BIOLOGY AND CONSERVATION OF CYCADS

Proceedings of the Fourth International Conference on Cycad Biology

Held in Panzhihua, Sichuan, China,
1-5 May 1996

Editor
Chia-Jui Chen

Hosted by the Cycad Society of China and
IUCN's CNPPA East Steering Committee
Under the Auspices of IUCN SSC's Cycad Specialist Group
Sponsored by
The Institute of Botany, Chinese Academy of Sciences
The Government of Panzhihua City, Sichuan, China

International Academic Publishers

1999

Biology and Conservation of Cycads — Proceedings of the Fourth International Conference on Cycad Biology (Panzhihua, China) (C.J. Chen, ed.) International Academic Publishers, Beijing, pp354-363, 1999 ISBN 7-80003-452-6

Encephalartos altensteinii: a massive rape but possible recovery

Ashton Vice
East London Museum, 319 Oxford Street, East London 5201, South Africa

Abstract: An unfortunate theft of *E. altensteinii* Lehm. from its natural habitat in South Africa during April 1995 gave botanists an unexpected and rare opportunity to translocate 108 mature cycads weighing 31 tons. The exact method of replanting is tabulated. Review of the South African literature makes little mention of longterm survival rates of translocated *Encephalartos* species from the wild. Six previous replanting exercises are tabulated and new statistics regarding each of the translocated *Encephalartos* species survival rates are documented, revealing a mean translocation survival rate of 32% at 4 years. A 1 year follow up survival rate of this *E. altensteinii* colony is noted as 72%, the first in its longterm progress. The author proposes a minimum of 4 years lapsing from the time of replanting to ascertain the longterm survival in translocated *Encephalartos* species from the wild.

Key words: *Encephalartos altensteinii*, translocation, survival rates.

Introduction

April 1995 saw the uncovering of one of the largest cycad thefts in the Eastern Cape Province of the Republic of South Africa. The incident probably received more media publicity than any cycad happening in the Republic to date and newscoverage also found way into the international media.

The event should be viewed in four parts:
1. The theft of 31 tons of *Encephalartos altensteinii*.
2. The replanting programme.
3. The longterm survival rates of this newly established colony of *E. altensteinii*.
4. Results : 1st follow-up study 1 year later.

1. The theft

Astute reconnaissance by officials of the Cape Nature Conservation Department and surveillance of possible sites resulted in the nocturnal interception, on 20 March 1995, of a massive longhauler with 31 tons of the indigenous Eastern Cape cycad *Encephalartos altensteinii*. The theft site, some 10 km south of the King Williamstown-Grahamstown national road, in an area between the Keiskamma River and the upper reaches of the Tyolomnqa River, is well away from the public eye. This site is the habitat which is further from the coast for *E. altensteinii* (Dyer 1965). One traverses kilometres of gravel roads, then grasslands to arrive eventually at a semicircular riverine bushy site on sloping ground. Evidence of cut fences and the honeycomb from different vehicle tracks in all directions bear witness to the prolonged operation conducted by the thieves. One is struck by the enormity of the exercise mounted by the accused, named in the press as Konstantinos Guileas, an Orange Free State businessman. Bulldozer excavation clearly shows the large roadways used for access, some contoured, another traversing the area and all designed for better removal of the cycad colony onto

Picture 1. The easterly limit of the theft site. Note the bulldozer tracks across the ravine. The arrow shows a large cycad awaiting transport. At the bottom right note the depth of earth moved. Div de Villiers of the Cape Nature Conservation Department partially obscured.

Picture 2. Excavated cycads with Div de Villiers.

the lowbed vehicle (Picture 1). It appears the large multiple-stemmed old clumps of *E. altensteinii* were dug out manually before mechanical means were used to remove the plants.

Various authorities who examined the cycads were impressed by the excellent condition of the specimens. Seldom did one find a stem that was scarred or a trunk that appeared to have been severed. This observation was contrary to some press reports.

