SABONET NEWS

Newsletter of the Southern African Botanical Diversity Network

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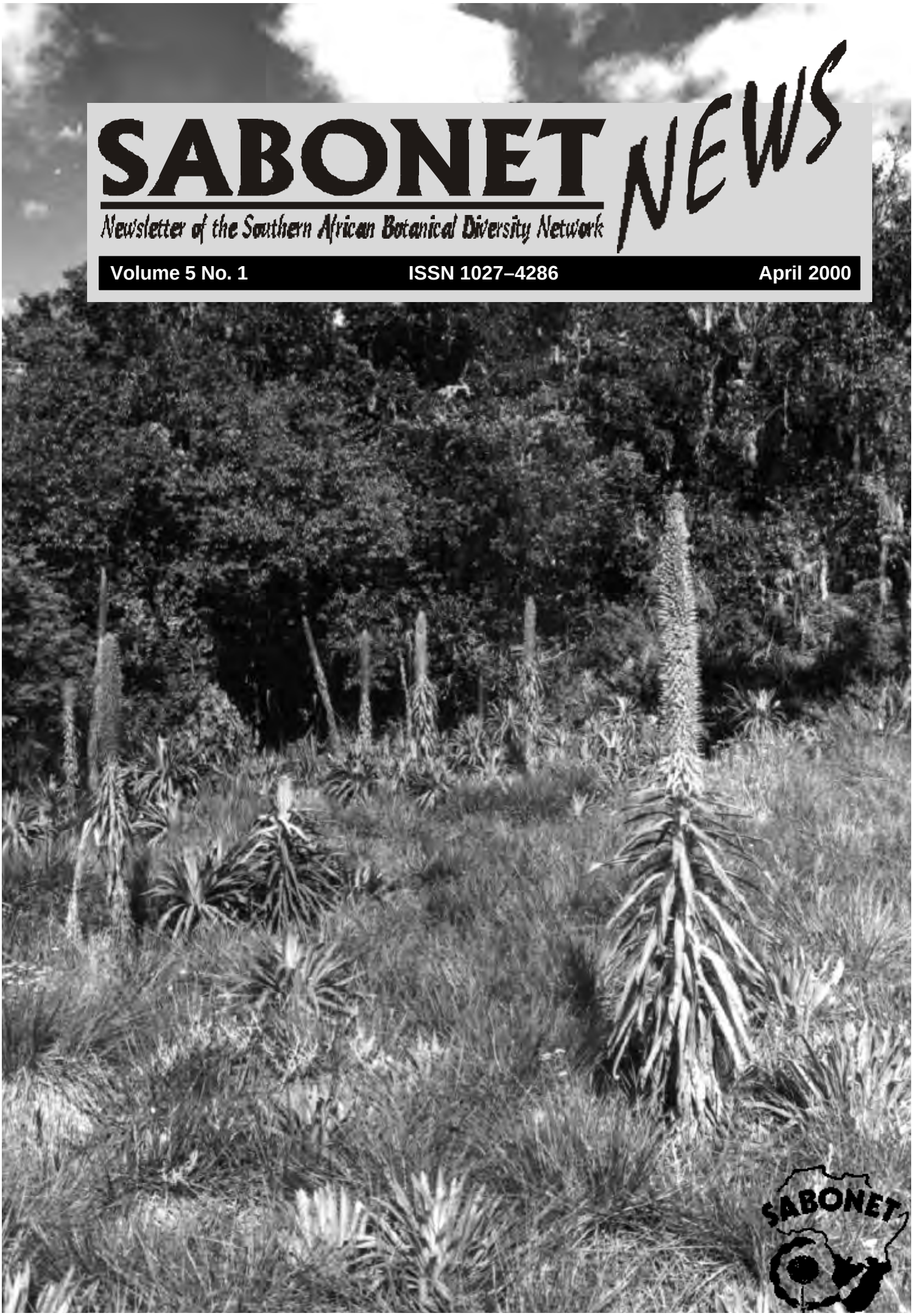

IN THIS ISSUE

FRONT COVER: *The giant lobelia,* Lobelia mildbraedii *(Lobeliaceae), growing at Lake Kaulime, Nyika National Park, Malawi.*

Editorial

Welcome to the 12th edition of *SABONET News*, the official newsletter of the Southern African Botanical Diversity Network Project, more commonly known as SABONET. The major recent event that has taken place within the project has been the completion of the project's first regional botanical collecting expedition to the Nyika National Park in Malawi/ Zambia. (The park straddles the international boundary between northern Malawi and Zambia.) A preliminary report on this expedition is included in this edition of our newsletter, with certainly more exciting reports and scientific findings expected once the more than 3 000 plant specimens that were collected during the expedition have been identified and analysed. This recent expedition was a great learning experience for all the participants, from the young botanists to the more experienced plant taxonomists, and will stand us in good stead for future regional expeditions planned within the project and beyond. The project's philosophy is "learning by doing", and we certainly learnt by doing on this recent expedition. The next regional botanical collecting expedition is scheduled to be held in Mozambique, probably in 2001, and will be as much, and possibly even more of a challenge, particularly in terms of the logistics required.

In addition to our regular features, this issue reports on the Southern African Red Data List Workshop that was held towards the end of 1999 in South Africa, as well as a Red Data List Assessment by Dickson Kamundi (National Herbarium, Malawi) of

***Dalbergia melanoxylon*. Readers can look forward to three new numbers in the *SABONET Report Series*: an inventory on southern African plant taxonomic and diversity expertise, the results of a botanic gardens needs assessment survey that was conducted within the region last year, and a manual on environmental interpretation in botanic gardens. A couple of important international meetings will be taking place around the world over the next couple of months, and we hope to report on each of them in the August edition of our newsletter. COP V (5th Conference of Parties to the Convention on Biological Diversity) is being held in Africa (Kenya) for the first time and the International Botanic Gardens Congress is scheduled to be held in June in Asheville, North Carolina, USA. The New International Agenda for Botanic Gardens in Conservation, to which the SABONET Project and the region's botanic gardens contributed in June 1999, will be launched at this meeting.**

We trust you will enjoy reading this edition of our newsletter and that there will be something of interest *and* use to you.❑

Christopher Willis
SABONET Regional Coordinator
18 April 2000

CONFERENCE ANNOUNCEMENT

SASAQS 2001: Aquatic ecology and resource management in southern Africa
The 36th conference of the Southern African Society of Aquatic Scientists will be held at Aventura Eco Eiland in the Northern Province, South Africa from 1st July to 6th July 2001. For further details please contact

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PROFILE

Augustine Charles Chikuni

▲ *Augustine Charles Chikuni.*

Augustine Charles Chikuni was born on 25 October 1964 in a small village in Chiradzulu District, Malawi, the second-born son from a family of four children. He completed his primary schooling at Chimwalira School (1970–1979), near Nasawa Technical School, Zomba District, and secondary education at Mwanza Secondary School in Mwanza District (1979–1983). In August 1983, he went to Bunda College of Agriculture, University of Malawi, where he completed a BSc (Agriculture) in 1988. After his BSc course he was employed as an Assistant Scientific Officer at the National Herbarium and Botanic Gardens of Malawi (NHBG). Realising that he had very little taxonomic background, he attended a short plant taxonomy course at the Biology Department, Chancellor College, University of Malawi.

At the NHBG he was involved in the planning of the XIIIth AETFAT Congress, which took place in Zomba in April 1991. In October 1991, he went to Reading University, UK where he completed a MSc degree in Applied Plant and Fungal Taxonomy. He studied the genus *Achyrospermum* Blum. (Labiatae) from southern Tropical Africa. He returned to Malawi in

October 1992 and continued as a Scientific Officer at the NHBG. On his return to Malawi he was requested by Prof. J.H. Seyani to assist with editing the proceedings of the plenary sessions of the XIIIth AETFAT Congress; the proceedings were published in 1994.

In 1995, Augustine was awarded a scholarship by the Commonwealth Scholarship Commission to do a DPhil at the Plant Sciences Department, Oxford University, UK. He innocently chose to study the genus *Brachystegia* Benth. for his DPhil. Although *Brachystegia* is one of the most difficult tropical African genera, he managed to complete a wide-ranging monographic study of the genus. He is at the moment preparing a monograph and a *Flora zambesiaca* account of *Brachystegia*. On returning to Malawi in February 1999, he continued as a Scientific Officer until November 1999, when he was appointed Acting Director of the NHBG. He is currently the National SABONET Coordinator for Malawi.

Augustine is interested in ethnobotanical research, especially botanical pesticides and medicinal plant research. He is also interested in the systematics of tropical African Caesalpinioideae legumes, especially *Brachystegia*, *Isoberlinia* and *Julbernardia*. He is currently revising the genus *Isoberlinia*. Having used morphological characters in the taxonomic study of *Brachystegia*, he feels that molecular techniques should be used to sort out infrageneric classification, species relationships and also the relationships of *Brachystegia* with other genera.

He liked climbing little hills and fishing as a young lad and enjoyed singing gospel songs while at college. He now enjoys watching football and listening to music during his spare time.❑

SABONET Nyika Expedition 2000

by Christopher Willis, John Burrows & Pieter Winter

"For in order to care deeply about something important it is first necessary to know about it. So let us resume old-fashioned expeditions at a quickened pace, solicit money for permanent field stations, and expand the support of young scientists—call them "naturalists" with pride—who by inclination and the impress of early experience commit themselves to deep knowledge of particular groups of organisms".
(Edward O. Wilson, *Conservation Biology* 14(1): 1–3, February 2000)

As reported in the August 1999 edition of *SABONET News* (Volume 4 Number 2, pages 118–123), a Regional Plant Collecting Expedition to the Nyika National Park in Malawi/Zambia was planned for the SABONET Project since May 1999. This expedition took place from 22 March to 10 April 2000, and was successfully completed by more than twenty botanists from the southern and eastern African countries of Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe. The Nyika is the largest montane complex in south-central Africa, and consists of rolling grasslands, dambos, forest patches and miombo woodlands on the plateau escarpment. The expedition focussed on the following areas: the Zambian Nyika National Park, Chosi, Mwanda and Nganda Mountains, Chisanga Falls, Fingira Rock, Dembo, Kaulime and Wovwe Rivers, Nthakati Peak, Chelinda Bridge area, Mpopoti, Sangule Kopje, Mbuzinandi, Vitinthiza Hill, Jalawe/Domwe area, miombo woodlands in the southwestern part of the Nyika, as well as the Juniper Forest area. Although some areas have been well collected by previous botanists, such as in the Chelinda Bridge and Nganda areas, we attempted as far as possible to target areas on the Nyika that had not been well collected previously. Despite our intensive botanical collecting efforts over a period of two weeks, vast areas of the Nyika remain undercollected, especially in the more inaccessible northeastern and eastern areas of the Nyika National Park.

Altogether 3 343 plant numbers were collected during the expedition. Where possible, four to five duplicates of each specimen were collected. The intention is that the duplicates will be distributed to the following regional southern African herbaria: National Herbarium, Malawi (MAL), University of Zambia Herbarium, Zambia (UZL), National Herbarium, Zimbabwe (SRGH), National Herbarium, South Africa (PRE), and INIA Herbarium, Mozambique (LMA).

Prior to the expedition, a small group of southern African botanists had worked hard to prepare a preliminary plant checklist for the Nyika as a working document during the expedition, as well as species profiles on Nyika's endemic plants. In addition, published illustrations of some of the plants that were known to occur on the Nyika were compiled as a separate working document. Previous estimates of the number of plant taxa found on the Nyika have varied between 1 200 (Seyani, Chikuni & Kamundi 1991) and 1 420 (Patel, Brummitt, Overton & Overton 2000) plant taxa. Our preliminary estimates are significantly higher than this, probably closer to 1 800–1 900 plant taxa, although the actual figure is probably over 2 000. Several new distribution records were made for many Nyika plant taxa, including some of the strict Nyika endemic plants, such as *Setaria grandis* (Poaceae) and *Oxalis chapmaniae* (Oxalidaceae).

