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## Buckawayo Research Project®

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### INTRODUCTION

In August 1998 I planted my very first cycad in the ground at Buckawayo. With this very first planting I had assumed a very major responsibility towards the conservation of cycads. My aims with this venture were fourfold:

Firstly the totally hedonistic experience, cycads give me lots of pleasure.

Secondly, the very important job of trying to become involved with the conservation of cycads.

Thirdly this facility would be available for the training of University and Technikon students in the conservation and cultivation of cycads.

Lastly the venture would not succeed if the commercial aspect were not part of the entire conservation ethic.

### IN THE BEGINNING

I had to be very aware of the accuracy of seed and seedling sources. This was achieved by careful and thorough purchases. I was able to ascertain in our local journal, *Encephalartos*, that seed collecting trips had been done to certain African states. I contacted the person who led the expedition and from that person I was able to buy many species of local and African cycads. Over the next year I was able to buy about 1000 African cycads. As fate would have it I received a call from a person one day saying that he had decided to emigrate and would I be interested in buying his cycads. Wow!! What a question? Of course I would and somehow I did.

The plants were all duly loaded and transported over a period of 1 month to our

farm in Brits near Pretoria. From here I started transferring some of these plants to Buckawayo where they were replanted into new containers and marked. In the meantime lots of seed had germinated and had been planted into containers where they were growing into healthy young plants.

By January 1999 I had planted over 600 cycads in the ground, most of these 600 plants were *Encephalartos dyerianus*, *E. eugene-maraisii*, *E. middelburgensis*, *E. nubimontanus*, and *E. laevifolius*. A year after planting I measured and documented all the plants in the garden. The cycads were planted in a very informal setting; there were no straight line in the 2-ha garden. I used palm trees planted in the ground as initial shade protection for the young plants.

Ten months after doing the measuring and documenting I repeated the procedure. My initial response was disappointment but as I analyzed growth that had taken place I came to the conclusion that it is not possible for all the plants to grow at the same rate. The *E. middelburgensis* outperformed all three other species.

This trial has not been conducted scientifically but the data has been accurately recorded and documented.

### **MORE ACCURATE SCIENTIFIC EXPERIMENTS**

In January of this year (2001) I decided that it was time to attempt a very accurate scientific experiment. What I needed was a very large shade house, after deciding which species and how many of each I wanted to plant I designed and built a shade house of 2400 m<sup>2</sup>.

The design would be a structure of 100 m × 24 m. Lengthwise the treated gum poles (125/150 mm) would be planted at intervals of 5 m, that is 21 poles. In the width the poles would be planted at a distance of 6 m apart. This would then give me grid sections of 5 m × 6 m, a very workable 30 m<sup>2</sup> per grid and a total of 80 grids of 30 m<sup>2</sup> for a total area of 2400 m<sup>2</sup>. In the length I would have line A to D and in the width I would have lines 1 to 20. Each one of the grids would be easily identified, i.e., A1 – D20.

Depending on the size and species of the seedling I would then allocate 30 plants per grid section that is 1 m<sup>2</sup> per plant. I intended planting 3- to 5-year-old seedlings that had been container grown. Some of the seedlings were older and larger; I would then allocate either 16 or 20 plants per grid section 1.6 – 2.0 m<sup>2</sup> per plant. The structure would then be covered with 40% black shade netting; the poles would be secured using a plastic coated 6-mm steel cable. The sides of this structure were left open allowing free wind flow as well as unrestricted access for working at any point in the shade house.

The soil is a sandy loam very deep red color with exceptionally good drainage capabilities. The entire area was ploughed to a depth of 400 mm; this was done to relieve soil compaction at an upper level. The entire area was then fertilized using organic phosphate (bone meal). Dolomitic lime was also applied at the rate of 100 g m<sup>-2</sup> to raise the pH of the soil. The pH of the soil was analyzed at 5.2. I will monitor the soil pH on an annual basis.

After completion of the structure and the ploughing of the soil nothing was done for a period of 30 days. This was to allow weeds to show, the weeds were removed and the area leveled to allow for the marking of the planting holes.

Each hole measured 400 mm × 400 mm across, as well as 400 mm deep. The hole was dug and the soil removed to the exterior of the shade house. Once thirty holes

had been dug and the soil removed we then set about preparing the correct soil medium that would then be used in the planting hole.