A question which will possibly remain unanswered is how many of these enormously heavy and unwieldy clumps of cycads were dropped at the time of removal or during the loading?

One can only assume that given the machinery and time the thieves had at their disposal, the size of the clumps of *E. altensteinii* transported (some being multiple-stemmed and up to 5 m in length) and the pristine nature of the recovered stems, it is quite feasible that individuals with previous cycad experience were involved in this massive thieving operation.

Furthermore, given the unfortunate interception (from the thieves' viewpoint) outside Grahamstown and the number of partially dug out cycads and removed specimens placed on their sides waiting for transportation from the site, one is left with the inevitable question: how many more large loads of cycads were to be stolen?

It is the author's viewpoint that, given the infrastructure the thieves laid, their operation would be finalised only when the very last cycad in the valley was stolen.

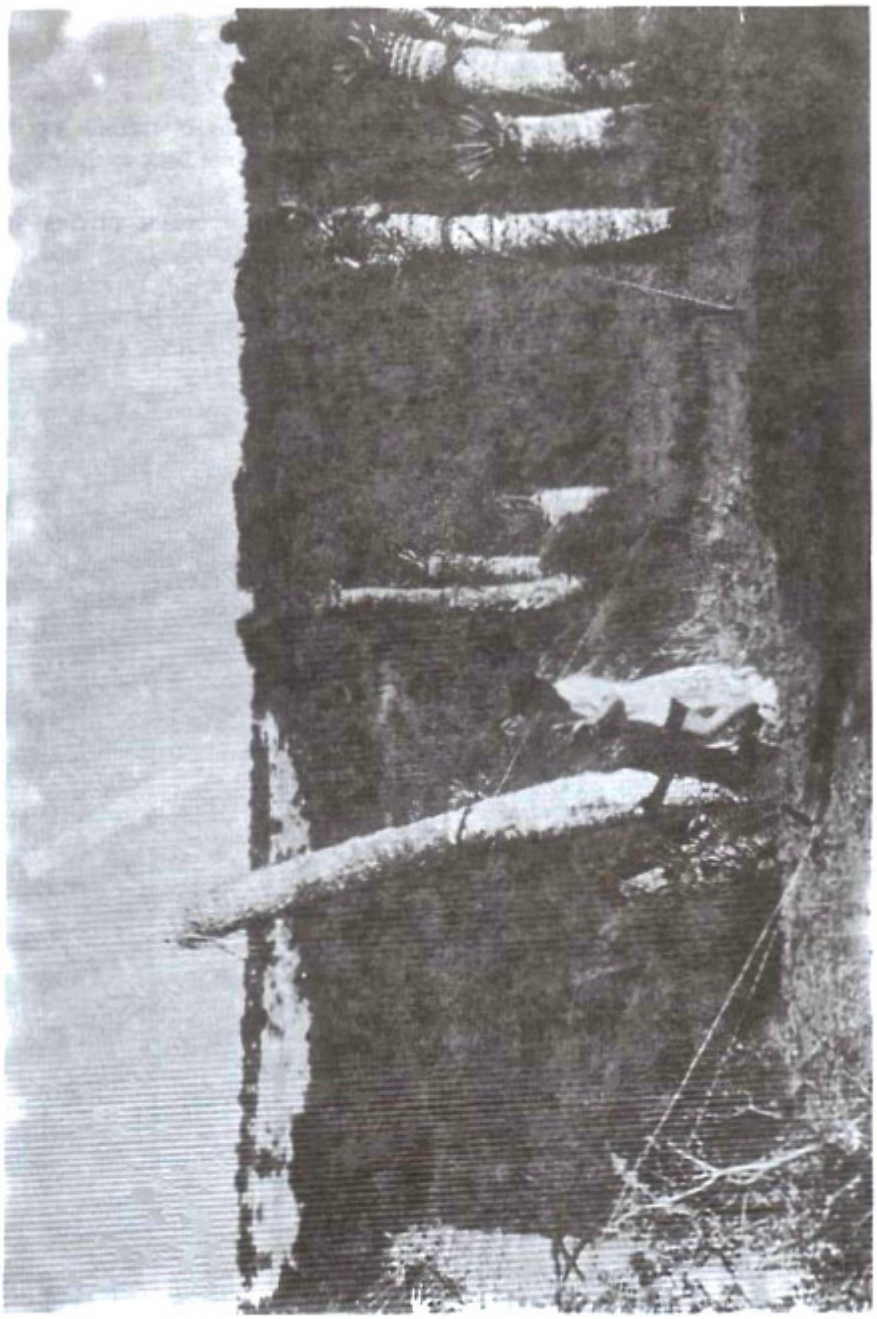
As for the thieves' motivation one can only speculate. Financial gain appears to have been the primary incentive, with an alleged 4 million Rand payout mentioned. As regards government complicity in the event, high ranking provincial officials Ms Tozie Mazitshane, one of the aides in the Eastern Cape Premier's office, and Vax Mayekiso, Free State provincial housing minister, have