Primary Goals

The following goals have been or will be achieved, either fully or partially, as a result of the expedition:

- Document and list flora collected from previously under-collected areas/vegetation types

(such as the herbaceous flora in the montane grasslands) on the Nyika Plateau.
- Determine the distribution of selected known endemic and threatened plant species on the Nyika Plateau (selected plant taxa determined largely from the literature).
- Produce an illustrated field guide/annotated checklist to the plants of the Nyika National. Park/Plateau. (A single line drawing of each genus represented in the local flora will be included.) The publication will also include bibliographic citations, synonyms, distribution and altitude information, habit, and specimen citations. It is hoped that this publication will provide useful information to National Parks officials on both the Malawian and Zambian sides of the Nyika and assist them in their management of the Nyika flora.

Secondary Goals

- Field experience for staff employed in regional herbaria
- On-site training in the following: plant pressing and collecting; use of GPS; team management; expedition planning and implementation; identification of selected plant groups;mentoring by plant specialists
- Link with existing initiatives relating to botanical diversity on the Nyika Plateau so as to complement, and not duplicate, efforts (especially with regard to the annual Overton expeditions to the Nyika)
- Improve plant collections from the Nyika Plateau represented in the Malawian and Zambian herbaria
- Training for herbarium workers in report writing
- Recommendations adopted by relevant conservation agency and added to the existing management plans
- Networking between regional botanists

Ferns

Before the SABONET Nyika Expedition 2000, it was thought that the pteridophytes were fairly well-collected on the Nyika Plateau. Nonetheless, some specialised collecting of this group produced 13 interesting additions to the fern flora of both Nyika and Malawi (Table 1). Of particular note was the re-collection of the very rare maidenhair fern, ***Adiantum reniforme*** L., originally collected at the same locality by the Wye College Expedition in 1972. This locality represents only the third confirmed occurrence of this peculiar

Table 1. *New pteridophyte records collected during the expedition*

Anogramma leptophylla	New record for Malawi
Ophioglossum convexu	New record for Malawi
Blechnum australe	New record for Malawi (North)
Elaphoglossum acrostichoides	New record for Malawi (North)
Isoetes* sp. *(?I. schweinfurthii)	New record for Malawi (North)
Megalastrum lanuginosum	New record for Malawi (North)
Ophioglossum lusoafricanum	New record for Malawi (North)
Ophioglossum rubellum	New record for Malawi (North)
Aspidotis schimperi	New record for Nyika
Mohria lepigera	New record for Nyika
Ophioglossum polyphyllum	New record for Nyika
Thelypteris chaseana	New record for Nyika
Thelypteris friesii	New record for Nyika

fern from the African continent. Its reaffirmed healthy presence, albeit very restricted, is heartening.

Angiosperms

Expedition members collected nineteen new dicot and monocot records (Table 2). This list represents only those taxa that could be identified in the field; several other new records may yet come to light once identifications have been carried out in herbaria by specialists in particular groups.

Nomenclature, floras and distribution records

The expedition also afforded southern African botanists the opportunity to assess the state of knowledge and taxonomic resources relevant to the *Flora zambesiaca* (FZ) area and to improve on these with data collected (plant specimens) and analysed (identification, assessment, checklist, etc.).

• ***Continued on page 8***

Table 2. *New angiosperm records collected during the expedition*

Ficus persicifolia (Moraceae)	New record for Malawi
Galium thunbergianum* var. *hirsutum (Rubiaceae)	New record for Malawi
Gunnera perpensa (Haloragaceae)	New record for Malawi (North)
Anisophyllea boehmii (Anisophylleaceae)	New record for Nyika
Chrysanthemoides monilifera (Asteraceae)	New record for Nyika
Cyphia decora (Lobeliaceae)	New record for Nyika
Faurea delevoyi (Proteaceae)	New record for Nyika
Ficus ovata (Moraceae)	New record for Nyika
Ficus rokko (Moraceae)	New record for Nyika
Gardenia ternifolia* subsp. *jovis-tonantis (Rubiaceae)	New record for Nyika
Lipocarpha comosa (Cyperaceae)	New record for Nyika
Mondia whitei (Asclepiadaceae)	New record for Nyika
Monotes discolor (Dipterocarpaceae)	New record for Nyika
Myrothamnus flabellifolius (Myrothamnaceae)	New record for Nyika
Rabdosiella calycina (Lamiaceae)	New record for Nyika
Rothmannia engleriana (Rubiaceae)	New record for Nyika
Striga asiatica (Scrophulariaceae)	New record for Nyika
Strychnos spinosa (Loganiaceae)	New record for Nyika
Syzygium guineense* subsp. *guineense (Myrtaceae)	New record for Nyika
***Tylophora* sp.** (Asclepiadaceae)*	
***Erodium/Pelargonium* sp.** (Geraniaceae)*	
Coleochloa* cf. *setifera (Cyperaceae)*	
***Floscopa* sp.** (Commelinaceae)*	

* Possible new records for Nyika, i.e. not in the preliminary checklist; may be due to previous misinterpretation.

▸ ***Continued from page 7***

Some shortcomings in available literature are already apparent. These include obvious incorrect identifications in previous lists, nomenclatural inconsistencies (particularly some between the FZ and *Flora of southern Africa* (FSA) regions), and new distribution records for some species. A thorough analysis will only be possible once every specimen has been identified, the determination lists have been collated and a final checklist has been drawn up.

An example of a name used inconsistently is *Crassula globularioides* (Crassulaceae). In the FZ area, it refers to the plants collected on Mwanda & Fingira, with ciliate leaf margins and glabrous lamina, whereas in the FSA region, Tölken interpreted it as a plant in the *Crassula swaziensis* complex, of similar structure, but with pubescent leaves lacking cilia.

Several collections may later prove to be of interest but are as yet unidentified. Among these is a grass with peculiar, stubby, reflexed laminae, and an annual species in the *Justicia* group (Acanthaceae) barely 2 cm tall. This dwarf annual habit was observed in several other genera as an adaptation to the ephemeral habitats on the plateau (*Panicum*, *Trichopteryx*, *Eragrostis*, *Schizachyrium* (Poaceae), *Antherotoma* (Melastomataceae) and *Lobelia*).

There seems to be some discrepancy surrounding a specimen of *Bersama abyssinica* (Melianthaceae), in that it does not conform to the pattern of altitudinal and morphological correlation described in FZ. This complex may need revisiting.

In the Apiaceae, a species of *Peucedanum* was matched with two collections in PRE (duplicates in several major herbaria), but defies identification, as both specimens are undetermined. There seems to be no mention of this species in FZ.

The *Heteromorpha involucrata* (Apiaceae) complex was observed properly, particularly with regard to habit, habitat and distribution over the plateau. Two entities were identified as *H. involucrata* and *H. kassneri*, correlating to grassland and miombo woodlands respectively. This observation could lead to the reinstatement of *H. kassneri*, which is currently a synonym of *H. involucrata*.

Several plants were illustrated for the first time by Sandie Burrows, one of which is the endemic *Plectranthus acaulis* (Lamiaceae). Sandie produced 143 field drawings of different Nyika plant genera whilst on the expedition!

Two *Aloe* species (*A. nuttii* & *A. buchananii*, Asphodelaceae) were collected which seem remarkably close to the South African species of section *Leptoaloe*. The relationships within this group are currently being studied and further insight based on these tropical collections and field observations are most opportune.

Overall, SABONET's first regional botanical collecting expedition to the Nyika was very successful and a great learning experience for all involved. We look forward to publishing further scientific results emanating from the expedition as the plant specimens are processed and identified.

Acknowledgements

The botanical collecting expedition was made possible through the generous funding provided to the SABONET Project by the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP). Co-funding from Wildlife Conservation Society (New York) office in Tanzania, which facilitated the participation of Mr Leonard Mwasumbi from the University of Dar-es-Salaam, is also acknowledged. Staff attached to the SABONET Coordinator's Office in South Africa, specifically Nyasha Rukazhanga-Noko, Carina Haasbroek, Janice Golding and Marthina Mössmer, provided much support in the planning and preparatory stages of the expedition, for which we are extremely grateful. Thanks to Lyn Fish and Marthina Mössmer for editorial comments on this article.

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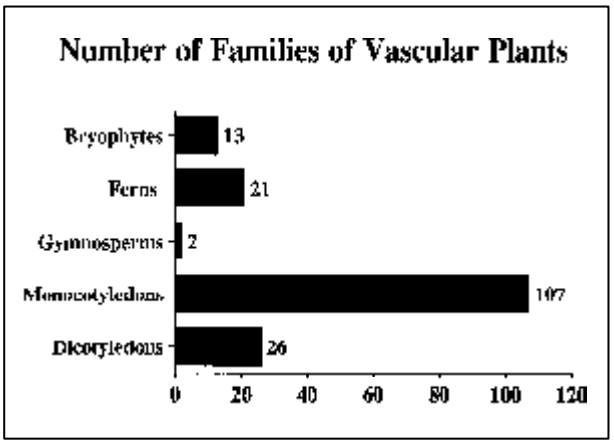
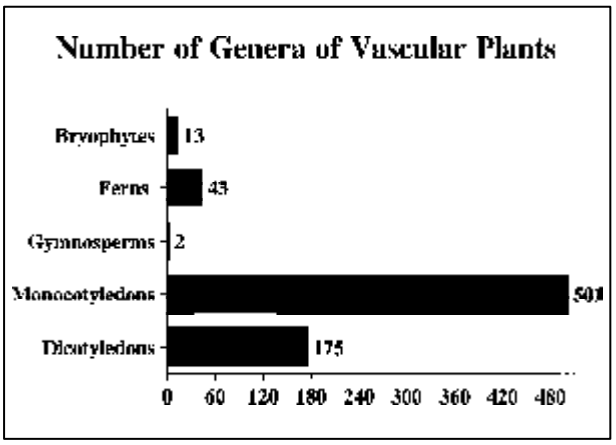
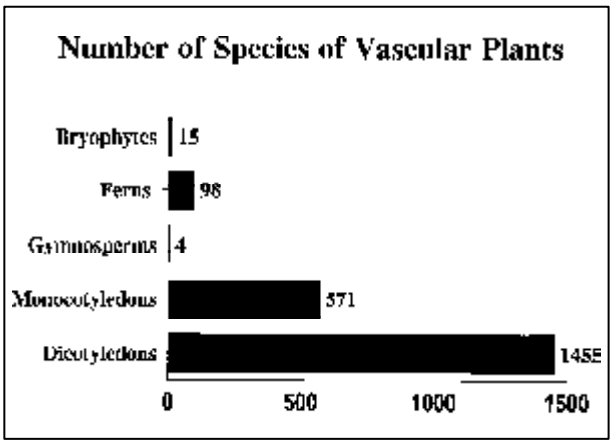


▲ *Summary statistics from the preliminary Nyika plant database as recorded before the SABONET-Nyika Expedition. Breakdown of the* ***number of families of vascular plants*** *per major plant group.*



▲ *Summary statistics from the preliminary Nyika plant database as recorded before the SABONET-Nyika Expedition. Breakdown of the* ***number of genera of vascular plants*** *per major plant group.*



▲ *Summary statistics from the preliminary Nyika plant database as recorded before the SABONET-Nyika Expedition. Breakdown of the* ***number of species (including sub-specific taxa)*** *of vascular plants per major plant group.*

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▸ ***Continued from page 9***

▲ *Some of the more than 3 000 plant specimens collected during the SABONET Nyika 2000 botanical collecting expedition.*

▲ *Fingira Rock, Nyika National Park, Malawi.*

▲ *Southern African plant hunters, Chelinda Camp, Nyika National Park. Absent from photo: Hubert Kurzweil, Solomon Nkoana and Steve Johnson.*

