these wild plants that can never be altered. The use of stable isotopes in combination with these other forensic technologies now provides the Green Scorpions with a comprehensive suite of methods for identifying cycads removed from the wild. These forensic methods may be the break-through needed for saving our critically threatened cycads from an extinction crisis.

FORENSIC TRACERS AND LEGAL IMPLICATIONS

Advances in forensic tracers are helping to determine when and where a cycad originated from. This will

not only improve detection of the illegal cycad trade, but will also ensure better management of the legal trade with cultivated plants. Proof of origin will facilitate compliance with the CITES regulations. Stable isotopes can assist in identifying suspect cycads during export and ensure that parent plants used to propagate exported seeds/seedlings are legal.

As from 2012, it is illegal to trade with any cycad that came from the wild. This includes wild cycads permitted prior to May 2012 (see Box 1), which a person can still legally possess, but is unable to trade, sell, buy, donate, import, export, convey or receive. Box 2 provides guidelines for identifying cycads that may have originated from the wild. If you suspect a cycad originated from the wild, do not purchase it and inform environmental officers in your region.

Cycads are part of our national and global heritage. The illegal trade is threatening the survival of this 300 million-year-old lineage, and is depriving South Africans

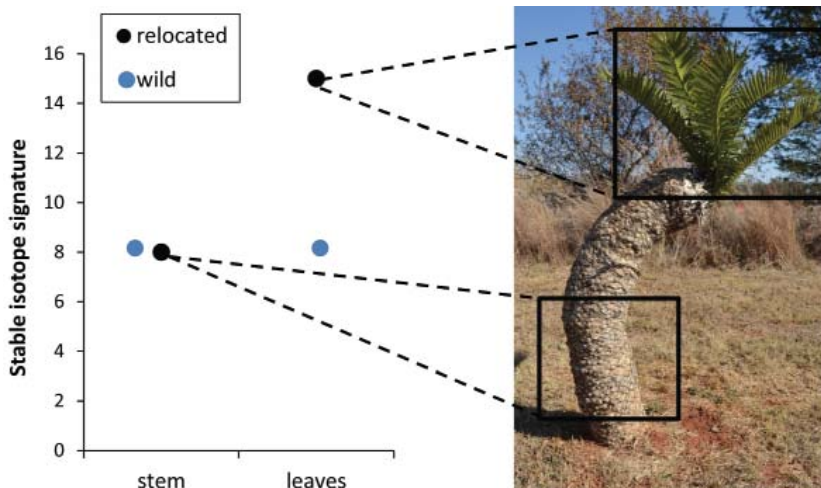


Figure 2. Sampling of the stem and leaves from a relocated and wild plant can show that the stable isotope signature in a relocated plant is consistent with a wild origin, whereby the stable isotope signature in the old tissue sampled from the base of the stem in the relocated plant matches the stable isotope signature in the wild plant, while the signature in the new tissue sampled from the leaves is completely different.

BOX 2: HOW DO I KNOW THAT I AM NOT BUYING A WILD CYCAD?

- A cycad may be of wild origin if it has one or more of the following features:
- micro-chip in the stem (the plant would need to be scanned to determine whether the
- micro-chip identifies the plant as a legal garden cycad or a wild cycad)
- stem with strange deformities
- over hanging stem shaped like a crescent
- variations in the diameter of the stem (indicating varying growth rates)
- long stems with small leaf bases (indicating slow growth)
- compact, generally smaller leaf bases at the lower parts of the stem (indicating harsher wild conditions) and bigger leaf bases further up the stem (indicating milder garden conditions)
- multiple side branches from the main stem
- burn marks on the stem from veld fires
- stem sanded with wire brush or sand paper to remove burnt leaf bases
- cut marks on the stem made from a panga when removing the cycad from the wild
- deep holes in the base of the stem where poachers have tried to remove the micro-chip
- absence of leaves
- patches of leaf bases completely removed by porcupine or traditional healers in the wild (very unlikely in a nursery)
- numerous old leaves still attached to the stem or recently removed (this is the dress of the cycad, which is usually cut off in garden specimens).
- no permit or the permit is not for the correct size and threatened status of the species

and foreign tourists alike from seeing these iconic plants in the wild where they belong (Figure 3). While advances in forensic sciences may help to limit this trade, ultimately the survival of these iconic plants will depend on individuals choosing not to purchase wild-harvested cycads.

READING

DA SILVA, J.M., DONALDSON, J.S., REEVES G. & HEDDERSON, T.A. 2012. Population genetics and conservation of critically small cycad populations: a case study of the Albany Cycad, *En-*

cephalartos latifrons (Lehmann). *Biological Journal of the Linnean Society* 105, 293–308.

NEWTON, C. 2014. Rarer than rhino and just as prized by poachers. University of Cape Town webpage.

NORDLING, L. 2014. Forensic chemistry could stop African plant thieves: Isotope analysis could help in the rush to save South Africa's cycads from extinction. *Nature* 514(17) DOI:10.1038/nature.2014.16010.

RETIEF, K., WEST, A.G. & PFAB, M. 2014. Can stable isotopes and radiocarbon dating provide a forensic solution for curbing illegal harvesting of threatened cycads? *Journal of Forensic Sciences* 56 (6), 1541-1551. DOI: 10.1111/1556-4029.12644.



Figure 3. Mature *Encephalartos friderici-guilielmi* (Near Threatened) in the wild. Photo by De Wet Bösenberg.

CYCAS BEDDOMEI DYER (CYCADACEAE) FROM WILD TO CSIR-NBRI BOTANIC GARDEN

J.S. Khuraijam & A.K. Goel

Of the 107 species of *Cycas* Linn. reported so far the world over, *Cycas beddomei* Dyer is the only *Cycas* species to be listed in **Appendix-I** of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, 2003; Osborne *et al.*, 2012). This species is endemic to the Tirumala-Kadapa Hills in Seshachalam Biosphere Reserve of Chittoor and Kadapa districts of the state of Andhra Pradesh. It is locally known as 'Perita' in Telugu language (Rao, 2010; RBGS, 1998-2012). *Cycas beddomei* is listed in the IUCN Redlist and categorized as an endangered taxon. The species is also protected under the Schedule - VI (Section - 2) of the Wildlife (Protection) Act 1972 by the Government of India (MOEnF, 1991). The species listed in Schedule - VI are prohibited from cultivation and planting.