2. The replanting programme

The decision to replant the colony of plants, comprising 48 clumps of mature specimens and individual stems and 15 smaller plants, to a secure environment and not back to their original site, was made by the Eastern Cape Nature Conservation officials.

The Thomas Baines Nature Reserve, a site 130 km west of the cycads' original indigenous habitat and 30 km north of the south-westerly limit of *E. altensteinii*, i.e. the west bank of the Bushmans River (Giddy 1984), was chosen for security reasons. [Some authorities record locations further west for *E. altensteinii*, e.g. Alexandria (Goode 1989)]. This Nature Reserve, roughly 15 km west of Grahamstown, is about 40 km south of the nearest *E. altensteinii* habitat and has previously

Picture 3. The author examining the condition of one of the newly relocated cycad clumps.



Picture 4. The replanting project on completion, note the height of the plants in relation to the 1.73 m person. The arrow towards the vehicle marks the original site from where the plants were transported.

been used for relocation of confiscated cycads. Slight concern was expressed that planting the colony within 10-15 km of an existing *E. caffer* reserve could result in cross pollination. "It is a well documented fact that no other species seems so much involved in natural hybridization as *E.*

altensteinii" (Dyer 1965).

The cycads were removed from the trailer and laid in two rows of plants at the Nature Reserve for a short period while a team was summoned to decide "where and how".

All credit must go to the Eastern Cape Nature Conservation officials and specifically Deon "Div" de Villiers for summoning various eclectic inputs and in formulating a team approach to ensure that this new cycad colony had the best possible survival chance. In many respects this project has similarities with another cycad relocation project as documented in *Encephalartos* 27 (Giddy 1991).

A wet Sunday morning 8 April 1995 saw the get together of the scientists, the agronomist, the landscaper, the conservators and the curator in planning the replanting project (Picture 2).

A site was chosen some 400 m from where the plant had been originally offloaded from the vehicle: a gentle south-westerly slope, some 50 metres away from a natural stream. Soil samples from the original site and the new site were compared. The landscaper, with previous cycad replanting expertise, was content with the site and planting commenced on 10 April 1995.

Whilst every cycad gardener has his own method of planting and is usually dogmatic about the treatment and planting of cycads, he tends to be less vocal about the long term survival rates of his treatment. Furthermore as mentioned by Wayne Boyd at CYCAD 1993, the large scale replanting of certain cycad species has not always had a favourable outcome and often leads to a high mortality rate.

Methods: All leaves were removed. Roots were pruned and "Previcur" (a systemic and contact fungicide) was applied. "Chlorpyrifos" (an organophosphate insecticide) was sprayed over the plants and any scars were treated with "Bravo 500" (a contact insecticide).

Metal rods, with number 8 wire covered with hosepipe, were used to stabilize the larger plants from the elements and the inquisitive rhino and buffalo on the Reserve. Due to the time delay, hessian bags were placed over the roots of cycads awaiting planting (Picture 3).