The combination of ingredients I decided to use was as follows. I screened the existing soil that had been removed from the hole using a 15-mm screen. I still needed fairly large particles as well as the smaller stones that the soil had contained. I used this soil, very clean coarse river sand, and a very well composted and screened pine bark medium (1 : 1 : 1, by volume). This medium was measured to have an air filled porosity of 30%, which is very well drained yet still able to hold adequate moisture. For the actual planting I used an organic fertilizer again, bird guano from the platforms off our West Coast. This fertilizer contains good N, P, K, and trace elements as well as a growth hormone. We would dig, prepare, and plant 30 holes at a time. Once a cycad had been planted we recorded the diameter of the caudexes, number of leaves, as well as overall condition of the plant.

### Rating Scale:

Minimum of 25-mm caudex diameter and 4 or better strong leaves = 1.

Minimum of 20- to 25-mm caudexes diameter and  $\frac{2}{3}$  good strong leaves = 2.

Less than 20-mm caudexes diameter and 1 only leaf = 3.

**Species Planted.** The initial planning was to plant 23 species of cycads. Certain of these species would be planted in multiples of 30. For example *E. tegulaneus* was available in fairly large quantities so I decided to plant five blocks of 30 plants per block, whereas *E. munchii* and *E. septentrionalis* not being easy to obtain, I was only able to plant one block of each, that is 30 plants each of these two species. The seed of the *E. tegulaneus* was collected from habitat. The seedlings of the *E. munchii* I received from the curator of the Durban botanical garden, while the seed of the *E. septentrionalis* was also habitat collected.

I used four people per grid block (30 m<sup>2</sup>). That is two labourers and two students; it took a full day to complete the entire exercise from digging hole, to mixing the medium, to finally planting the relevant cycads.

The following cycads have already been planted in their appropriate blocks:

- 1) *E. lehmannii* — 4 blocks of 30 to 150 plants. A1, B1, C1, D1.
- 2) *E. tegulaneus* — 5 blocks of 30 to 150 plants. A2 to A6.
- 3) *E. middelburgensis* — 4 blocks of 30 to 120 plants. B2 to B5.
- 4) *E. eugene-maraisii* — 5 blocks of 30 to 150 plants. B6, B7, B8, C2, C3.
- 5) *E. sclavoi* — 2 blocks of 30 to 60 plants. C4, C5.
- 6) *E. princeps* — 4 blocks of 30 to 120 plants. D2, D3, D4, D5.
- 7) *E. msinganus* — 2 blocks of 30 to 60 plants. A7, A8.
- 8) *E. cerinus* — 2 blocks of 30 to 60 plants. B9, B10.
- 9) *E. horridus* — 1 block of 30 to 30 plants. D6.
- 10) *E. umbeluziensis* — 1 block of 30 to 30 plants. D8.
- 11) *E. altensteinii* — 1 block of 30 to 30 plants. D10.
- 12) *E. hildebrandtii* — 1 block of 30 to 30 plants. A11.
- 13) *E. inopinus* — incomplete block to 13 plants.
- 14) *E. nubimontanus* — large seedlings 12 years old — incomplete block to 8 plants.
- 15) *E. paucidentatus* — 1 block of 30 to 30 plants. B12.
- 16) *E. caffer* — incomplete block to 15 plants. C12.
- 17) *E. leboomboensis* — 1 block of 30 to 30 plants. D12.

- 18) *E. woodii* × *E. natalensis* — 1 block of 30 to 30 plants. C13.
- 19) *E. concinmus* — incomplete block to 10 plants.
- 20) *E. septentrionalis* — 1 block of 30 to 30 plants. B15.
- 21) *E. munchii* — 1 block of 30 to 30 plants. B16.
- 22) *E. longifolius* — 2 blocks of 30 to 30 plants. A9, A10.
- 23) *E. laevifolius* — incomplete block to 11 plants. C14.

Already a total of 1227 cycads have been planted since the 2nd of April 2001. I anticipate that the balance of the cycads will be planted by end of Dec. 2001. On three separate occasions students of horticulture have participated in this project, that is a total of thirteen students who had until then never had any exposure to cycads whatsoever. With this project I hope to achieve many objectives, primary objective being to create awareness of the plight of our cycads to the next generations of potential cycad enthusiasts.

I intend running practical workshops for students twice a year. The workshops will last for about 10 days, the only restrictions I have are that they be bona-fide students enrolled at either a University or Technikon studying horticulture.

The farm has facilities to accommodate five students at a time; this training will be open to local as well as foreign students. Training is done free of charge, the students are fed, accommodated, and paid a nominal salary. Transport from Pretoria to Letsitele is available if needed.