An expedition was recently organized to survey the species and collect *Cycas beddomei* from its natural habitat for conservation studies in the Botanic Garden, CSIR-National Botanical Research Institute, Lucknow. On 26th November 2014, a team of 6 persons, which included forest department officials, visited Tirumala hills for an intensive survey of the wild populations of *Cycas beddomei*, to identify viable habitats where the collections could be carried out. A population around 8 - 10km from Dharmagiri in the Tirumala Hills was located and demarcated for the collection of this taxon. Several mature plants, both male and female ones, were present at the site and plants with intact, mature, viable seeds were also present. At some individuals seeds were found scattered on the ground with the fleshy outer coat (sarcotesta) eaten by wild animals. The following day, with due permission from the forest department headquarters, the team visited the site again to collect the specimens.

Cycas beddomei usually grow in clumps and removing individual plants was very difficult. A few plants were selected and dug out without damaging the roots. Four plants measuring 30-50cm in length and seven small plants were collected. Seeds were also collected for *ex-situ* conservation studies in the CSIR-NBRI Botanic Garden. Special care was taken to avoid damage to leaves and roots during the relocation of plants from the Tirumala region to Lucknow. Three days after collection from Tirumala - Kadapa Hills, the four bigger specimens were planted in the ground in the Cycad House of the Botanic Garden while the smaller plants were planted in earthen pots. The plants are under observation and each plant is being regularly monitored to ensure their survival, just like the other cycad species being conserved in the Cycad House. With the arrival of these wild collected specimens from Tirumala Hills, CSIR-NBRI Botanic Garden



Figure 1. A viable habitat of *Cycas beddomei* in Tirumala Hills, Seshachalam Biosphere Reserve.

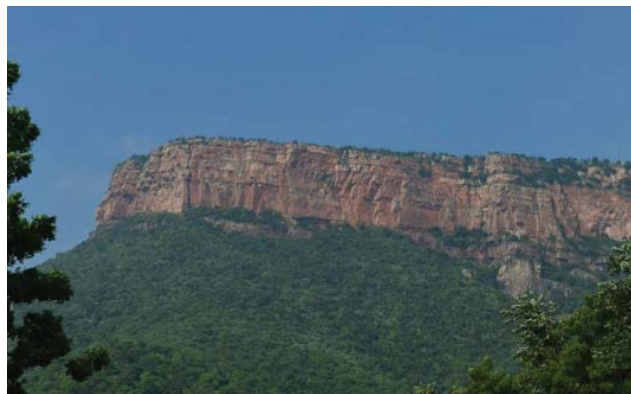


Figure 2. Tirumala Hills, Chittoor district, Andhra Pradesh.

is now one of the pioneers in *ex-situ* conservation of this very rare, endangered and endemic cycad species.

The main factor causing the rarity of this plant species is the destruction of natural habitats by development activities. In addition, it is also overexploited by the locals in the form of the collection of male cones for the preparation of rejuvenating herbal tonics. The stem pith is also crushed finely and made into a paste and used in ponds and streams to encourage faster multiplication of prawns.

ACKNOWLEDGEMENTS

The authors are thankful to the Director, CSIR-NBRI, for all the encouragement and support of the conservation studies at the Botanic Garden and to the authorities of the Forest Department, Government of Andhra Pradesh, for assisting in any way possible with the survey and collection of the plant specimens.

REFERENCES

- CITES. 2003. Review of Significant Trade Cycads. <http://www.cites.org/eng/com/pc/14/E-PC14-09-02-02-A1.pdf>
- MOEnF, 1991. The Indian Wildlife (Protection) Act, 1972: Schedule VI (Section 2). <http://envfor.nic.in/legis/wildlife/wildlife2s6.pdf>

Botanic Garden, CSIR-National Botanical Research Institute
Rana Pratap Marg, Lucknow-226001, India
Email: jskhuraijam@yahoo.com,
kgoelofcsirnri@gmail.com



Figure 3: *Cycas beddomei*: a) Uprooting of an individual plant, b) uprooted plant, c) Re-planting at the Cycad House, NBRI Botanic Garden.

OSBORNE, R., CALONJE, M.A., HILL, K.D., STANBERG, L. & STEVENSON, D.W. 2012. The World List of Cycads. Proceedings of 8th International Conference on Cycad Biology, Panama. Memoirs of The New York Botanical Garden. The New York Botanical Garden: New York.

RAO, B.R.P. 2010. *Cycas beddomei*. The IUCN Red List of Threatened Species. Version 2014.3. www.iucnredlist.org. Downloaded on 02 December 2014.

RBGS. 1998-2012. *Cycas beddomei*. <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/cycadpg?taxname=Cycas+beddomei>

REMEMBERING NAT GROBBELAAR

P.Vorster*

On the 4th January Nat Grobbelaar died, aged 86. We shall miss him, but we won't forget him.

He always promoted the protection and correct use of the Afrikaans language, and the creation of Afrikaans botanical terminology through his association with the South African Academy for Science and Arts. That this tribute is written in English rather than in Afrikaans should not be seen as a sign of disrespect – it was done so that Nat's and our friends abroad who are not familiar with Afrikaans, can share in our memories and appreciation.

Nat has been part of the Society almost since the beginning, his membership number being 96. He hasn't been merely a member, but a very active member, one who did enormously much to make the Society what it is today. He was the second President, serving from 1990 to 1993. During this short tenure he recruited two colleagues from the University of Pretoria, namely Isabella Claassen who served us for many years as Editor of ENCEPHALARTOS, and Guillaume Theron who acted as our Secretary for just as long. I remind the reader of my note in ENCEPHALARTOS 42: 27 (June 1995) on the central role played by the Botany Department of the University of Pretoria in cycadology in general and the Society in particular. He also persuaded his supportive wife, Hanneke, to share the fun, and she was a very active and efficient Secretary to the erstwhile Transvaal Regional Branch (now the Central Regional Branch). Together with Roy Osborne he organised the Third International Conference on Cycad Biology, hosted by the Society in 1993. He was a regular contributor to ENCEPHALARTOS, and his articles, comments, and letters graced its pages at least 96 times, covering a wide range of topics. He was the driving force in the writing of our first Constitution and he was responsible for the establishment of our Research Fund.