The operation was overseen by a professional landscaper, Allan Hart of Shamrock Nurseries from East London, who donated days of his time free of charge, and the Reserve Manager, Derek van Eeden.

Donations: All cycad lovers owe a word of appreciation to the sponsors of this project who donated either their time or material or contributed financially.

The Grahamstown T.L.C., City Engineers Department and Parks and Forestry Department; The Provincial Administration, Grahamstown; Phoenix Roller Mills, Grahamstown, East London; Rhino Plastics, Port Elizabeth; A.E. Homman, Grahamstown; Pretoria Portland Cement, R70 000; Border Branch of the Wildlife Society of Southern Africa; Decor Profile Randburg; Kynoch Fertilizer, Grahamstown and East London.

3. Longtrem survival of the newly established colony

It is a well documented phenomenon that *E. altensteinii* is one of the more hardier members of the genus. Stress and shock often provoke reactionary growth (Jones 1993). As alluded to under points 1 and 2, the possibility exists that certain plants could have been dropped resulting in internal disruption, unseen on the outside. All care has been taken in this replanting experiment and the exact applications recorded.

Survival rates of transplanted *Encephalartos* species from the wild amongst amateur gardeners is usually confined to anecdotal evidence. Furthermore, this practice has been prohibited in South Africa since 1985. Success was often claimed and failure seldom mentioned. In many cases of failure, when a cycad died, a replacement specimen from the wild was substituted.

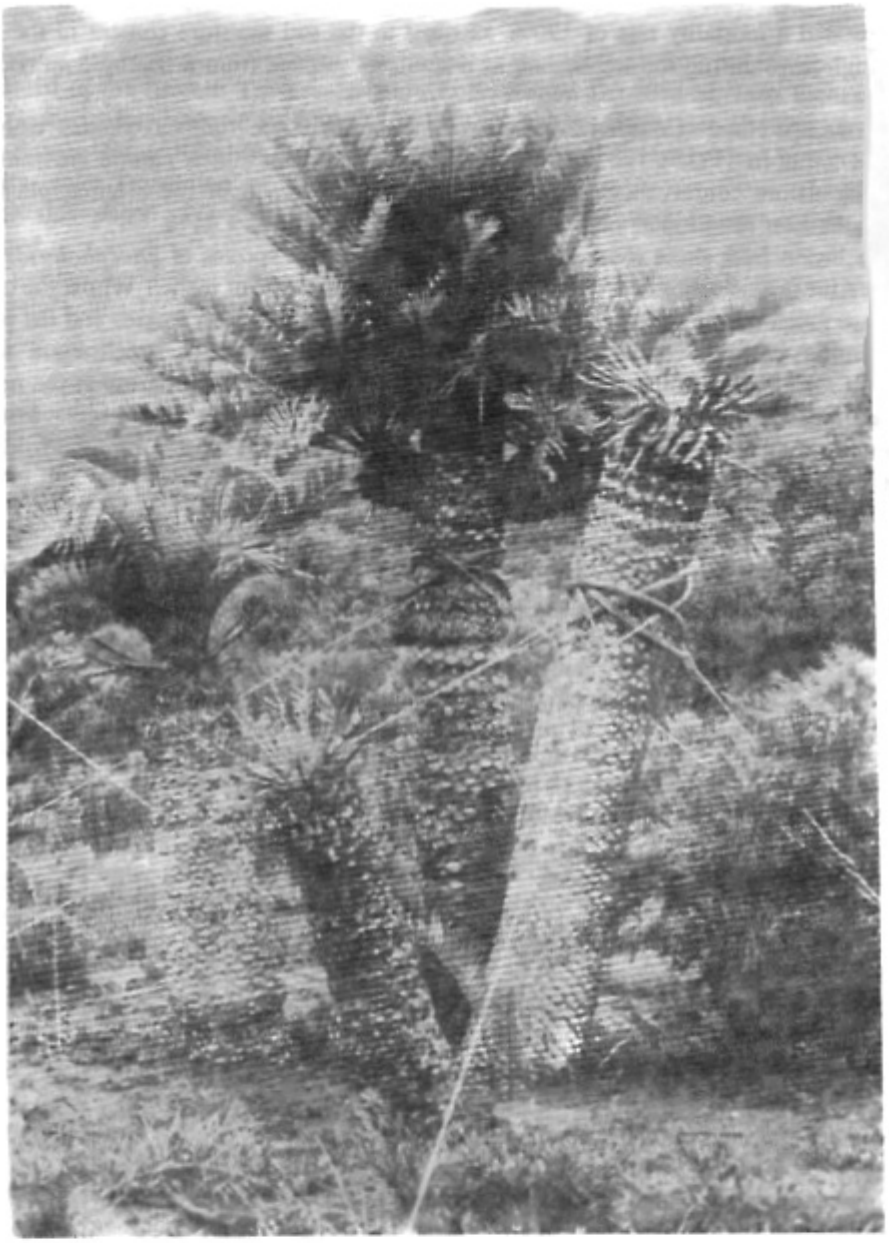
The cycad literature is devoid of accurate data on peculiarities of *Encephalartos* species, method of treatment and survival rates, especially over a prolonged period (Donaldson 1995). Jones (1993) mentions that "cycads are generally very easy to transplant and even very large specimen plants can