## SUMMARY

In closing the system that I have devised where the cycads are planted in grid blocks of 30 is very easy to manage. Cycads are allocated an individual number where monitoring will be possible. In grid block A the first cycad planted will be no 1 A1 and the last one 1 A30. The next grid block will be 1 B1 – 1 B30, this will facilitate the personal monitoring of each cycad. If an individual either grows very well or whether another dies this system will be easily monitored. The measuring of the caudex growth and leaf production will be done once a year, this data will be kept on computer. Growth patterns and tempo will be analyzed. This information will be available on request. Fertilizing regimes will be accurately recorded—quantity and frequency of fertilization. For top dressing I will use a 3:1:5 (N:P:K) and seabird guano four times a year. The entire area has been mulched with a 19-mm pine bark, the reason for this again is twofold—water conservation and weed control. Finally the cycads will all be on a drip irrigation system allowing the accurate dispensing of water to the plants. Amount of water will probably be restricted to about 5 to 8 liters per plant per week.

What do I personally hope to achieve from this? Firstly as the owner of this operation I will make the decisions as to what I do with the plants. I am hoping that many of these plants will mature and eventually become seed producers, but primarily this will remain a commercial venture. If plants become too congested they will be lifted and containerized for resale. Hopefully many botanic gardens will want to buy plants from Buckawayo for planting in their gardens.

Secondly it is vital to gain credibility from all persons involved in conservation, whether it is from academics, enthusiasts, commercial growers, or generally just the private person who wants one cycad in a pot. I hope to work with nature conservation on this project, I would be more than willing to arrange workshops for nature conservation officials who need to be trained in cycad identification or any other aspects related to cycad conservation.

Unfortunately I don't know of any project that has succeeded where local people have become involved with cycad propagation. Neither the Edendale project in Natal nor the Mananga project in the far Eastern Mpumalanga has succeeded as a commercial venture.

Plans for the future are well underway, a second shade house of 3000 m<sup>2</sup> has been completed, and work on construction of the third shade house has commenced. I have been very fortunate to acquire a very large collection of very rare cycads. The cycads that I have bought will be transported to Buckawayo only 40 km away.

Approximately 300 of the 700 plants are suckers from the adult plants; these suckers have all been established in containers for a few years.

These rare plants, which include *E. dolomiticus*, *E. heenanii*, *E. cupidus*, as well as all the other rare category plants will be planted in the new shade houses.

The mature cycads, which include *E. inopinus*, *E. dolomiticus*, *E. nubimontanus*, and *E. laevifolius* will be carefully removed and replaced in colonies at Buckawayo for future seed production.

I would like to thank my wife Lelanie for her support in this endeavour as well as for her unwavering support despite what at times felt like insurmountable obstacles. I love cycads. **On a Positive Note I Will Quote From a Few Letters Received From Students Who Have Trained at Buckawayo.**

***Jan-Louis Bezuidenhout — 3rd year B.Sc. student, University of Petoria.***

“And then there is a collection of cycads that will set most peoples pulses racing, what struck me was to see how close Steve is to his plants. At Buckawayo one learns how to love a plant, my interest became a love, a love for plants I never knew existed.”

***Ilona — 3rd year B.Sc. student, University of Pretoria.***

“The Trollips are passionate about their palms and cycads because so many cycads are very endangered they have made it their life's work to collect and grow the plants, whether it be from seeds, suckers, or the plant itself. Their plan for the near future is to complete the collection as far as possible and create a conservation environment.”

***Jana van den Berg — 2nd year B.Sc. student University of Pretoria.***

“Cycads are almost a subculture in South Africa but many people have no clue how important cycads are to our environment. Many cycads habitats have been plundered to virtual extinction. I feel like crying when I think of this massive habitat destruction.”

***Mariné Pienaar — 1st Year B.Sc. student, University of Pretoria.***

“The conservation of cycads is something Steve is very keen on achieving. We were very happy to be taken to Mariepskop to photograph *E. laevifolius* in habitat. We saw slides of terrible habitat destruction as well as heard horrific stories about cycad poaching. It is very scary to think that people will ruin an entire habitat for the sake of money. I saw how two people with a love for these plants could make a difference. A love becomes a passion, a passion becomes a lifestyle, and for this reason I know that the cycads at Buckawayo are safe and loved.”

***Elza Kuhn — 3rd Year B.Sc. student, University of Pretoria.***

“Admiration, joy, and sorrow are but a few words to describe my experience at Buckawayo. Admiration for all the species of palms and cycads and the passion with which they are being grown as well as the knowledge of the subject; and joy at the species that have adjusted and are growing, also for the rare species we saw growing. Finally, sorrow, for the cycads that have been virtually eradicated in their habitat. Cycads, one and all are imbedded deep in my heart forever.