▲ *Hassam Patel (Malawi) and Ratidzayi Takawira (SRGH, Zimbabwe) collecting plants on the shores of Lake Kaulime.*

▲ *The giant lobelia,* Lobelia mildbraedii, *on the shores of Lake Kaulime.*

▲ *Ms Lyn Fish (PRE) pressing Nyika grasses.*

▲ *Ms Marinda Koekemoer (PRE) pressing plants of the family Asteraceae.*

▲ *The trio that found the maidenhair fern* Adiantum reniforme *(Pteridophyta) along the Wovwe River, Nyika National Park. L-R. Jonas Luhanga, Hassam Patel and Pieter Winter.*

▲ *Activity at Chelinda Camp, Nyika National Park.*

▲ *L-R. Hassam Patel, Moffat Thera, Pieter Winter and Jonas Luhanga (National Parks) on Mwanda Peak.*

▲ *Mwanda Hill, southwestern Nyika. The international boundary between Malawi and Zambia runs along the ridge shown in the photograph. The geology comprises Mafingi Group sediments, mainly quartzites, siltstones and argillites.*

▲ *Hassam Patel (Malawi) recording information on his field labels, Mwanda Hill.*

• ***Continued on page 12***

▸ ***Continued from page 11***

▲ *Leonard Mwasumbi (left, Tanzania) and Patrick Phiri (Zambia) processing their plant collections, Chelinda Camp.*

▲ *Chisanga Falls, North Rukuru River, Nyika National Park, Malawi.*

▲ Adiantum reniforme *(Pteridophyta: Adiantaceae) collected during the expedition from the Wovwe River, Nyika National Park, Malawi. Previously collected by Brummitt, Munthali and Synge at the same locality during the Wye College Expedition 28 years ago in 1972.*

▲ *Inflorescence of* Setaria grandis *(Poaceae), endemic to the Nyika Plateau. This species was often found associated with forest patches dominated by the trees* Hagenia abyssinica *and* Myrica salicifolia. *This is the only grass species which is endemic to the Nyika Plateau.*

Nyika 2000 Limericked

Twenty-four botanists bold
Set off for the Nyika so cold
To collect plants big and small,
We searched for them all;
At least those that our presses could hold.

Chris headed the Nyika Brigade;
And he paid, and he paid, and he paid.
But we can honestly say
That by the end of our stay
A botanist of Chris we had made.

(*SABONET Regional Coordinator, Christopher Willis, was the team leader and purser for the expedition; on more than one occasion he was heard to mutter about continually settling accounts. But on the positive side, he was initiated into the pleasures of plant collecting by gathering his first 250 numbers.*)

On the way up Marinda was driving,
Found the roads in the dry were astounding,
But the roads in the wet
She'll never forget;
Said John: "Its all character-building!"

(*For Marinda Koekemoer and Lyn Fish of the Herbarium at N.B.I., Pretoria, the rough roads leading to the Nyika National Park, proved to be a novel experience, their nerves strained further when the roads turned to mud after heavy rains. John Burrows would occasionally try to placate them by assuring them that the experience was all character building!*)

Pieter was our expert on *Heracleum*,
***Heteromorpha*, kalmoes and *Peucedanum*;**
But the coup of the trip
Was when he went for a dip
And returned with the rare *Adiantum*.

(*Pieter Winter of the University of the North, specialised in the family Apiaceae but collected a wide range of other plants, including the rare maidenhair fern,* Adiantum reniforme, *only once before seen on the Nyika and only the third locality in Africa.*)

Said Steve, with his moth-catching light,
Of the delphiniums on Nyika so bright,
"In the day I can see
The blue with the bee
And at night the moth on the white."

(*Dr Steve Johnson of Natal University spent much time monitoring the two species of* Delphinium *that grow on Nyika; the blue, non-scented* D. dasycaulon *which is pollinated by bees; and the white, sweetly-scented* D. leroyi *which is pollinated at night by hawk-moths*).

• ***Continued on page 14***

▸ *Continued from page 13*

Our man from Lusaka was Phiri,
On grasses and mosses a 'fundi'.
Since the latter are found
Not far from the ground,
It was there that we'd usually see Phiri.

(*Dr Patrick Phiri of UZL, Zambia, was most often to be seen crouched close to the ground digging up minute mosses*.)

Those hyaenas are terrible vandals,
They ran off with Sandie's prize sandals.
They were found in a mess
With one heel a bit less;
Not so lucky were the trailer's round handles.

(*On the first night at Chelinda, Sandie Burrows left her rubber/canvas sandals outside the cottage door for the night. Both were promptly carried off by the nocturnal hyaenas and, although they were found a few days later, they had lost parts of the soles. A few nights later, the hyaenas decided to chew on the plastic handle of the jockey-wheel of the hired trailer*.)

Our host at Chelinda was Fi,
Her desserts were a wonder to see.
But Chris got a warning
To his cheery "Good morning"
When she said, "Don't you get chipper with me!"

(*Gary and Fiona Brown were our hosts at the Chelinda Camp on the Nyika. The effervescent and charming Fiona and her hard-working crew of cooks managed to produce some amazing culinary delights under very remote and primitive conditions; a fact much appreciated by all. But Fiona was not a 'morning person' and she could not always match Chris's good spirits so early in the morning!*)

By the end of two weeks we had done
Three thousand numbers, plus some.
I think you'd agree
T'was a botany spree.
Now what of two thousand and one?

John Burrows

Life at Natal Herbarium

by Nikaya Arumugam and Nontuthuko R. Ntuli

▲ *The friendly Natal Herbarium staff. Standing from left to right: Dr. Neil Crouch, Alfred Ngwenya, Matthews Mbonambi, Rosemary Williams (Curator), Nontuthuko Ntuli, Helen Noble and Mariana Tomlinson. Seated from left to right: S'miso Ngcobo, Jeff Govender, Caroline Hlongwane, Yashica Singh, Nikaya Arumugam and Catherine Prentice. (Photo: Trevor Arnold)*

Since we started work on the PRECIS database, we have been exposed to the rich history of Natal Herbarium (NH) along with the modern dynamic vibes of the present. We would like to give you a taste of ***Life at NH…***

A is the **accessioning** of herbarium specimens. This allows data to be easily **accessed**. One cannot forget those important collectors **Abbott** and **Acocks**! 'A' is also for those dreaded **alien** plants.

B stands for **Botany**, need we say more?! It is also for **Buchanan**, a well-known NH collector, who rarely provided proper localities. **Biotic effects** play a major role in a plant's life too!

C refers to the **Cycad Expedition** (1947) that covered a vast area of the Eastern region of southern Africa. It represents all of the **collectors** who contributed to our **collection**. Many thanks to all of you. 'C' is our **coastal region**, rich in mangrove swamps and dune forests.

D represents the various label **descriptions** that provide us with **data** for the specimen **database**. 'D' stands for **Durban**, NH's beautiful hometown.

E "In June 1960 the herbarium identified seeds of the water hyacinth, ***Eichornia crassipes***, in a court case." (Schrire, 1983). **Evans, M.S.** (1854–1920) wrote the first volume of 'Natal Plants', along with Medley-Wood. 'E' is our **existing specimens**, of which we have approximately 100 000**.** Jeff Govender is doing a taxonomic revision of ***Eucomis*** L'Hérit. **Ethnobotany** by Dr Neil Crouch is a dynamic field.

F are the **friendly faces** you are guaranteed to bump into at NH. 'F' also stands for **Forbes H.M.L.** (1900–1959), curator at NH from 1940 to 1955. She has done revisions of the genera *Psoralea* and *Tephrosia*, and written "An account of the flora of Malvern District" and "The flora of Isipingo".

G is the **grid references** and **gazetteer**, both a nightmare for data capturers. It is also for the famous duo **Gerrard and McKen** who collected extensively together between 1862 and 1865. Their specimens provided the basis of the herbarium.

H refers to the vast **habitat types** in KZN, from the seashores to mountain plateaus. Then there is our world-famous ***Hypoxis*** study by Yashica Singh. A tremendous task, but nothing is impossible with a woman's touch!

I refers to our **Indigenous Flora**, which we endeavor to promote, preserve and conserve. **Inanda**, an area extensively collected in by the founder of NH. (Read on to find out who!)

J is for Miss **Johnson**, curator of NH from 1956 to 1963, when she left to get married.

K is **KwaZulu-Natal** with its three priority conservation areas: Maputaland, Pondoland and the Drakensberg Alpine.

L is the variety of **localities** that require grid references. This is not always possible, especially with places like Helpmekaar and Tweefontein, when province details are not included in the notes.

M **McClean, A.P.D.** was placed in charge of the Botanic Station (which incorporated NH) in the middle of 1926. He worked on diseases attacking sugarcane and other crops and collected plant specimens in the Inchanga area.

N represents the **new specimens** that are continuously brought in by collectors. The **Natal Herbarium** was founded in 1882. According to the *Index herbariorum: southern African supplement*, it is the fourth oldest herbarium in Southern Africa. The herbarium building, housing the plant collection and library, was constructed in 1902.

O is our annual **Open Day**, when members of the public are shown the various resources available to them at NH.

P is for **Poaceae**—the family we are computerising at the moment. Then there is **Pole-Evans, I.B.** (1879-1968) and **Plant, R.** (?-1858), who made tremendous contributions to the NH collection. 'P' also stands for our **plant identification service**, which is done mainly by Alfred Ngwenya.

Q are the **queries** we receive from the public, which enhance our learning too!

R is the **record of plant diversity** that SABONET is striving for. This would be an account of KZN's extraordinary plant life of over 5 000 species (more than three times the number found in England).

S is our unique **Student Training Program** that we offer to students from the University of Durban-Westville and the University of Zululand. The course is run twice a year and introduces students to the functions of the herbarium. And we cannot leave out KZN's newly acclaimed World Heritage Site, **St. Lucia**!

T refers to **Thode, H.J.** (1859-1932), another contributor to the NH collection. He is commemorated in several species names including *Disa thodei* Schltr., *Kniphofia thodei* Bak., *Holothrix thodei* Rolfe, *Erica thodei* Guth. & Bol., *Manulea thodeana* Diels and *Osteospermum thodei* Markötter.

U represents **Umlaas** and **Umgeni**. **Umlaas** was the first area proposed for the site of the Botanic Gardens (June 1848), but this was refused by the Lieutenant Governor. An area on the banks of the **Umgeni River** was then approved and occupied until it proved to be

unsuitable due to inadequate soil and lack of available water. Eventually a suitable site was found at the foot of the Berea Ridge! 'U' stands for **undercollected areas**, many of which occur in unreachable terrain. 'U' is also for **unknown localities** that make research difficult.

V is for the **vegetation types** of the province. Just behold the various types: typical coastal-belt forest, Zululand palm-veld, dune forest, mangrove forest, coastal plateau sourveld and Zululand thornveld, to name but a few!

W At last we take pleasure in presenting **John Medley Wood** (1827–1915) the father of Natal botany. He was the founder and first curator of the herbarium. His home, built in 1890, is now our administrative centre. At the time of his death, the Natal Herbarium had about 45 000 specimens, nearly half of which he had collected. And what a coincidence that our present curator is also to be found at 'W': **Rosemary Williams**! Her hard work reflects itself in the present state of NH, while her perseverance always rubs off on us all. Then there is **Ward, C. J.** (1926–) who continues to support NH to this very day. He has been commemorated in *Salacia wardii* Verdoorn and by the Ward Herbarium at the University of Durban-Westville.

X Interestingly enough, ***Xysmalobium woodii*** N.E.Br. is found only in KZN. In addition, it was named after Medley Wood. ***Ximenia caffra*** Sond. **var.** ***natalensis*** Sond. was first discovered in KZN. The beautiful orange fruit are delicious when ripe (Gibson, 1975).