His contributions to the knowledge of cycads ranged far beyond the Society. The crown jewel of his achievements is his book *BROODBOME, met spesiale verwysing na die Suider-Afrikaanse soorte*, with an English edition *CYCADS, with special reference to the Southern African species* (reviewed in ENCEPHALARTOS 73: 39–40, March 2003). It is one of the very best treatises ever published, with answers to any conceivable question about cycads. Nat was always a stickler for correctness and in this book he introduced a startling terminology to correct less than perfect application of terms.

*34 Brandwag Street, 7600 Stellenbosch.
E-mail: pjvors@gmail.com

One of Nat's most endearing characteristics was his lack of conformation. He was outspokenly cross-grained. On the one hand it did not necessarily win him friends, but on the other hand it enabled him to approach problems from unconventional angles which led to startling discoveries to which the pages of ENCEPHALARTOS and his book testify.

There is a lovely story dating from long ago when he lived near, but not within, walking distance of the University. He often had to tend his experiments at the University on set times during weekends, and he was endlessly frustrated by congregational members of the church across the street parking in his driveway. One Sunday morning it happened yet again, and being really the mutters he deflated not one tyre of the offending vehicle, but all four. The matter ended in court, where he got a warning, to the amusement of his students. But Nat had a point.

As students we respected him hugely. We always spoke of him, even behind his back, as Prof. Grobbelaar. Unlike so many professors these days, he was always present during practical classes, circulating through the laboratory, talking to each student and helping where we had problems.

Nat was a man of many talents, and huge perseverance. He acquired a delectable piece of land on the frost-free northern slope of the Magaliesberg outside Pretoria, where he, over the years, with the help of a single assistant, built a dream house with his own hands. As long ago as 1972 Hanneke presented him with a cycad. On the surface not too much happened, but as he approached retirement, it became apparent that the kernel (sorry, omnule) had fallen on fertile ground, and Nat was "bitten by the bug". It was probably a natural thing, as for years he had been conducting research on the physiology of nitrogen-binding micro-organisms. Of course these, in the form of blue-green algae in the coralloid rootlets, play an enormously important role in cycads' ability to survive close to extreme habitats. Soon the lovely slope below the house started sporting cycads, and a nursery was taking shape. That nursery was a model of its kind: the plants grown from seed were beautiful because of the local climate, and the prices asked were very reasonable. In fact, he would never take a cent from me for any plant. Another envied innovation was a block and tackle mounted on a tripod which could be affixed on his pickup truck, which made handling and transportation of large plants manageable.

We were very fortunate indeed to have known Nat, and learn from him. His memory and his visible and cryptic bequests will stay with us for many years to come.

ETHNOBOTANY OF *CYCAS PECTINATA* HAM. IN NORTHEAST INDIA

J.S. Khuraijam¹ & R. Singh²



Figure 1. A tall tree of *Cycas pectinata* Ham. on the bank of Brahmaputra River with IIT, Guwahati in the background, in North Guwahati, Assam.

ABSTRACT

Gymnosperms are an ancient group of naked seeded plants. *Cycas* is a basal genus of Cycadophytes which is represented by 9 species and one variety in India. *Cycas pectinata* Ham. is the only species reported from Northeast India and listed as Vulnerable in the IUCN Red List. Geographically the species extends up to Southeast Asia. The wild populations of *Cycas pectinata* in Northeast India are disjunct, highly scattered and have diminished to the extent of rarity primarily due to deforestation, *jhum* cultivation, excessive harvesting of leaves for food, medicine and secondly, due to its wide use in religious and ceremonial rituals. The paper documents the traditional uses of *Cycas pectinata* Ham in the North-Eastern states of Assam, Manipur, Meghalaya, Sikkim, Tripura and West Bengal.

Keywords: *Cycas pectinata*, traditional uses, threats, Northeast India.

1Botanic Garden, CSIR-National Botanical Research Institute, Lucknow – 226001, India

Email: jskhuraijam@yahoo.com

2University School of Environment Management, GGS Indraprastha University,

Dwarka 16C, New Delhi – 110 078, India

Email: rsinghipu@yahoo.co.in

INTRODUCTION

Cycas pectinata was described by Buchanan-Hamilton in 1826 in the hills towards the eastern side of Bengal, which actually refers to the present eight states of India, namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. The species further extends to southern China, Myanmar, Thailand and Vietnam (Pant, 2002; Jones 2002; Whitelock, 2002, Osborne *et al.* 2007).

Cycas pectinata Ham. belongs to the infrageneric Indosinensis Section of the genus *Cycas*. They are tall, evergreen, palm-like trees. The trunk bears an apical crown of long dark green leaves that are 1 to 2m long with a few spines in the petiolar region. Leaflets are narrow, linear, flat, tapering into a minute spine and the margin very slightly recurved. Male plants bear very large, cylindrical ovoid male cones with numerous microsporophylls with long apical spines. Female plants bear compact closed cones with numerous broadly subulate pectinate megasporophylls which bear 4 to 6 ovules. Margins of the megasporophyll blade are deeply subulate pectinate and spiny, with the blade terminating in a strong subulate acumen. Seeds are ovoid, glabrous and orange to red-yellow colour in its mature state. *Cycas pectinata* grows in warm open forest usually at elevation 600-1200m. Cycad population in Kamrup (Assam) grows at elevation 60-250m.

Table 1. Vernacular names of *Cycas pectinata* used by different ethnic people of Northeast India.