be removed successfully providing a few basic horticultural procedures are observed". Unfortunately he does not specifically cite *Encephalartos*, nor does he quote long term survival rates.

Therefore it is quite opportune here to not only cite some six previously documented exercises in replanting of cycads from the wild in South Africa but to tabulate the long term survival rates as a basis for determining the expected long term survival of this new colony of *E. altensteinii*.

1. Unpublished data by Drs Dyer and Verdoorn on the subsequent history of the 6000 *E. lebomboensis* removed from the wild in "Operation Wildflower" during the building of the Jozini Dam revealed a long term survival of 40% (Giddy, pers. comm.).
2. About 100 *E. horridus* cycads, confiscated by the Eastern Cape Nature Conservation Department and replanted by the Uitenhage Parks Department in well-drained indigenous *E. horridus* habitat, during which damaged plants were treated with fungicide, revealed a long term survival rate, after 5 years, of 20% (Farrington, pers. comm.).
3. The replanting of *E. laevifolius* of "Operation Stork" in which four stems were transplanted with utmost care and supervised by experts, revealed a 25% survival (Giddy, pers. comm.).

Picture 5. The author examining the appearance of male cones in this 5 m specimen of *E. altensteinii*.



Picture 6. *E. altensteinii* with 4 stems from a single base simultaneously showing the appearance of new leaves, basal leaves, cone development and dormancy in the proximal stem.

4. Jones (1993) cites two resettlement schemes, in 1986 and 1989, of *E. humilis*. Facts reveal that 6000 *E. humilis* plants were removed from within established mono-culture plantations to the ex-provincial nursery. Subsequently, 3000 plants have been put back into the wild at two locations. As at 1995, an 80% success rate has been obtained in both cases (Boyd, pers. comm.).
5. A total of 114 *E. inopinus* plants were translocated to a safer but similar site on a provincial nature reserve. Once placed at this site it was discovered that the plants were easily accessible from a nearby roadway. The plants were then moved again to a new site further within the reserve. This

operation revealed a mortality rate of ±90%, ascribed to the soil moisture content in the new area rising to a high level during the wet season as a result of seepage from a nearby dam (Boyd, pers. comm.)

6. The Eastern Cape Nature Conservation Department confiscated *E. latifrons* plants, removed from the Bathurst District in 1993. The plants were re-established within their natural environment in a secure existing nature conservancy. The author re-examined each of the original plants during 1995, 18 months after re-introduction. Survival rate was recorded as ± 21%.