▲ *Natal Herbarium with the Medley Wood House in the background. (Photo: Nikaya Arumugam)*

Y stands for "**yet to be discovered**"! Due to the high species diversity, amazing vegetation types, and large number of undercollected areas in KZN, it will come as no surprise when new species are discovered!

Z is for **Zululand,** where the majority of ***Zantedeschia albomaculata*** (Hook) Baill. occurs, especially on hillslopes and in valleys. KZN is also proud of ***Zaluzianskya natalensis*** Hochst., which was first discovered in this province; and ***Zantedeschia valida*** (Letty) Y. Singh that is endemic to Northern KZN.

This tiny unit with its small complement of staff has come a long way from its humble beginnings. Its halls have been blessed with many devoted contributors who continue to support the herbarium.

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SABONET Report Series update

Update on the Inventory of Taxonomic Experts on Southern African Plants

The SABONET inventory of taxonomic experts is nearing publication. The book will be based on a database of local and overseas taxonomists and other plant diversity experts with knowledge of southern African plants.

The main body of the book will consist of an alphabetical listing of more than 200 taxonomic experts. Each entry will contain the person's qualification details, herbarium name, address, telephone and fax numbers, and e-mail address, as well as listing the plant families and genera in which the person has expertise. The entry will also include information on the geographical area in which the person is interested and a list of research interests.

Various indexes will make it easy to find relevant entries in the book:
- List of taxonomic experts by country
- List of taxonomic experts by institution
- Taxonomic index (families and genera)
- Geographical index
- Research interest index

In addition, the book will contain a bibliography of selected articles and books published by the listed authors. The publication references will be listed under the relevant author(s) name(s), as well as under family and genus names, where these are applicable.

The inventory should be published by the end of May 2000 as part of the *SABONET Report Series*. The book will also be available as a downloadable PDF file on SABONET's web site.

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Southern African Botanic Gardens Publications in Progress

Two reports currently being prepared for publication in the *SABONET Report Series* are expected to be published within the next few months. These are the ***Southern African Botanic Gardens Needs Assessment*** (Daan Botha, Christopher Willis & John Winter), and ***Making your Garden Come Alive! — Environmental Interpretation in Botanical Gardens*** (Maryÿke Honig). We hope to announce their availability as separate numbers in the *SABONET Report Series* in the August 2000 edition of *SABONET News*. ❑

A MEMORABLE OCCASION: THE 16th INTERNATIONAL BOTANICAL CONGRESS

by Gideon F. Smith

How time flies! It feels like only yesterday that the 15th International Botanical Congress (IBC) took place in Yokohama, Japan, in August 1993. Those readers who attended the Congress in Japan will probably recall how it seemed like a lifetime before the next IBC was to take place in St Louis, Missouri, in the United States in 1999. And now this Congress, too, has come and gone!

The first port of call in the United States was Miami, Florida. Flying in from a miserably cold winter on the highveld of South Africa, I found the summer temperatures of over 35°C a most pleasant experience. Miami's climate is much like that of the KwaZulu-Natal coast: tropical, humid and very warm. A combination of these climatic factors is often unpleasant, but when it is thrown into the midst of winter, it is a real treat. However, the weather in St Louis was a different kettle of fish. Maximum day temperatures regularly rose to well over 40°C. These conditions were truly life-threatening; by the end of the first week of deliberations by the Nomenclature Section, news broadcasts reported that 94 people had died in Missouri and Illinois as a result of the heat wave.

The Nomenclature Section of the IBC

During the week before the IBC (26–30 July 1999), the Nomenclature Section of the Congress met to discuss and vote on 218 published proposals to amend and improve the *International Code of Botanical Nomenclature* (*ICBN*) (Greuter *et al*. 1994; Greuter & Hawksworth 1999). Including those introduced from the floor, a total of some 230 proposals were finally considered. A record (unverified) 297 plant taxonomists from around the world registered for the Section meeting, most of them from the United States, the United Kingdom and continental Europe. However, as a result of the system of transferable institutional votes, the number of votes cast in St Louis on any issue could be over 700.

The Section had to decide about some far-reaching proposals aimed at introducing into the *ICBN* previously discussed but clearly controversial methods to improve nomenclatural stability and simplification. These issues dealt specifically with introducing lists of Names in Current Use (NCU) (Smith *et al*. 1993; Smith & Hawksworth 1994), harmonising the various *Codes* governing biological nomenclature (Hawksworth 1994; Greuter & Nicolson 1996), and a proposed mandatory system of registration of new names of plants and fungi (Smith & Germishuizen 1999).

The Section defeated proposals and recommendations pertaining to the first two of these three issues with large majorities. Therefore the terminology and concepts associated with NCU and the *Biocode* discussed at Yokohama in 1993 and during the last six years will not be entrenched in the *ICBN*. The Nomenclature Section expressed a general sentiment against harmonising the *ICBN* with the various other biological codes of nomenclature (Zoological, Cultivated Plants, Bacteriological), as evidenced by the almost complete rejection of those general proposals aimed at introducing into the *ICBN* certain terms that are familiar in the other codes.

The proposers withdrew the proposals and recommendations regarding the third major topic, the registration of plant names. A proposal introduced from the floor to delete all references currently present in the *Code* regarding name registration was carried by 461 (64.8%) to 251 (35.2%) votes in a secret card ballot. With regard to these three polemical issues it would therefore seem that plant

nomenclaturists prefer maintenance of the *ICBN* more or less as it stood before the 1993 (Yokohama) Nomenclature Section meeting. This was further evidenced by the heavy defeat suffered by a proposal introduced at the last minute to establish a Special Committee on the Restriction of Early Names (349 [59.4%] against, 239 [40.6%] votes in favour). However, the Section accepted the following two non-mandatory recommendations for inclusion in the St Louis Code:

Recommendation 30A. Authors introducing new names or new combinations are encouraged to choose periodicals that regularly publish taxonomic articles or else to send a copy of their work to the appropriate indexing centre(s).

Recommendation 30B. Authors and editors are encouraged to list nomenclatural novelties in the summary, abstract or index of the publication.

The largest number of published proposals dealt with refining rough edges to seemingly straightforward Articles already firmly entrenched in the *Code*. Some of these generated considerable and lengthy debate, such as a proposal to accept as effectively published appropriately indicated new names and combinations included in theses and other publications submitted for obtaining educational degrees. This could be done, for example, by providing the thesis with an ISBN. The proposal submitted in this regard, calling for the acceptance of these names from early on in the new century, was defeated by a narrow margin. However, a motion to establish a Special Committee on Effective Publication was accepted. This Committee will report back and make further concrete proposals to the Nomenclature Section of the 2005 IBC.

Somewhat surprisingly, a proposal aimed at allowing the genitive form of a feminine forename ending in a consonant to be formed by adding *-ae* (not *-iae*), e.g. *Arundinaria murielae*, took up more than an hour of discussion time during the Nomenclature Section! However, after lengthy deliberation this proposal was also defeated.

These few paragraphs cannot do justice to all the decisions taken at the Nomenclature Section. For the full story, readers will have to wait for the revised *Code* to become available from the offices of the International Organisation for Plant Taxonomy. This should happen within the next 12 months.

The 16th IBC

As with all past IBCs, it was extremely difficult to decide which of the thousands of presentations to attend. Unfortunately, with numerous sessions running parallel, it was impossible to attend more than a small fraction of lectures. The Abstracts Book (759 pages, and a further 30 pages published as an Addendum) made available at the IBC carried in its author index the names of more than 8 100 contributing authors! The Congress itself was attended by more than 4 600 plant scientists from across the world. In addition to the verbal presentations, there was a display of just over 2 600 posters. All in all, the 16th IBC was a tremendous opportunity to expand one's botanical horizons and attend lectures by experts that one previously knew only through their scholarly papers and books. Overwhelming in magnitude, but invigorating in content. What more can one say?

Acknowledgements

Prof. Dr Werner Greuter, Director of the Botanischer Garten & Botanisches Museum Berlin-Dahlem and Rappporteur-général of the Nomenclature Section of the 16th IBC and Ms Emsie du Plessis of the National Botanical Institute, South Africa, are thanked for comments on an earlier draft of this paper. ❑

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Additions and Corrections 1 Checklist of Namibian Plant Species, April 2000

p. 5 Exormothecaceae Bornefeld *et al.* 1996. Bothalia 25:159-165
9712000 *Exormotheca bulbigena* Bornefeld, O.H. Volk & R. Wolf

p. 20 *Digitaria scalarum* = De Winter & Marais 4319 PRE = *D. sanguinalis* in WIND

p. 23 *Anthephora ramosa* is valid.

p. 24 *Tristachys superba* Schweinf. & Asch. not (De Not) according to Vorster 1994. Bothalia 11:287

p. 33 *Cyperus* Browning *et al.* S.Afr.J.Bot. 1999. 65:374-381

p. 39 *Xyris* 4. Lock. 1999. Kew Bull. 54:301-326
Eriocaulon 5. Phillips. 1998. Kirkia 17,1:11-67

p. 42 *Bulbine rhopalophylla*

p. 44 *Haworthia venosa* subsp. *tessellata* becomes var. *tessellata* (Haworth) Halda in Acta Mus. Richnov. Sect. Nat. 4,2:39 1997 cited in IOS Repertorium Plantarum Succulentarum XLIX (1998)
This will not be followed at WIND till confirmed by experts at NBG

p. 47 *Ornithogalum* 9. Archer, C. & Archer, R.H. 1999. S.Afr.J.Bot. 65:431-433
Ornithogalum apertum
O. merxmuelleri E
O. toxicarium C. Archer & R.H. Archer
O. tubiforme is E , not *O. tenuifolium*

p. 51 1166 *Hessea*
4. Snijman. 1999. Novon 9:107-110
Hessea sp. nova = Bruyns 8105 ID D.Snijman
Scadoxus multiflorus subsp. *katharinae* (Bak.) Friis & Nordal FPA 4:136 Bruyns 5553

p. 52 *C. acaule* FPA 56:36-40 (1999)
C. macowanii FPA 56:30-35 (1999)

p. 53 1199 *Cryptostephanus* Welw.
C. densiflorus Welw. ex Baker Bruyns 8030 ID D.Snijman

p. 55 Remove 1272 Homeria and make following changes to *Moraea*
Moraea britteniae (L.Bolus) Goldblatt = Homeria britteniae L.Bolus
M. pallida (Baker) Goldblatt = Homeria pallida Baker
Babiana hypogea is not E

p. 58 *Trema* 4. various authors.1999. Bothalia 29:241
Ficus petersii position is unclear. Maybe syn of *F. thonningii* or valid as in 7. Presence in Namibia must be verified

p. 59 *Agelanthus* Tieghem

p. 65 *Hermbstaedtia spathulifolia* E

p. 70 *Tetragonia rangeana* E

p. 71 *Brownanthus ciliatus* subsp. *schenckii* not schenkii
Psilocaulon namibense not namibensis

p. 75 *Ebracteola* Glen. 1986. Bothalia 16: 218-225
E. derenbergia E

p. 77 *Lithops* add the following:
L. gracilidelineata Dinter subsp. *gracilidelineata* var. *gracilidelineata* P
subsp. *waldroniae* de Boer E P
L. herrei L.Bolus P

L. julii (Dinter & Schwantes) N.E.Br. subsp. *fulleri* (N.E.Br.) B.Fearn var. *rouxii* (de Boer)D.T.Cole E P
subsp. *julii* E P

p. 78 *Schwantesia* Zimmerman. 1995. Cactus & Succ. Jl (US) 67:23-25

p. 79 add 2405 *Trichodidema* Schwantes after *T. schwantesii*

p. 79 *Anacampseros baeseckei* FPA 56:54-57 (1999)

p. 80 *Ceraria carrissoana* Exell & Mendonca Bruyns 8011 T
Anacampseros quinaria FPA 56:58-60 (1999)

p. 83 *Heliophila deserticola* Schltr. var. *micrantha* E not var. *deserticola*

p. 87 *Crassula ausensis* subsp. *ausensis* E

p. 88 *Myrothamnus* FPA 56:62-68 (1999)

p. 89 *Acacia erioloba* E.Mey.
= Acacia giraffe sensu auct. mult., non A. giraffae Willd.
Acacia erioloba E. Mey. * Acacia haematoxylon Willd.
= Acacia giraffe Willd.