Sl.no	Vernacular names	Ethnic people/tribe	State
1	Nagshampa, Nagphal, Nagphana	Assamese	Assam
2	Telchupi	Rabha	Assam
3	Or-oh	Karbi	Assam
4	Akphal, Nagmoni	Bengali	Assam, Tripura
5	Thaljimura, Thakal	Nepali	Assam, Sikkim, West Bengal
6	Dieng-sia-goda	Khasi	Meghalaya
7	Yendang	Meitei, Kuki, Naga	Manipur
8	Thakal	Nepali	Sikkim, West Bengal

A perusal of literature reveals that *Cycas pectinata* occurs in Kamrup of Assam, Rangeet and Teesta Valley in Sikkim, Darjeeling in West Bengal, Lushai hills (now Mizoram) and Manipur (Hamilton, 1826, Griffith, 1854a,b, Hooker, 1854, Deb, 1958; Kanjilal *et al.*, 1940; Deb, 1981; Sahni, 1990; Srivastava, 1993; Pant *et al.*, 1994). Of all the species of *Cycas* reported from India, *Cycas pectinata* is the least studied species. It could be due to difficult terrain and inhospitable geographical range of its habitat, compounded by the political disturbances in the region for the past few decades. Most of the areas where from species was reported earlier are now transformed for the construction of roads, dams, clearing of the forests for agriculture or for the plantation of the cash crops or extension cities and thus urbanisation. Consequently, the populations which appeared to be continuous once are now fractured severely and dwindled to the extent of extinction in the region. A few remnant trees of those very old populations managed to survive the wrath of development and these are still standing tall in the hillocks of the Indian Institute of Technology (IIT) Campus of Guwahati and surrounding areas which are part of Kamrup and the region of Hamilton's discovery of the species.

Due to widespread distribution of the species in the past, most of the ethnic communities of the region have learned to utilise all the parts of this beautiful tree species in their numerous socio-cultural rituals, festivals, food and medicines (Kanjilal and Bor, 1940; Thieret, 1958; Thieret, 1958; Whiting, 1963; Patiri and Borah, 2007; Kar and Borthakur, 2008; Singh and Singh, 2010). For example, earlier workers have reported the use of the pounded stem of *Cycas pectinata* as hair-wash to cure diseased hair roots by Assamese (Kanjilal and Bor, 1940; Thieret, 1958, Whiting, 1963). Fertilised ovules or immature seeds are eaten as food and are also used as medicine for gastric trouble (Patiri and Borah, 2007). Soft, young and not yet unfolded, succulent leaves are cooked and eaten as a vegetable (Thieret, 1958; Kar and Borthakur, 2008). In southern Assam and northern Tripura, microsporophylls are used to cure asthma while megasporophylls are used for treating piles (Das and Dutta, 2007). While extensively surveying these states in Northeast India for the assessment of the remaining populations of *Cycas pectinata* and to understand its taxonomic status for over last five years, we have also collected and documented data on the uses of this species which are still prevalent among the inhabitants in the vicinity of the populations and so identified the main threats. The paper incorporates these findings and literature surveyed (mentioned above) as direct evi-

dence of how little work has been carried out in the past on *Cycas pectinata* in the North Eastern states of India.

MATERIALS AND METHODS

Study area

The study was carried out in the state of Assam, Manipur, Meghalaya, Sikkim, Tripura and West Bengal from 2007 to 2014. Natural populations of *Cycas pectinata* in Kamrup, Naogaon and Bongaigaon districts in Assam; Senapati, Chandel, Thoubal and Imphal East districts in Manipur; South Sikkim and West Sikkim districts in Sikkim, Darjeeling in West Bengal were selected for conducting field data collection. Like all other plants, *Cycas pectinata* is also known by different vernacular names in different parts of these states (Table 1). Using these vernacular names, market places of Guwahati, North Guwahati, Boko in Kamrup District, Naogaon, Doboka, Longka in Naogaon District, Goalpara Town in Goalpara District, Tezpur and reserve forest areas of Nameri National Park in Sonitpur District and Diphu in Karbi Anglong District of Assam, Shillong, Tura and Nongpoh in Meghalaya, Imphal, Nambol, Bishenpur, Kakching and Lamphel in Manipur and North Tripura in Tripura were visited, which are far away from the site of data and plant sample collection. Survey of cultivated *Cycas* was also conducted in Guwahati University, Raip-

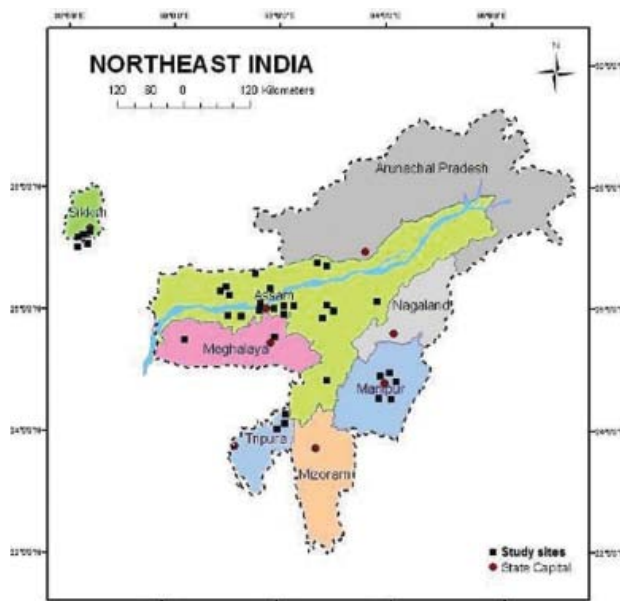


Figure 2. Map of Northeast India showing study sites.



Figure 3. (a) Assam: A village headman posing proudly with his female *Cycas* plant in Bongaigaon district; Sale of male cones in the local markets of (b) Meghalaya, (c,d) Tripura; (e) Decapitated young female cone in the market of North Tripura district.

ara and Rangia in Kamrup District, Darrangiri in Goalpara District, Diphu Govt. College and Recreation and Biodiversity Park in Karbi Anglong District of Assam and DM College and Khonghampat Orchidarium in Imphal West District of Manipur.

Data Collection

A thorough review of literature was conducted. Herbaria at Central National Herbarium (CNH) at Kolkata and Eastern Circle of Botanical Survey of India at Shillong were consulted to locate the cycad populations in the Northeastern states. Ethnobotanical data were collected by interviewing the indigenous people of the region. Digital photography and recording was done to describe and document the data collection. Information on the medicinal uses of cycad was collected from the reluctant local healers or Maiba (in Manipur) or Vaidyas (in Assam, Meghalaya and Tripura).