The conclusion from these observations in transplanting six species of *Encephalartos* from the wild, reveals a mean survival rate of 32%, or conversely, a death rate of 67%. Whilst the cited cases obviously raise much debate due to the variability and uniqueness of each species and the peculiarity of the replanting exercise conducted, this percentage could provide a bench mark for single populations of *Encephalartos* transplanted from the wild with which the progress of the new colony of *Encephalartos altensteinii* can be compared (Picture 4). All plants have been measured as a starting point for long term study on translocated *Encephalartos* cycad species from the wild and their subsequent survival rates.

4. Results: 1st follow-up study 1 year later

The cycads were closely examined on 10 occasions over 12 months, 1 year after the cycads were removed from their original habitat, the findings are listed below. (Picture 5)

Table 1. 1 year follow-up of colony status: *E. altensteinii*

A.	Total number of cycad trunks exclusive of branched "Heads" planted in 18 groups between 4 and 13 cycads each	108
B.	Number of cycad cones produced	96
C.	Number of male cycad cones produced	82
D.	Number of female cycad cones produced	14
E.	Number of cycads in which new leaves were produced	61
F.	Number of cycads in which new basal leaves were produced	31
G.	Number of cycads which produced no new leaves, no basal leaves and no cones	30

As this paper primarily deals with the longterm recovery prospects of these translocated cycads points A and G are of specific interest revealing a 1 year activity survival rate of 72%. (Picture 6) Whilst this 12 month cycad survival figure is indeed very encouraging as compared with the aforementioned mean longterm survival rate of 32% the author (1995) has demonstrated that previous translocation of very large mature *Encephalartos altensteinii* from the wild had a 100% death rate at 4 years.

It is therefore proposed that due to the peculiarities of *Encephalartos* cycad species and their dormant characteristics the successfulness of translocating mature cycads should be accurately assessed at minimally 4 years after replanting from the original habitat.

Acknowledgements: The author thanks Div de Villiers of the Cape Nature Conservation

Department, East London, for inviting him to contribute to this project, the invaluable assistance of Wayne Boyd of the Eastern Transvaal Nature Conservation Department, Jaap Pienaar of the Cape Nature Conservation Department, Port Elizabeth, Mike Reynolds and Derek van Eeden of the Thomas Baines Nature Reserve, Roy Osborne of the University of Natal, Piet Vorster of Stellenbosch University, John Donaldson of Kirstenbosch and Cynthia Giddy for their valued assistance in preparing this paper. The support of Carl Vernon of the East London Museum was much appreciated.

An earlier, incomplete version of this paper was published previously in *Encephalartos*. My thanks to the editor, I. Claassen.

References

Boyd, W.M. 1995. The translocation and re-establishment of priority *Encephalartos* species in the Transvaal, South Africa. In Vorster, P. (ed.) Proc. 3rd Intern. Conf. Cycad Biology. 39-43. the Cycad Society of South Africa, Stallenbasch.

Donaldson, J.S. 1995. Understanding cycad life histories: an essential basis for successful conservation. In Donaldson, J. S. (ed.) Cycad Conservation in South Africa-issues, priorities and actions. Cycad Society of South Africa.

Dyer, R.A. 1965. The cycads of Southern Africa. *Bothalia* **8**: 405-515.

Giddy, C. 1984. Cycads of South Africa, Second revised edition. Struik, Cape Town.

1991. The relocation of two rare cycad plants. *Encephalartos* **27**: 17-19.

Goode, D. 1989. Cycads of Africa. Struik, Cape Town.

Jones, D.L. 1993. Cycads of the World. Reed, New South Wales, Australia.

Osborne, R. 1995. Confiscated Plants: where they can best be used in the interests of conservation? In Donaldson, J. S. (ed.) Cycad Conservation in South Africa-issues, priorities and actions. Cycad Society of South Africa.

Vice, A. 1995. *Encephalartos altensteinii* Removal from the wild becomes a death sentence. *Encephalartos* **44**: 39-40.