p. 94 Lebeckia elongata Hutch is a syn. of *L. spinescens* Harv.
Crotalaria pearsonii not pearonsii

p. 95 *Indigastrum burkeanum* not burkeana

p. 101 *Macrotyloma* 4. Mackinder. 1998. Kirkia 17,1:69-84

p. 102 *Pelargonium* L'Her. not ex Aiton according to vd Walt J.S.Afr.Bot. 45:378-379

p. 103 *Zygophyllum* 6. van Zyl & Marais. 1999. Bothalia 29:231-237
Z. applanatum Van Zyl E
Z. hirticaule Van Zyl E
Z. pterocaule Van Zyl

p. 105 *Entandrophragma E. caudatum* FPA 56:74-80 (1999)
Sphedamnocarpus pruriens is spelt puriens in FSWA

p. 107 *Antidesma venosum* appears to be a syn. of *A. rufescens* and this arrangement, which follows Arnold & De Wet 1993, must be incorrect.

p. 108 *Acalypha ambiqua* is in FSWA and should be in a larger font
Tragia dinteri E

p. 110 *Euphorbia ephedroides* var. *debilis* E
Euphorbia leistneri E

p. 111 *Euphorbia spartaria* E

p. 119 *Bergia pentherana* in FSA, not *B. pentheriana* as in Arnold & De Wet 1993

p. 122 5539 *Pteleopsis*

p. 124 *Polemanniopsis* sp. nova E

p. 128 *Pachypodium* Rowley has made this species *P. lealii* subsp. *lealii,* as he includes the east African species as another subsp. This work is rejected

p. 130 6860 *Secamone* R.Br.
S. punctulata Bruyns 8023

p. 131 *Hoodia officinalis* subsp. *delaetiana* E
Halda made changes to *Hoodia* & *Lavrania* in Acta Mus. Richnov. Sect. Nat. 5,1:31-33 1998 cited in IOS Repertorium Plantarum Succulentarum XLIX (1998). These will not be followed at WIND

p. 134 *Marsdenia sylvestris* (Retz.) P.I.Forst. not Forest.

p. 135 Convolvulaceae 5. Meeuse & Welman. 2000. FSA 28,1:1-138
6972 *Falkia* not Falckia
6973 *Evolvulus alsinoides* no var.
6978 *Seddera* Hochst. & Steud.
6991 *Jacquemontia ovalifolia* is not in Na as it was recorded in FSWA based on erroneous identifications
6993 *Convolvulus multifidus* Thunb. is not in Na
C. ocellatus Hook. not Hook.f.
= Convolvulus multifidus Hallier f. non Thunb.
6994 *Calystegia* is not in Namibia

p. 136 *Xenostegia* 6. various authors. 1999. Bothalia 29,2:253-266
X. tridentata subsp. *angustifolia* (Jacq.) Lejoly & Lisowski
7000 *Astripomoea malvacea* recorded for Namibia in Arnold & de Wet (eds.)1993 was probably mistaken for *A. rotundata* as it does not occur in Na.
A. rotundata is found in Botswana and therefore is not E
7003 *Ipomoea*
I. albivena is not in Na
I. atherstonei Baker is a syn. of *I. oblongata*
I. bolusiana no subsp.
I. fulvicaulis var. *fulvicaulis*
I. involucrata is not in Na
I. nil is known from one naturalised specimen in Kaokoveld
I. oenotherae no var.
I. pes-tigridis var. *pes-tigridis*
I. sinensis subsp. *sinensis* is not in Na
I. stenosiphon is not in Na

p. 139 *Clerodendrum dekindtii* T

p. 141 *Ocimum* Paton & Putievsky. 1996. Kew Bull. 51:509-524

p. 142 *Solanum coccineum* is probably a syn. of S. *tometosum* var. *coccineum*
p. 143 *Nemesia violiflora* E
p. 146 *Lindernia* add Fischer 1992. 214-316
Chamaegigas add 4 & 5 under *Lindernia*
p. 147 *Selago* 6. Hilliard. 1999. The Tribe Selagineae. Royal Botanic Garden, Edinburgh.
S. albomarginata Hilliard
= Walafrida nachtigalii auct. non (Rolfe) Rolfe
= Walafrida schinzii auct. non Rolfe in FSWA
S. alopecuroides Rolfe
= Walafrida alopecuroides (Rolfe) Rolfe
= Walafrida schinzii Rolfe
S. amboensis Rolfe E
S. angolensis Rolfe
= Walafrida angolensis (Rolfe) Rolfe
S. angustibractea Hilliard
S. centralis Hilliard
S. dinteri Rolfe subsp. *dinteri*
= Walafrida dinteri (Rolfe) Rolfe
= Walafrida fleckii Rolfe
= Walafrida saxatilis auct. non E.Mey. pro parte
subsp. *pseudodinteri* Hilliard
S. divaricata L.f.
= Selago albida auct. non Choisy
= Walafrida merxmuelleri Roessler
S. kurtdinteri Hilliard
= Walafrida paniculata auct.non (Thunb.) Rolfe in FSWA
S. lepida Hilliard E Giess 12750 WIND= T
S. *nachtigalii* Rolfe
= Walafrida nachtigalii (Rolfe) Rolfe (type only in FSWA) E
S. welwitschii Rolfe var. *australis* Hilliard var. *holubii (Rolfe) Brenan*
= Selago holubi Rolfe
p. 148 *Rhamphicarpa fistulosa* does not occur in Na as it was incorrectly identified according to Hansen. 1975. Bot.Tidsskrift. 2-3:103-125.
p. 151 *Petalidium cymbiforme* E
p. 157 *Gaillonia* 6. Thulin. 1997. Nord.J.Bot. 18:31-38
p. 158 *Acanthosicyos horridus* F
p. 164 *Sphaeranthus epigaeus* E
Lasiopogon ponticulus is not E
p. 167 *Geigeria nianganensis* is probably not E
Anisopappus pseudopinnatifidus E
p. 168 *Bidens biternata* (Lour.) Merr. & Sherrf not Sherff
p. 169 *Myxopappus hereroensis* E
p. 170 *Rennera* 6. Herman. 1999. Bot.J.Linn.Soc. 129:367-377
p. 172 *Euryops multifidus* (Thunb.) DC.
E. namaquensis Schltr. which is identified in PRE as *E. namibensis*
Othonna clavifolia E
p. 173 *Garuleum schinzii* subsp. *crinitum* E
Osteospermum muricatum subsp. longiradiatum E
p. 174 *Arctotis frutescens* E
p. 175 *Dicoma sessiliflora* subsp. *sessiliflora*
p. 197 *Crytanthus* 1191 & *Cryptostephanus* 1199 ❑

Southern African Plant Red Data List Workshop

A workshop/training course, tailored to meet the needs of the Southern African Plant Red Data List Project, was held at the National Herbarium (PRE) on 22–26 November 1999. All the SABONET member countries participated and a total of 21 institutions were represented. The 26 participants were the ten SABONET Red Data List National Coordinators, as well as representatives from various governmental and non-governmental nature conservation agencies. Mr James Mugodo represented WWF-SARPO (World Wide Fund for Nature—Southern African Regional Programme Office) and IUCN-ROSA (the IUCN's Regional Office of Southern Africa) was represented by Mr Misael Kokwe and Mr Excellent Hachileka. Mr Craig Hilton-Taylor (IUCN-Species Survival Commission, United Kingdom) was the main resource person and Mr Trevor Arnold (Head of SABONET Information Technology), Mr Christopher Willis (SABONET Regional Project Coordinator) and Ms Janice Golding (SABONET Plant Red Data List Coordinator) also made contributions.

As this was the first time that all the key people involved with SABONET's Red Data List Project met, the first hour or so was introductory. Later, the scope of the project was outlined within the context of SABONET, the National Botanical

▲ *The course participants: southern Africa's threatened plant specialists of the future. (Photo: Adela Romanowski)*

Institute (with regards to information technology and databases), the IUCN-SSC and IUCN-ROSA. The rest of the five days covered training on the methodology of Red Listing, training in electronic listing, numerous working sessions on case studies (plant and animal examples) and vibrant debates leading to Red Listing assessments. Manuals specifically prepared for the course were used.

The following topics were dealt with in detail:
- Threatened plant concepts and terminology
- Application of the IUCN 1994 categories and criteria
- Dealing with uncertainties
- Global versus national assessments

▲ *(Left–right) Isaac Simwanza (Kafue National Park, Zambia), Catherine Nguvulu (Forestry Department, Zambia) and Dickson Kamundi (National Herbarium, Malawi) racking their brains! (Photo: Adela Romanowski)*

Reporting (monitoring and evaluation) procedures were explained and time was also allocated for trouble-shooting and general, *ad hoc* issues. An informal session allowed each of the SABONET Red Data List National Coordinators to report on Red Listing in their country. This was followed by a Red List 'needs appraisal' for each country. The objective of the needs appraisal was to identify issues hampering Red Listing in the countries.

All in all, the workshop/training course was extremely successful. The participants left feeling confident that they could make assessments on their own. Secondly, the discussions fostered insights into the importance of national Red Data Lists as well as the most crucial issues facing the production of Red Data Lists. As during every SABONET course, existing ties were strengthened and new ties were forged amongst our colleagues in the region. Many thanks and appreciation go to Craig for his excellent teaching material and high level of professionalism. Thanks are also extended to all the anonymous others for their support. ❑

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Fantastic fungi need your support

The lives of terrestrial plants are inextricably interwoven with other organisms. The fungi, however, are probably the most closely linked to plants—it is on and in plants (or plant products) that most fungi occur.

In the good old days of botanical exploration, plant collectors as a matter of course collected fungi (then considered to be 'lower'plants) and preserved them as herbarium specimens. People such as Medley Wood were as important to mycological as to botanical exploration in South Africa. In fact he is still to this day the only person who has made any systematic collection of indigenous fungi in KwaZulu-Natal!

Unfortunately, in 1945 the mycologists who worked at the National Herbarium (PRE) were transferred to the Department of Agriculture to concentrate on plant pathological problems of crop plants. Their subsequent contributions to national and international agriculture have been considerable (and agriculture, being one of the largest sectors of our economy, provides much of the tax that supports botany). However this has meant that for the last 50 years not a single person has been employed in South Africa with the sole task of studying the taxonomy of **indigenous** fungi (except lichens).

In Ethel M. Doidge's *magnus opum* (Bothalia vol.5, 1950), a total of 4 748 species of fungi (including lichens) were listed as occuring in South Africa. This total represents probably only between 10% and 20% of the actual diversity of fungi to be found here. Today, apart from the fungi causing diseases of crop plants, only the macroscopic basidiomycetes (mushrooms and bracket fungi) and lichens, and the microscopic soil saprophytes, fly speck (Perisporales), rust (Urediniales) and entomogenous fungi (insect pathogens) that occur in South Africa are fairly well known. Not a single collection has been made of any marine fungus or freshwater chytridiomycete. Few collections have been made of other groups of fungi. Of all those that *have* been collected, often only one or two incomplete herbarium sheets represent our total knowledge. Many fungi described from here are not represented by a single collection held in South Africa!

▲ *A fly-speck fungus* Meliola *sp. These fungi are very common on bushes and trees in the wetter parts of South Africa. Each species is restricted to one or a few plant host species.*

I would therefore like to encourage any botanist who goes on field trips to collect plants, to please consider also including collecting fungi. And this is as easy as making a proper herbarium specimen! And any specimen is welcome.