RESULTS

Uses of *Cycas* as food

In all the north-eastern states except for Tripura, the soft uncoiled circinate photosynthetic leaves are still commonly used as green vegetables and for making special dips and chutneys. Large numbers of soft and fleshy young circinate leaves in *Cycas* emerge in flushes in mature trees during vegetative growth. These are collected either from their indigenous habitats and

sold in the markets or from the plants usually cultivated in the courtyards of the houses. In Manipur, different ethnic communities (Meitei, Kuki, Naga) prepared specialized local cuisines called *Yendang Eromba* and *Yendang Kanghou* from these tender leaves which are sold in the local markets at the time of leaf flushes during vegetative growth. The emergence of leaf flushes during March-April coincides with the new year of Meitei community. It is considered auspicious for each household of Meitei community to cook *Yendang Eromba* and *Yendang Kanghou* using *Cycas* leaves, which are offered to God along with other indigenous food preparations to celebrate the Manipuri (Meitei) New Year Day, *Cherrouba*. However, in Sikkim and northern West Bengal, cuticles of these fronds are peeled off and along with other ingredients, they are eaten raw in paste form with rice. Raw or roasted ovules are eaten like potatoes in Assam and Meghalaya, where the plants are indigenous. Review of the literature of cycad toxins revealed that almost all the cycads contain cycasin, with the level of cycasin reported for the species belonging to the genus *Cycas* (Duncan, 1991). However, in northeast India, we have observed that none of the communities have any health associated complaints which can be correlated to direct consumption of *Cycas*.

Uses of *Cycas* as medicine

Both vegetative and reproductive plant parts are used as medicine in all the states where we conducted our studies. Mature green leaves are used as medicine in



Figure 4. Manipur: (a) Unfolded young tender leaves in natural habitat of Thoubal district, Manipur; (b,c) Bundles of young circinate leaves being sold in the Imphal market; (d,e) Preparation of *Yendang Eromba*.

Assam and Manipur. In the Thoubal district of Manipur, a decoction of mature leaves is used to cure cystolithiasis or presence of stone in bladder, while in the Kamrup district of Assam it is used to cure stomach ache. Raw young microsporophylls are eaten to reportedly increase male potency in the region bordering Assam and Meghalaya. In Assam, Meghalaya and Tripura, male cones are sold in the markets by local healers, where they sell microsporophylls at INR 2-5 per piece. These microsporophylls are chewed along with water on an empty stomach to cure stomach ache and ulcers. There is the belief among local residents in Meghalaya, that to hang megasporophylls at the entrance door of their houses, will drive away snakes and avoid nightmares in young girls.

THREATS TO CYCAS IN NORTHEAST INDIA

Human activities have greatly impacted cycad populations in Northeast India. Habitat destruction and transformation of the land for agriculture and other

developmental processes are the major threats to the natural populations of cycads in the region. Shifting or *jhum* cultivation is an age-old practice in these states and accounts for the loss of important cycad populations in states like Manipur, Sikkim and Assam. The last few decades had been quite crucial in the transformation of natural landscape due to urbanization and human settlements, particularly in Kamrup District in Assam, where formerly the species reportedly occurred in abundance (Hamilton, 1826) and Imphal in Manipur. The two districts have been severely hit by the urbanization spasm which led to the heavy loss of flora and fauna, including cycad populations. With human settlement, illegal trade of rare plants like cycads and orchids increased significantly. As result, large numbers of adult plants are now uprooted and exported to international exotic plant collectors. Natural cycad populations of Naogaon in Assam are targeted by illegal unskilled traders of Bengali Muslim origin, who collect immature male and female cycad cones from the reserve forests to sell as medi-

Table 2. *Cycas pectinata* : Plant parts and their uses in Northeast India.

Sl. no	Plant Parts used	Uses	State
1.	Young Leaves	Food	Assam, Manipur, Sikkim and West Bengal
2.	Mature leaves	Decoration, rituals	Assam
		Medicine	Assam and Manipur
3.	Microsporophylls	Medicine	Assam, Meghalaya and Tripura
4.	Megasporophylls	Medicine	Assam, Meghalaya and Tripura
5.	Seeds	Food	Assam and Meghalaya



Figure 5. Sikkim: (a) Removing the cuticle of soft rachis; (b, c) Grinding of *Cycas* leaves along with other ingredients using traditional mortar; (d) *Cycas* dip or Chutney.

cines in the weekly markets or *Haats* of Guwahati, Shilong, Goalpara, Tezpur, Silchar and North Tripura at the rate of INR700-800 (US \$ 15–20).

CONCLUSION

Cycads have been widely used as ornamental plants, food and medicine. However, due to over-exploitation, unsustainable harvesting and habitat destruction, the cycad population across the globe are now facing threats to its survival (Donaldson, 2003). In Southern states like Kerala, Tamilnadu, Karnataka and Andhra Pradesh, *Cycas* leaves are extensively harvested for decoration in festivals and social ceremonies (Singh and Mudgal, 1997; Saneesh and Varghese, 2007; Radha and Singh, 2008; Singh, 2008). Cones, stem and leaves are extensively used as medicines for curing many ailments and diseases (Drury, 1873; Whiting, 1963; Thieret, 1958; Radha and Singh, 2008; Singh, 2008; Singh and Singh, 2010, 2011).

During festivals in northern Eastern Ghats of Odisha, apical crown of leaves are generally hacked with an intact stem part for decoctions and use in rituals (Singh and Singh, 2011). Such unsustainable and mindless collection and destruction of the growing region of the plants hampers the growth of this already slow growing group of plants. Likewise over-collection of young leaves in the state of Assam, Manipur and Sikkim in north-eastern India disturb the phenological cycle and growth of the plants. Selective collection of male cones from the natural populations over a period of time has resulted in the dwindling of sex ratio in these populations. This has led to a reduction in the seed production and maintenance of the population size in all the cycad populations in Northeast India (Singh and Singh, 2010). This can be tackled only by implementation of strict measures for sustainable harvesting techniques. *Ex-situ* conservation should be promoted to propagate cycads at large scale to meet the future demands of the local consumption. Attempts should be made by both the state governments and research organisations actively involved in the sustainable conservation programme, to maintain the sex ratio of *Cycas pectinata* in its natural habitats for its natural regeneration. Communities living near the cycad population should be involved in all the conservation initiatives, as their participation will help safeguard the cycad populations.

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REFERENCES

- BUCHANAN-HAMILTON, F. 1826. Commentary on *Cycas pectinata*. *Memoirs of the Wernerian Natural History Society* 5(2): 322-323.
- DAS, A.K. & DUTTA, B.K. 2007. *Cycas pectinata* – a wonderful native plant remedy for piles and asthma in Southern Assam, N.E. India. *Ethnobotany*. 19: 140-141.
- DEB, D.B. 1958. Endemism and outside influence on the flora of Manipur. *Journal of Bombay Natural History Society* 55: 313-317.
- DEB, D.B. 1981. *Flora of Tripura*. Today & Tomorrow's Printers and Publishers, Delhi.
- DONALDSON, J.S (ed.). 2003. Cycads. Status, survey and conservation action plan. IUCN/SSC Cycad Specialist Group. IUCN, Gland and Cambridge.
- DRURY, H. 1873. The useful plants of India: with notices of their chief value in commerce, medicine, and the arts. William H. Allen & Co.
- DUNCAN, M.W. 1991. Role of the cycad neurotoxin BMAA in the amyotrophic lateral sclerosis/parkinsonism dementia complex of the Western Pacific. *Adv Neurol*. 56: 301-310.
- GRIFFITH, W. 1854a. *Notulae ad Plantas Asiaticas*, vol. 4. Bishops College Press, Calcutta.
- GRIFFITH, W. 1854b. *Icones plantarum asiaticum*, vol. 4. Coshan: Calcutta.
- HOOKER, J.D. 1854. Himalayan Journals., Notes of a Naturalist in the Bengal, The Sikkim and Nepal Himalayas, The Khasia mountains, etc.
- JONES, D.L. 2002. Cycads of the world. Smithsonian Institution Press, Washington, DC
- KANJILAL, U.N. & BOR, N.L. 1940. Flora of Assam. Vol. 4. Calcutta.
- KANJILAL, U.N., KANJILAL, P.C. DE, R.N. & DAS, A. 1940. Flora of Assam. Government of Assam.
- KAR, A. & BORTHAKUR, S.K. 2008. Wild vegetables of Karbi-Anglong district, Assam. *Natural Product Radiance* 7(5): 448-460.
- PANT, D.D. 2002. *An Introduction to Gymnosperms, Cycas and Cycadales*. Birbal Sahni Institute of Palaeobotany, Lucknow, India.
- PANT, D.D., SINGH, R. & CHAUHAN, D.V. 1994. On *Cycas pectinata* Hamilton from North-East India. *Encephalartos* 38: 17-30.
- PATIRI, B. & BORAH, A. 2007. Wild edible plants of Assam. Director Forest Communication, Forest Department, Assam.

- OSBORNE, R., HILL, K.D., NGUYEN, H.T. & PHAN KE, L. 2007. *Cycads of Vietnam*. Osborne, Brisbane and Eeden, Cape Town.
- RADHA, P. & SINGH, R. 2008. Ethnobotany and conservation status of Indian *Cycas* species. *Encephalartos* 93: 15-21.
- SAHNI, K.C. 1990. *Gymnosperms of India and adjacent countries*. Bishen Singh Mahendra Pal Singh, Dehradun.
- SANEESH, C.S. & VARGHESE, A. 2007. Mutualistic relationship involving the endemic *Cycas circinalis* L.: Field notes from the Appankappu forests, Nilambur, Kerala, India. *The Cycad Newsletter* 30: 28-29.
- SINGH, R. 2008. Present day traditional uses of the Indian cycads. Proceedings of the International Symposium on cycad conservation.
- SINGH, R & SINGH, K.J. 2010. Status and survey of *Cycas pectinata* Buchanon-Hamilton in Sikkim and West Bengal. *Pleione* 4(2):235-239.
- SINGH, R & SINGH, K.J. 2011. The importance of Odisha *Cycas* in India. *Biodiversity* 12(1): 21-27.
- SINGH, K.J. & SINGH, R. 2011. Illegal trade of *Cycas* cones: Major threats to *Cycas* populations in North East India. In the 9th International Conference on Cycad Biology, FairyLake Botanical Garden, Shenzhen, December 1-7, 2011. *Journal of FairyLake Botanical Garden*. 10 (3-4): 64.
- SINGH, K.P & MUDGAL, V. 1997. Gymnosperms. In Floristic diversity and conservation strategies in India: Vol 1: Cryptogams and Gymnosperms (eds. Mudgal, V and Hajra, P K.). Botanical Survey of India, Calcutta.
- SRIVASTAVA, R.C. 1993. Gymnosperms of Sikkim, India. *Asia Life Sciences* 2(1): 71-87
- THIERET, J.W. 1958. Economic botany of cycads. *Economic Botany* 12:3-41
- WHITING, M.G. 1963. Toxicity of cycads. *Economic Botany* 17: 270-302.
- WHITELOCK, L.M. 2002. *The Cycads*. Timber Press, Portland.

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www.exclusivecycads.com

The Editor,

I have answers to a few of the letters, recently written to the editor.

SNOW WHITE FIRST SEEDLING LEAVES

Regarding Ina Vermaak's letter and photograph of a snow white first leaf of a seedling of *Encephalartos barteri* subsp. *allochrous* [not *E. Allochrous* (sic)] in ENCEPHALARTOS 116: 23, June 1914: the phenomenon is albinism, in plants caused by the absence of the green pigment chlorophyll. Such plants cannot photosynthesize, and they will not survive. The phenomenon is not unknown in cycads, and has been reported in *Stangeria eriopus* (ENCEPHALARTOS 58: 22–23, June 1999), *Encephalartos natalensis*, *E. cerinus*, and *E. villosis* (ENCEPHALARTOS 62: 11–12, June 2000; 63: 25–26, September 2000).

MITES IN CYCAD SEED

Retha Meiring's article on *thread-footed mites* on *Encephalartos* seeds, in ENCEPHALARTOS 115: 39–41

(March 2014) is very important to anyone endeavouring to grow cycads from seed.

I have noticed these small bugs on my cycad seeds, but were unable to classify them. So they are mites. My impression was that they do indeed enter the sclerotesta via the coronula (germination pore). Furthermore, my impression is that they do not feast on dead material inside the sclerotesta, but is the *cause* of death to the contents of the sclerotesta.

I have been unable to disable these bugs with any of my chemical weapons of mass destruction. I am fond of using Cypermethrin, which is a synthetic pyrethroid. As such it is not particularly poisonous to warm-blooded animals, and breaks down within days without leaving a poisonous residue. Moreover, it is a wide-spectrum arthropod poison, very effective against insects including hard-to-kill ants, millipedes, and spider mites; but it does not kill the thread-footed mites on *Encephalartos* seeds.