A complete pressed plant specimen bearing the fungal fruiting bodies of the microscopic fungi (preferably with flowers etc for verification of the host plant's identification), should also have full locality information, date, host pant identity, and any other notes such as abundance and host habitat.

Specimens can then be sent to:
Plant Protection Research Institute
National Collection of Fungi
Private Bag X134
Pretoria
0001

A few tips:
- State that the specimens are a donation for the herbarium and not for the identification service, or you may be charged for your efforts.
- A few good specimens are worth more than lots of bad ones.
- Enjoy! Your eyes will be opened to a fascinating world. ❑

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OKAGRASS at the Peter Smith Herbarium in Maun

A new project is underway at the Peter Smith Herbarium in Maun under the acronym of "OKAGRASS". The Okavango Delta is an area with a rich variety of habitats, each with its own characteristic plant species. Over the last few years the Peter Smith Herbarium at the Harry Oppenheimer Okavango Research Centre has initiated studies into the ecology of the system. During these studies, a need was felt to have a simple identification guide for the over 200 grass species that occur in the area, both in their flowering and non- flowering stage. For this purpose collaboration was sought with the Tropical Nature Conservation and Vertebrate Ecology group at the University of Wageningen. This collaboration has resulted in a visit by Herman van Oeveren, a grass identification specialist. He was based at the herbarium for three weeks and made field excursions into the Okavango Delta and the Chobe forest area with our staff. Vegetative characteristics such as shape and length of leaves, stems, ligulae and inflorescences of grasses were measured on fresh and herbarium material to develop a simple identification key. With help from the Peter Smith collection over 95% of the species presently known to occur in the Delta were covered. The data are stored in the computer programme Microsoft Cardbox, which runs under Windows 95. Simple options, chosen by clicking buttons on the computer screen, lead to the selection of the right species (in most cases), even if inflorescences are not available. Once our data entry is complete the database will be tested in the field. Thereafter it will be made available on CD and will include a manual. As the dressed-down version of Cardbox that will be distributed on the CD comes for free, the cost of the CD can be kept to a minimum. We hope to have the pilot version ready before the end of May. The Universities of Wageningen and Botswana, the Treub Foundation and SABONET are funding the project.

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MASTER GARDENERS

by Alex Silbajoris

I am the very model of a modern major gardener,
with every pest my enemy and every bloom my partner.

I scrutinise the listings in the newest nursery manuals
and thoroughly have trained myself in handling of perennials.
I am practised in the use and care of half a hundred garden tools,
I know the mixing ratios for all the two-stroke motor fuels,
I highly value safety and I follow the most stringent rules
And I never fill my mower until well after the engine cools!

He never fills his mower until well after the engine cools
he never fills his mower until well after the engine cools
he never fills his mower until well after the engine, engine cools!

I know my taxonomy from Abutilon to Zinnia;
I know a sickly yucca from a juvenile dracinia;
With every pest my enemy and every bloom my partner,
I am the very model of a modern major gardener!

I seize all opportunities for hunting beetles Japanese,
and if I please, on bended knees, I greet the eager honeybees.
Should aphids dare to venture there,
I'll spare no care toward their despair
but share my garden fair with any mantis gallivanting there!
Of grafting, double digging and deadheading I know quite a bit.
Whatever you would care to name I'll wager I have planted it.
To purchase fertiliser, I don't buy just any brand of…manure...
and I'm always careful with my speech and you can count on that for sure!

He is always careful with his speech and you can count on that for sure,
he's always careful with his speech and you can count on that for sure,
always careful with his speech and you can count on that for, that for sure?

Then I can re-create the hanging gardens of old Babylon,
or grade a level lawn for you to put a picnic table on.
With every pest my enemy and every bloom my partner
I am the very model of a modern major gardener!

In fact when I know what is meant by "chloroplast" and "cambium",
When I can tell at sight mite infestation on geranium;
When black spot, mildews, smuts, rust, scorch and dodder I'm more wary at,
and when I know precisely what is in Lasso and Lariat,
then I can drape a table with the harvest's flavour subtleties,
Or spread a bed of flowers making colour for your eye to see.
In short, when I can please the various senses with such things as these
You'll say a better Major Gardener has never stained his knees!

For I've applied my genius to the wond'rous field of Botany
where I find fascination where most others find monotony;
with every pest my enemy and every bloom my partner,
I am the very model of a modern major gardener!

Dealing with DDs:
uncertainties and deficiencies in Red Listing

by Janice Golding

Anyone starting a plant Red Data List (RDL) knows that consulting the literature and visiting the herbarium is a logical starting point. Throughout most of southern Africa, the few botanical accounts of species are descriptive and based on herbarium specimens. Confirming localities in the field for many species is an ongoing monitoring process, and while this may not happen soon or at a rapid enough pace in the region, RDLs somehow still need to develop. For this to happen using limited information, often data needs to be *developed* or *generated.* The ultimate purpose of this is to avoid the final RDL product being peppered with *Data Deficient* categorisations, as this is meaningless for decision-making.

The techniques proposed here take advantage of the definitions coined by the IUCN by "applying the precautionary principle" and making use of "inferred or projected data". Herbarium specimen information (that often covers only the localities) and general estimations are used. These rudimentary techniques may be regarded with great skepticism, but few options exist for determining preliminary RDL status. However, let us first review the main conceptual issues (Figure 1).

Conceptual issues

The IUCN has no guidelines with regards to extrapolating data. However, the IUCN principles governing cases where data are poor or uncertain are as follows:

- The ***Data Deficient*** (*DD*) category applies when the taxon is known from only the type locality and nothing is known on the current status or possible threats.
- The ***Vulnerable D2*** category (the *D2* criterion stipulates fewer than 5 localities or fewer than 100 mature individuals) applies when there are no recognisable threats and the area is well known.
- The ***Critically Endangered*** category applies if there are significant threats under the *B* criterion (*Extent of Occurrence* < 100 km^2 and the *Area of Occupancy* less than 1 km^2) and *C* criterion (< 250 mature individuals). (See also http://www.iucn.org/themes/ssc/redlists/ssc-rl-c.htm.)

It is rare to find specimen labels noting the number of individuals or other aspects useful to RDL compilers. Since some locality information is often available from herbarium specimens, the focal point of assessments can be based on distribution range (criterion *B*) in space and time. This entails whether the species is widely or narrowly distributed, whether the spread is even (continuous) or uneven (clumped) and *where* the distributions are in relation to processes that impose extinction risk.

The use of the Extent of Occurrence (EOO) and Area of Occupancy (AOO) is a means to understand the distribution of species (Figure 2); EOO and AOO operate at different scales.

- EOO is the area contained within the *shortest continuous imaginary boundary* that can be drawn to encompass all the known or inferred sites of the present occurrence of the taxon. This may exclude discontinuities or disjunctions within the overall distributions of taxa (eg. large areas of obviously unsuitable habitat).
- AOO is the *area within the EOO* that is occupied by a taxon. It is the smallest area essential at any stage to the survival of existing populations of a taxon.

Techniques

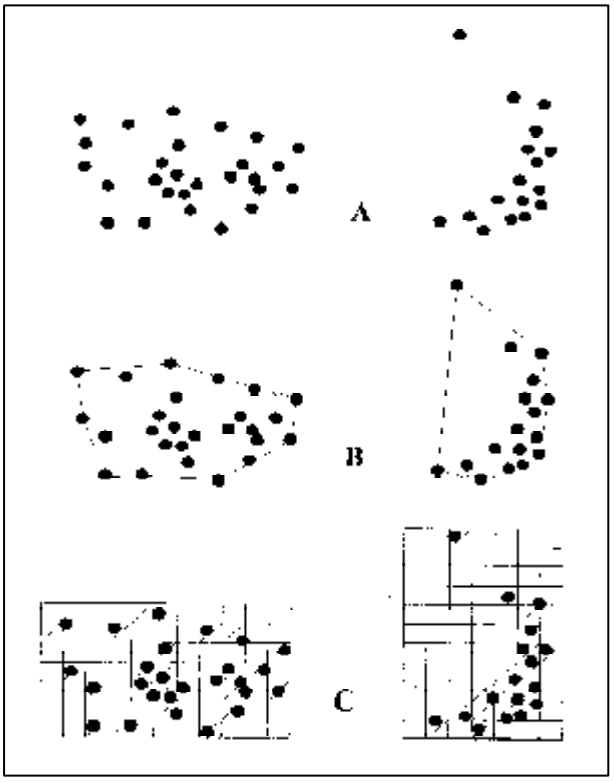
Listing can be done manually (incorporating the inevitable human bias) and electronically with decision-support software (RAMAS Red List Version 1.0). The use of these two methods is important to highlight disparities and to provide

• ***Continued on page 30***

Use any of the A-E criterion	Critically Endangered	Endangered	Vulnerable
A. Declining Population			
population decline rate at least	80% in 10 years or 3 generations	50% in 10 years or 3 generations	20% in 10 years or 3 generations
using			
either (1) population reduction observed, estimated, inferred, or suspected in the past			
or (2) population decline projected or suspected in the future.			
based on	a) direct observation		
	b) an index of abundance appropriate for the taxon		
	c) a decline in area of occupancy, extent of occurrence and/or quality of habitat		
	d) actual or potential levels of exploitation		
	e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites		
B. Small Distribution and Decline or Fluctuation			
Either extent of occurrence	<100km^2	<5,000km2	<20,000km^2
or area of occupancy	<10km^2	<500km^2	<2,000km^2
and 2 of the following 3:			
(1) either severely fragmented:	(isolated subpopulations with a reduced probability of recolonisation, if once extinct)		
or known to exist at # locations	=1	=5	=10
(2) continuing decline in any of the following:	any rate a) extent of occurrence b) area of occupancy c) area, extent and/or quality of habitat d) number of locations or subpopulations e) number of mature individuals	any rate	any rate
(3) fluctuating in any of the following	>1 order/mag. a) extent of occurrence b) area of occupancy c) number of locations or subpopulations d) number of mature individuals	>1 order/mag	>1 order/mag
C. Small Population Size and Decline			
Number of mature individuals	<250	<2,500	<10,000
and 1 of the following 2:			
(1) rapid decline rate of at least:	25% in 3 years or 1 generation	20% in 5 years or 2 generation	10% in 10 years or 3 generations
(2) continuing decline and	any rate	any rate	any rate
either (a) fragmented	all sub-pops <50	all sub-pops <250	all sub-pops <1,000
or (b) all individuals in a single sub-population			
D. Very Small or Restricted			
Either (1) # of mature individuals	<50	<250	<1,000
or (2) population is susceptible	(not applicable)	(not applicable)	area of occupancy <100km^2 or # of locations <5
E. Quantitative analysis			
Indicating the probability of extinction in the wild to be at least	50% in 10 years or 3 generations	20% in 20 years or 5 generations	10% in 100 years

▲ **Figure 1.** *Summary of the IUCN Red Data List Categories and Criteria.*

▸ *Continued from page 28*



▲ **Figure 2.** *The distinction between the **Extent of Occurrence** and **Area of Occupancy**. A is the spatial distribution of known, inferred or projected sites of occurrence. B shows one possible boundary to the Extent of Occurrence, which uses the measured area within the boundary. C shows one measure of Area of Occupancy that can be measured by the sum of the occupied grid squares.*

an opportunity to resolve them. Details of the software are given at the end of this article. What follows is a description of a "manual technique".

Reading the distances between plant collection localities from fine-scale maps of can be used to estimate the EOO. The EOO is obtained by making use of an imaginary boundary, and by multiplying the "length x breadth" for a distribution involving 4 or more localities. If a specimen is known from only two localities, the distance between the two localities can be map-read, but the "breadth" needs to be estimated. A good way to do this is check whether a suitable habitat exists or where the species is likely to occur. A best point estimate should be used. A scale appropriate to the biology of the organism should be applied; 1:50 000 maps are usually unsuitable for most plant species. For example, a 1:50 000 map is unsuitable to assess a population known from three localities each 5 km apart, each consisting of not more than 10 small-sized individuals. A map at this scale is better suited for a more widespread species distributed through most of the country or across its borders.