My question to Retha is: what does kill them?

Piet Vorster
pjavors@gmail.com

Dear editor,

The photograph shows a number of "rainbow" *Cycas revoluta* which are being offered for sale by the huge Walmart megastore in the USA. Reaction from members of the cycad community has varied from a curious acceptance to outright condemnation, with a lot of "gay" innuendoes.

Apparently the paint used is "plant friendly" – although we believe that the coating would certainly clog the plants stomata and inhibit photosynthesis. Interestingly too, one or two shoppers have returned the plants to the stores with a complaint that "new leaves came up green".

Roy Osborne



ANTLIARHINUS KEWER OP 'N OMNULE VAN ENCEPHALARTOS MIDDELBURGENSIS

Die Redakteur,

Een van my kliente het hierdie saad met 'n kewer wat daarop vassit, onlangs vir my gebring en ek het dit toe afgeneem. In die 15 jaar wat ek bestuiwing op broodbome doen is dit die eerste keer wat ek hierdie verskynsel sien.

Groete
Tilania
tilania1@gmail.com

Beste Tilania,

Hierdie is 'n goeie voorbeeld van 'n *Antliarhinus* kewer wat in die saad inboor om haar eiers te lê. Die larwes teer op die endosperm en wanneer hulle volgroei is kruip hulle uit om die lewensiklus te voltooi. Dit is uitstekende foto's om hierdie fase van die kewer se lewensiklus te dokumenteer.

By navraag het Piet Vorster vertel dat dit waarskynlik *A. peglerae* is hierdie. Nat Grobbelaar gee ook meer inligting oor hierdie goggas in sy boek.

Red.



Figure 1. Saad met Kewer.



Figure 2. Larwes in saad.

[Tilania received a seed with a beetle stuck to it from a customer of hers. She photographed it (see Figure 1) and sent it to ENCEPHALARTOS. It shows an *Antliarhinus* beetle, probably *A. peglerae*, boring into a

seed of *Encephalartos middelburgensis*. In Figure 2 the result can be seen. The larvae consume the endosperm and when fully grown, burrow through the sclerotesta to complete their life cycle outside the seed. Ed.]

LANGUAGE AND SPELLING OF CYCADOLOGISTS

Dear Editor,

Cycad aficionados are known to spend frightening amounts of money on plants. Conversely, they are loathe to spend on books. Yet, that is not very clever, because books mean knowledge, and without that knowledge your expensive cycad may (God forbid) die. Should you buy every available book on cycads, it should still cost you less than what you spent on a single plant.

One of the things which you can learn from books, is the correct names of cycads. Names of plants are governed by strict rules, which MUST be obeyed. A plant's name consists of two words: a generic name, for example *Encephalartos*, which is equivalent to a person's surname (such as Smith), and starts with a capital; and a specific epithet, for example *transvenosus*, which always starts in lower case and which is equivalent to a person's personal name, such as John. It is thus patently wrong to call a plant *transvenosus* – it is *Encephalartos transvenosus*. If you talk about a *transvenosus* or a *ferox*, everyone will think that you are an un-educated hillbilly. Similarly, it is really common to call a plant an eypee, a brevi, nubi, a friederiki, a heenan, a layvie, a lahtie, a longie, a pawsie, and we are tempted to say, woody eye. Then there is the matter of vernacular names found in all sorts of popular literature and books on other plant groups. These have never been used by us who know cycads, they are not used now, and they will not be used in future. These vernacular names are spurious, and have all been invented behind desks. The only vernacular name which has credence, is Modjadji Palm. We will not now talk about pronunciation of scientific names, because so few of us know Latin anymore.

This note was initiated by comments received from a well-loved and respected member of our Society on Facebook, in turn inspired by an advertisement which appeared in ENCEPHALARTOS 114. Just as one cannot use a computer unless your input is accurate, one has to be accurate when talking or writing about cycads. In this advertisement 8 of the 10 names were wrong: *E. shaejesii* should be *E. schaijesii*, *E. flaviostrobilus* should be *E. flavistrobilus*, *E. mackenziei* should be *E. mackenziei*, *E. barterii* should be *E. barteri*, and *E. smitzii* should be *E. schmitzii*. *E. levubuensis*, *E. novo nobokolo*, and *E. tsikappa* are not valid names – we presume that they are unregistered trade names – and correctly they should be written *E. "levubuensis"*, *E. "novo nobokolo"*, and *E. "tsikappa"*. This could easily have been avoided

by checking names against the books which you haven't bought; or even easier, by using the cumulative index to ENCEPHALARTOS 1 to 100 which you received in October 2010.

This sort of thing makes a very bad impression, and it compromises the image of ENCEPHALARTOS and the Society. We won't say who is responsible – the advertiser, the proofreader, or the editor (who is well known for never doing the right thing), but we cannot afford it.

Anonymous

Dear Mr. Anonymous,

I share your concern and believe that members should always be encouraged to participate in the activities of the Society and sharing their experiences by contributing to ENCEPHALARTOS, but it is not only the editor's duty to correct member's mistakes. By keeping the standard of ENCEPHALARTOS very high, (although we do slip sometimes!) we try to educate our members as well as provide entertaining articles. It must be kept in mind that education is a two way street and no amount of education will help unless you have members that want to learn.

A lack of knowledge of botanical Latin is also no excuse to abuse the names of our beloved cycads. A quick visit to www.amazon.com to buy a copy of BOTANICAL LATIN by William T. Stearn can rectify this in a jiffy! If you have spent all your money on cycads, do try www.abebooks.com for a used copy.

A similar situation arises when members contribute photographs of an interesting occurrence but without a caption. The message simply says "I have never seen anything like this!" or even more vague "I noticed this very interesting thing on one of my plants. Do you know what it is?" Sadly the editor is not as clever as many members believe him to be. We welcome photographs, but each MUST have a caption, otherwise no-one knows what you are trying to show to us, and this editor cannot guess what you had in mind. A contributor only has to write ONE article or caption and then check it for correctness whereas the poor editor and proofreader must do it for the whole journal. Please help us!

Watch your mailbox for the next exciting, and possibly, faultless issue of ENCEPHALARTOS, the best cycad journal... in the World!

Ed.



2 DVDS = R200 + R50 POSTAGE/POSGELD

4 X INTERVIEWS / ONDERHOUDE

- Prof Nat Grobbelaar - English
- John Klopper - Afrikaans
- Dr Martin Bruwer - Afrikaans
- Matian Barnard - Afrikaans

4 X GARDENS / TUINE

HABITAT PHOTOS / FOTOS



ORDER / BESTELLING

John Kloppers 083 701 3482

Hermann Böhm 083 564 9937

Banking info: Central branch of CSSA / Sentraaltak van BVSA

FNB cheque / Tjek 62443159240, Code / Kode 260147

CYCAD COLLECTORS PRODUCTS

“With Quality comes Trust”



- **Cycadfeed** – The complete nutritional product for your established cycads, including N, P and K in the correct ratios for cycads as well as all the required micro-elements. R450/20kg.
- **Cycad Sucker Stim** – A unique combination of auxins and cytokinins (derived from Kelp), along with a complete nutrient range, including all macro- and micro-elements and fulvic acid to feed newly established cycads and suckers and stimulate root development. R1500 for 25 liters.
- **Nitrosol** – The original Nitrosol. R125 per liter.
- **Cycad seed germination box** – The best way to germinate your cycad seeds, winter and summer. Heating and moisture retention. R500.



Contact Andre Cilliers at 082 499 6515 or acilliers@nulandis.com

CYCAD-O-METER

New 50 cm Model now Available

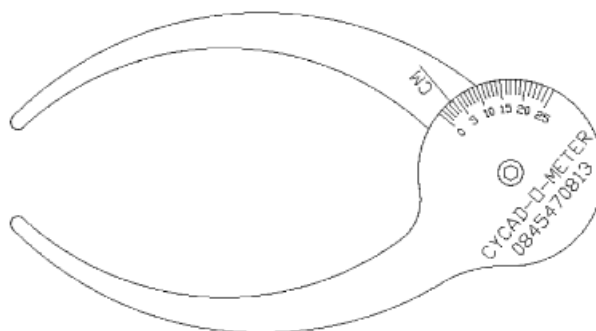
With the new legislation you will be required to list the diameter of all your plants, the new 50 cm Cycad-O-Meter makes this an easy task. With this instrument you will be able to measure the diameter of your cycads from 0 cm to 50 cm in 1 cm increments. The instruments are made from 2.5mm durable,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

Selling price of the standard 25 cm Nurseryman's Cycad-O-Meter R275.00 (Add R25.00 for postage and Packaging)

Contact Russell:074 134 2149 or Andy 082 900 8624

Or lasertecstreetluge@gmail.com



BOOKS FOR SALE

Two autographed copies of Loran Whitelock's book "The Cycads" are available at US\$250.00 each. They are said to be in mint condition and the purchaser(s) will have to pay the postage from the USA. Should anyone be interested in acquiring a copy, please contact the Secretary on cycad@cycadsociety.org

BOEKE TE KOOP

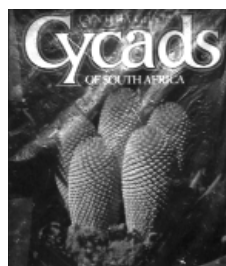
- Cycads of Africa by Douglas Goode – R800
- Cycads of South Africa by Cynthia Giddy – R1200

Contact Wynand van Eeden at Wynand@ananzi.co.za for more information.

INHEEMSE BROOBBOME TE KOOP.

Broodbome gereed om uit te plant in tuine of vir potplante. Verskeie broodboom spesies, grootes wissel vanaf 5cm tot 20cm.

Vir verdere inligting kontak Sarie by 082 379 2311 of e-pos : saries-teenkamp@gmail.com





CYCAD SOCIETY OF SOUTH AFRICA

www.cycadsociety.org

NEW MEMBERSHIP APPLICATION – MEMBERSHIP RENEWAL 2015

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 **2105***

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 2015:

Local members (residents of South Africa)	R 240			
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 Bassingthwaighe, 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 Bassingthwaighe; or in American dollar to Willie Tang; or in Australian dollar to Paul Kennedy.

The appropriate addresses are:

- **Ian Bassingthwaighe:** P.O. Box 176, 0159 Montana Park (Pretoria), South Africa.
- **Paul Kennedy:** 21 Sierra Road, Engadine, NSW 2233, Australia.
- **Willie Tang:** 65 Corydon Dr., Miami Springs, Florida, 33166, 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	SBZAJJ						

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

Posbus 176
0159 Montanapark
Pretoria, Suid Afrika

P.O.Box 176
0159 Montana Park
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:									
D 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									
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

NUWE LIDMAATSKAP AANSOEK - LIDMAATSKAPHERNUWING 2015

Ek/Ons _____

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

Lidmaatskapnommer van bestaande lid
vir lidmaatskaphernewing _____

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 gereelde publikasie 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 2015***

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 2015

Plaaslike lede (inwoners van Suid-Afrika)	R 240			
Suid-Afrika lede (Namibië, Swaziland, Zimbabwe, ens) <i>Lugposaflewering</i>	R 365	Suid-Afrika lede (Namibië, Swaziland, Zimbabwe, ens) <i>Landposversending</i>	R 325	Oorsese lede <i>Lugposaflewering</i>
				R 400 US\$ 56 AU\$ 55 € 40 £ 34
				Oorsese lede <i>Landposversending</i>
				R 355 US\$ 49 AU\$ 48 € 38 £ 29

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

Ian Bassingthwaighe, 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

DEBIETORDERVORM

PERSOONLIKE BESONDERHEDE VAN KLIËNT												
Van / Besigheid naam:												
Volle name / Trading Name:												
ID nommer / Registrasie nommer:												
Fisiese Adres:												
Pos Adres:												
Kontak nommers:	HUIS	WERK	SELFOON	e-POS	FAKS							
Kliëntverwysings nommer:												
BANKBESONDERHEDE VAN KLIËNT												
Naam van rekeninghouer:												
Rekening tipe:		TJEK	TRANSAKSIE	SPAAR	ANDER							
Naam van Bank:												
Rekening Nommer:												
Taknaam:												
Takkode:												
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** gehel 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 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-tousourier en/of Redakteur.