It is also necessary to consider aspects of autecology (traits or attributes of the species); where it is possible, this should be done at a species or generic level. The autecology method assumes that species within the same genus possess similar traits (life histories, reproductive strategies, habitat requirements and so forth) and have similar responses to threatening processes. For example, small-seeded, wind-dispersed perennials can be regarded as being less susceptible to fire effects, and therefore less prone to extinction. Another example is a fast-growing pioneer species that is probably less susceptible to extinction compared to a slow-growing climax species. These assumptions assist in extrapolating a figure for the Area of Occupancy (AOO). Moreover, they give one an indication of how well the species can cope with different threats like inappropriate fires, unsustainable utilisation or even prolonged periods of unfavourable climatic conditions.

Conclusion

These methods reflect initial attempts to lay the foundations for the identification of possible RDL plant species. Given the fact that extensive surveys will not take place in the near future to validate the information that was used to make the assessments, these unconventional techniques are necessary. They can be applied to other countries / regions facing similar problems imposed by botanically weak information, and which at the same time are experiencing enormous drains on their natural plant resources.

Red List Software

To purchase copies of the RAMAS Red List Software, contact IUCN/SSC, Attention: Isabelle Crosset, Rue Mauverney 28, Gland CH-1196, Switzerland, Fax: + +41-22-999 0015. Single-user and Site-licensed copies of the software sell for US$295 and US$445 respectively (plus postage and packaging). These are discounted

prices and a portion of the amount received for every copy bought through IUCN will be reinvested in the Red List Programme. See http://www.ramas.com for further details about the software. ❑

References and Further Reading

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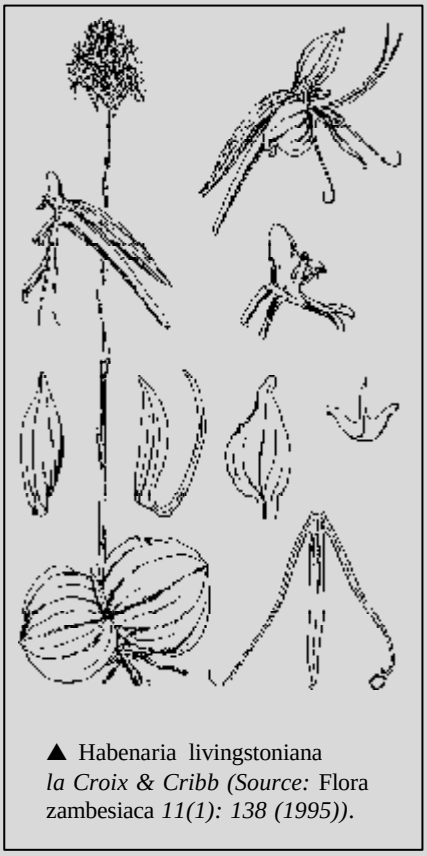
A case-study from Malawi: *Habenaria livingstoniana* la Croix & Cribb (Orchidaceae)

This species was collected twice from the same locality by different collectors and at different times. The type specimen was collected in 1967 by I. & E. la Croix 1015 (K; MAL) in Malawi. The specimen labels of both collections essentially state that the species was collected "in stony soil on slopes in *Brachystegia* woodland; at very low altitudes of between 950–1 000 m"; in Livingstonia. Based solely on this information, the following information is extrapolated:

- Because *H. livingstoniana* is known only from the type locality, it is possibly restricted in its distribution. However, several localities may exist for this species, and it may well be distributed more widely than what is currently known.
- According to the known information, the species has been collected from Livingstonia (east of the Nyika plateau in Malawi), one of the oldest colonial-era settlements of northern Malawi and also an area that has been very well collected by renowned collectors such as Jean Pawek and Dick Brummitt. Given the fact that orchids are charismatic plants, *H. livingstoniana* would have been collected more frequently if the species were common.
- The boundaries of the Nyika National Park do not extend below the 1 000 m contour in the Livingstonia area, and the species is not protected because it probably falls beyond the park boundaries. The mudstone deposits and alluvials make the land here extremely arable. The areas surrounding Livingstonia are subject to uncontrolled fires (land clearing) and deforestation (particularly *Brachystegia* woodland), and much of the land has been cleared for subsistence and commercial farming. Against this context, one can assume that *H. livingstoniana* exists in a hostile environment. Orchids generally can withstand fires well, and it is assumed that members of the family often produce a fair number of seeds. Individuals are usually out-competed, hence their usually solitary distribution.
- The *Extent of Occurrence* is suspected to be not less than 50 km^2 and not more than 100 km^2 (the general area surrounding Livingstonia and associated with the 950–1 000 m contour line). The *Area of Occupancy* is probably between 1 km^2 and 2 km^2.
- The species is preliminarily assessed as **Critically Endangered B1 B2abcde B3cd**.



▲ Habenaria livingstoniana *la Croix & Cribb (Source:* Flora zambesiaca *11(1): 138 (1995)).*

(Assessed by J.S. Golding, D.A.I. Kamundi & C.K.Willis, Zomba, Malawi.) ❑

Mining in a biodiversity hotspot

Restoration. Rehabilitation. Mitigation. What's in a word?

by Antje Burke[1]

▲ *Although seemingly bare at first sight, the terrace slopes facing the Orange River support many plant species of conservation and horticultural importance, such as this population of* Tylecodon bucholzianus *(small shrub in foreground). (Photo: A. Burke)*

The winter rainfall region of southwestern Namibia, Diamond Area 1, is of extremely high conservation importance. It presents one of the few centres of plant diversity of international conservation importance in an arid region, is part of a biome harbouring the richest succulent flora in the world, and is a centre of diversity for many reptiles, mammals, birds and insects. With the exception of mining activities and short-term emergency grazing along the eastern border of the Diamond Area, the majority of this vast stretch of land (about 250 x 100 km) has been out of bounds and is therefore today an almost untouched wilderness area. Despite being confined to only a small portion of this enormous area, the impacts of human activities are severe and have left (and are leaving) scars which will either take a long time to heal or may never heal at all.

Mining and wilderness are almost mutually exclusive terms and a healthy balance needs to be struck for the benefit of human development and conservation at the same time. In addition to Article 95 of the Namibian Constitution ("…the state shall adopt policies aimed at maintaining ecosystems, ecological processes and biodiversity…"), Namibia has joined the international community in an effort to conserve plant and animal diversity (biodiversity) by ratifying the Convention on Biological Diversity. Under this agreement Namibia is committed to develop policies and programmes which will facilitate the implementation of this far-sighted and commended statement. Environmental impact assessments and management plans for development projects partly take care of this commitment by examining the potential negative impacts on the environment and by suggesting

measures to avoid, limit or minimise such impacts.

Is every environmental concern taken care of? Not quite; rehabilitation, i.e. making the land useful again after disturbance, remains a controversial aspect. In Diamond Area 1 the most likely land use after mining will be tourism. Hence, in addition to ecological considerations, the wilderness character should be restored and preserved wherever possible. Rehabilitation plans are designed to restore an area towards a particular land use and often result in pastures, cropland or forest plantations. Of course, none of these conventional methods of restoring vegetation cover are appropriate or desirable for arid, windswept Diamond Area 1. Ideally, in view of the tourism potential and importance for biodiversity conservation, environmentalists would like to restore the character of the landscape to pre-mining conditions as far as possible.

This presents an enormous challenge, because we know little about the natural processes of vegetation recovery and associated wildlife in the southern Namib Desert. How can artificially created landforms be made suitable for re-colonisation by desert plants? What methods of dumping will provide better substrate for plant growth? What shapes, sizes and surface structure should dumps have? Can plants naturally occurring in the area be used for re-planting mine dumps? It is expected that restoring natural vegetation will provide a stepping stone for animals to follow. But what mitigating measures could be employed in places where restoring plant cover is not feasible to contribute to the preservation of plant diversity in this biodiversity hotspot? The questions are endless and at present informed answers are few.

▲ *Henk Dauth of the National Botanical Research Institute removes a small succulent earmarked for the desert section of the National Botanic Garden in Windhoek. (Photo: A. Burke)*

A small step towards overcoming this seemingly insurmountable mountain has been made by a project at the National Botanical Research Institute investigating the relocation and propagation potential of selected species of the southern Namib flora. Since many of the southern Namib plants are protected, treasured by succulent collectors and therefore of extremely high horticultural value, relocating plants from areas to be mined may provide a self-sustaining, commercial enterprise in the long term.

After a successful trial with selected plants from the proposed Skorpion Mine area in the southeast of the Diamond Area, the National Botanical Research Institute was recently invited to survey the Daberas gravel terraces by the local diamond mine Namdeb. This reconnaissance trip served to assess whether sufficient plant material of horticultural importance would become available during mining to justify a large-scale "rescue" mission, possibly carried out by a commercial nursery. The nursery, in turn, would carry out propagation trials and contribute a percentage of potential profits made from the sale of these plants to a "Southern Namib Restoration Fund".

During two windy days, blasted first from the south and then from the east, a team of five botanists, accompanied by Ronel van der Merwe of Namdeb's Environmental Office, scrutinised the Daberas terraces in search of precious succulents. Very different from the coastal dunes in Mining Area 1 and the sandy plains at

▲ *Equipped with hammer and chisel, Coleen Mannheimer, Silke Bartsch and Sonja Loots of the National Botanical Research Institute carefully remove succulents, while Ronel van der Merwe of Namdeb's Environmental Office documents the process. (Photo: A. Burke)*

Skorpion, the ancient gravel terraces are home to a low cover of small leaf succulent shrubs, such as *Ruschianthemum gigas*, *Psammophora modesta* and *Cephalophyllum ebracteatum*. Because of the unusual conditions of frequent fog moving far inland along the Orange River valley, the flora of the Lower Orange River is fairly special and comprises many species which occur only in this small part of the world.

Although the gravel terraces are at first sight seemingly bare, many plants are small or seek protection from the wind by being half-sunk in the ground, hence difficult to find. However, the highlight for the botanists were slopes and gullies facing the Orange River which receive additional moisture through occasional fog channelled along the river valley from the coast. Here the vegetation is locally more diverse and denser than any other part of the terraces and numerous plants of conservation and horticultural importance were found in a small area.

Besides assessing the "relocation" potential, the National Botanical Research Institute was able to enlarge their live plant collection by about ten species, all of which were first-time additions. Some of these plants will find a home in the desert section of the National Botanic Garden in Windhoek and will thus help to educate and interest the public in the fascinating flora of this very special piece of our planet.

Seed collections of some selected species rounded up the two-day exercise and will help to expand the holdings of the National Genebank by adding species of conservation importance. Overall, although large-scale "relocation" with commercial nurseries will likely not be feasible at Daberas, even "rescuing" some individuals of representative species will contribute to the preservation of the southern Namib flora.

This and many other aspects along this line will now be co-ordinated and pursued under the umbrella of a new project of the Namibian National Biodiversity Programme based at the Directorate of Environmental Affairs: the Southern Namib Restoration Ecology Project. All activities under this programme will actively promote and contribute to the conservation and restoration of one of the most fascinating and potentially threatened biomes of the world.

For more information on this new project, please contact the author or visit our web site at http://www.dea.met.gov.na/Programmes/Biodiversity/snare.html. ❑

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[1]With thanks to Coleen Mannheimer for comments.

A Red Data List assessment for *Dalbergia melanoxylon* in Malawi

by Dickson Kamundi

Dalbergia melanoxylon Guill. & Perr. (commonly called *ebony*, and in Malawi, *phingo,* family Leguminosae) is a small to medium slow-growing tree in Malawi. It is widespread in low-lying areas of Malawi, particularly around the Shire River and Lake Malawi where its over-utilisation coincides with high human population densities. Recorded heights range from 2-13 m (average of 5 m). The species is known from different vegetation types, ranging from the deciduous mopane, miombo, *Acacia* and *Combretum* woodlands, to palm forest, riparian forest, grassland, thicket and *Julbernardia*/*Diplorhynchos* woodland in the Nsanje, Mwanza, Mulanje, Mangochi, Zomba, Dedza, Lilongwe and Salima districts of Malawi. It grows in 26 sub-Saharan countries which has led it to be globally assessed as LR/nt (Low Risk—not threatened) by the World Conservatiom Monitoring Centre (Oldfield *et al*. 1998).

The **Extent of Occurrence** in Malawi is estimated to be some 75% of 118 000 km^2 (size of Malawi excluding Lake Malawi) = *ca* 88 500 km^2; the **Area of Occupancy** is estimated between 2 000 km^2 and 5 000 km^2.

The species is not protected by any statute laws in Malawi: any person has access to the wood that grows outside protected areas, especially on customary land. Few subpopulations fall within forest reserves that are protected areas. However, reinforcement of the law is not adequate, leading to unabated selective logging. Liwonde National Park, Lengwe National Park and Majete Wildlife Reserve are the only formally reserved areas that have *D. melanoxylon* stands, and these collectively protect a total of about 10 000 mature trees.

The wood of this species is a fine hardwood, and it is preferred because of its durability. *D. melanoxylon* is extensively used in craft-making and it supports a large curio industry in Malawi and neighbouring countries. The **generation time** is between 15 and 30 years. The number of individuals has been severely reduced, especially in the past 30 years, and this is mainly due to expansion in agriculture as a result of population growth. Reduction in the number of species is expected to continue at increasing rates (see Campbell 1996).

Range Estimates of the Past Decline: 45–90 years ago [100 000–200 000] mature individuals—approximately a 30% reduction.
Range Estimates of the Future Decline: 45–90 years from now [3 000–5 000] mature individuals—approximately a 50% reduction over the next 45–90 years.

The status for *D. melanoxylon* in Malawi is preliminarily assessed as **ENDANGERED A2c,d.** ❑

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Oldfield, S., Lusty, C. & MacKinven, A. 1998. *The world list of threatened trees*. World Conservation Press, Cambridge, United Kingdom. 649 pp.

Compiled by Marthina Mössmer

Leiden Herbarium

http://nhncml.leidenuniv.nl/rhb/

There seems to be some confusion as to the present address of the website of the Leiden branch of the Nationaal Herbarium Nederland. Currently, and after some peregrinations, the site has settled at the URL above. Any other versions (rhbcml.leidenuniv.nl, rulrhb.leidenuniv.nl) are no longer valid.

Centre for Environmental Education

http://www.cee.envirodebate.org

This is to invite you to participate in the CEE envirodebate at http://www.cee. envirodebate.org. This new web site seeks to involve policy makers, media, industry, NGOs, local stakeholders and the general public, nationally and internationally, in the ongoing debate. The web site will feature issues that are currently at the heart of the environment-development debate and will provide a much-needed opportunity for widespread public participation.

This new initiative is a part of CEE's Media for Sustainable Development(MSD) Unit's Environment and Development Book Series Project, supported by the Swiss Development Cooperation, which publishes landmark books featuring ecologically sustainable approaches to development by experts in a variety of fields. These books then form the basis for further discussion leading to policy and practical management applications. The project has helped initiate a think tank on key environment and development issues in the country.
MSD aims to mainstream the environment-development dialogue through this highly interactive web site. Do post your views at the web site or send e-mail to cenvirai@giasbg01.vsnl.net.in and mark the subject "bioprospecting".

New York Botanical Garden North American Bryophyte Catalogue

http://www.nybg.org/bsci/hcol/bryo/bry3.html

Approximately 20 000 new records from the contiguous USA have been added to the searchable catalog for the following families of mosses:

- Andreaeaceae
- Bruchiaceae
- Buxbaumiaceae
- Dicranaceae
- Ditrichaceae
- Fissidentaceae
- Seligeriaceae

The total number of records now available for searching in the North American Bryophyte Catalogue is approximately 130 000. This number includes all hepatics and anthocerotes from the entire flora area (USA, Canada and Greenland), and all mosses from Canada, Alaska, and Greenland. Images are available for selected Sphagnum types.

The NYBG North American Bryophyte Catalog project has been supported in part by the National Science Foundation since 1996. It is anticipated that the catalogue will be completed in 2001.

MNHN's scientific publications

http://www.mnhn.fr/publication/

The Museum National d'Histoire Naturelle (MNHN), Paris, France, has since 1802 been a publisher of journals and monographs in zoology, botany and palaeontology. The three sections of the old "Bulletin" have recently been revamped as Zoosystema, Adansonia and Geodiversitas. Information on these and other items published by the Museum can be viewed at this web site.

The site presents contents and abstracts for the latest issues, instructions to authors, information on how to order, etc. Beside the classical natural history museum research topics listed above

(mostly published in English), the MNHN publishes materials on biodiversity management and history of science (in French), as well as geology and stratigraphy, ethnology, etc.

Index to American Botanical Literature Online

http://www.nybg.org/bsci/iabl.html

After almost a year in operation, the Index to American Botanical Literature, formerly published in the Bulletin of the Torrey Botanical Club, and then Brittonia, is now fully functional and updated. It currently contains 21 689 records of recent literature, from both books and journals, dealing with American plants from Greenland to Antarctica. One can search by general category, author, journal, or several other options. Unlike the hardcopy versions, the electronic format has a keywords option.

If you find any errors, typographical or otherwise, or omissions, send e-mail to bbuck@nybg.org. Authors and editors are encouraged to send copies of their work to the same address for inclusion. If the publication is from a botanical journal, the Library at The New York Botanical Garden probably receives it (you can check the journal list on the web site) and a copy isn't necessary. However, if the publication is from a more general journal, especially state academy publications, copies would be greatly appreciated. After indexing they are deposited in the NYBG Library.

Wisconsin Vascular Plants

http://wiscinfo.doit.wisc.edu/herbarium/

The staff of the Wisconsin State Herbarium (WIS) at the University of Wisconsin-Madison is pleased to announce that Wisconsin Vascular Plants site is now available.

This site lists the 2 436 native and 792 introduced vascular plant taxa (species and infraspecific taxa) documented for Wisconsin. For each taxon, status, synonyms (if any), detailed distribution maps (944 taxa to date), and images (2 730 representing 1 570 taxa to date) are presented. Additional information, such as protection category as defined by the Bureau of Endangered Resources, Wisconsin Department of Natural Resources; habitat information; and information on ecologically invasive taxa are included where appropriate. The site is searchable by scientific name, habitat, status, and common name.

Additional photographs and maps will be posted, as they become available. Links to other on-line sources for Wisconsin biological and ecological data are included.

ASIL Wildlife Interest Group

http://eelink.net/~asilwildlife

The full text of the following Nigerian wildlife laws is now available on the ASIL WIG site:

- Endangered Species (Control of International and Traffic) Act (1985)
- Sea Fisheries Decree (1992)

Survey of Economic Plants for Arid and Semi-Arid Lands

http://www.rbgkew.org.uk/ceb/sepasal/

SEPASAL (the Survey of Economic Plants for Arid and Semi-Arid Lands) database is now available for searching. SEPASAL focuses on "wild" and semi-domesticated useful plants of tropical and subtropical drylands.

There are two levels of access to the system. By using the public web interface, anyone can search the database by scientific or vernacular names to see if a plant is represented in SEPASAL. To search by other criteria, e.g. uses, distribution, and to view detailed information on the plants, users need to apply for a login. This is easily done by clicking on the "Apply for a login" button on the first screen. Account applications are then processed and users notified of their userid and password. Applicants are asked to give as much detail as possible on the project they are working on and the use to which SEPASAL data will be put. This helps SEPASAL to process applications quickly. For more information, and to gain access to the database, see SEPASAL's home page or e-mail sepasal@rbgkew.org.uk.

SEPASAL forms part of Kew's Centre for Economic Botany (CEB). Its objective is to collate widely scattered published information on the uses, distribution, characteristics and environmental tolerances of dryland plants and to make this information available to aid and development organisations, NGOs and individual researchers working on dryland biodiversity and sustainable development projects in developing countries. It began at Kew in 1981 with funding from Oxfam. Since then SEPASAL has continued to be charitably funded and has had over 40 person-years of continuous development. It

includes information on more then 6 200 useful dryland species, excluding major crops.

Announcing Conservation/Geography

http:/www.esri.com/conservation

Conservation/Geography is a new web site where you can find out about hundreds of organisations using GIS to protect nature and promote social justice. The site features

- Dozens of quick-access indexes
- Dozens of new GIS Status Reports
- World maps of Conservation GIS
- The new Conservation Map Symbol Set
- New grant sections for CTSP and ECP
- Magazine sections for SCGIS and CTSP
- Special Tribal GIS section
- Special GIS on the Web section

Marthina Mössmer
SABONET Project Consultant
E-mail: marthina@yebo.co.za ❑

"What do students need to experience before they make decisions on one career or another? More than further exposure to the professorate, at this time they need exposure to people doing great things with courage, stamina, and creativity. They need mentors and role models, and these are most often found among those actually changing the world. Instead of career planning, they need a deeper and more vivid concept of what it means to live a life of service and commitment in what surely will be the most fateful period in human history. They need a compass to chart a life course that combines intellect, heart, judgment, and professional skills."

David W. Orr
(*Conservation Biology* 13(6): 1244)

Looking for a new research project?

It occurred to us recently that sometimes the ideas for research projects occur to those who lack the time or need for them, while other botanists may need ideas for themselves or their postgraduate students. Possibly one may give thought to establishing an 'ideas' column in *SABONET News* where questions such as those that follow may be aired, to be read and acted upon by those who need them (we hope). The ideas below have been discussed with others, so please check before claiming them. If anyone has interesting suggestions for research topics, send them to us!

1. Many of the trees sold in the Pretoria area as ***Celtis africana*** are, in fact ***C. australis***, ***C. occidentalis*** or ***C. sinensis***, none of which are indigenous to Africa, let alone southern Africa. It is widely believed (without any visible evidence) that hybrids between all four of these may be found in Gauteng. **Are these hybrids real or imaginary? If the former, is there gene flow from the exotics into natural populations in, or on the fringes of, urban areas? What is the situation in other areas?** In discussion, Prof. A.E. van Wyk (PRU) added a rider:

1A. The real *Celtis africana* in Pretoria is almost always infected with a mycoplasma that causes the leaves to go yellow and start falling in midsummer. **When did this disease first appear? Are the exotics immune to it and if so why? Is it possible to graft scions of *C. africana* on to stock of one of the exotics at reasonable cost, and would the result be immune?**

2. Pretoria Technikon has a remarkable collection of specimens made by J.E. Repton in various natural areas around Pretoria between c. 1930 and 1965. **How many of the places he collected in are still natural, and how many of the plants he found still occur where he found them?** This would be an excellent opportunity to examine environmental change

resulting from human population pressure. Other similar opportunities are afforded by collections made equally long ago by L.N. Prosser (housed at JBG) and Prof. C.E. Moss (housed at J), and, outside of Gauteng, doubtless by many others. This idea is possibly a specific example of a class of projects that could be applied to almost any fast-growing urban area.

3. The history of botanical collecting is just (or not quite) long enough to allow the secular effects of climate change on plant distributions to be observed. One may be able to do this by noting the limits of ranges of tree species especially, as recorded by early collectors and explorers, e.g. Thunberg, Burchell and Wehdemann, and comparing these with modern known distributions. It seemed to us, looking at Wehdemann = s notes, that he tended to find trees in the southern Cape a significant distance east of their present western limits, but we were unable to confirm this with a cursory glance at the early specimens cited in *Flora Capensis*. **Is the apparent south-westward movement of trees since the early 19th century real or imaginary?**

4. For some time now, *Myrsine pillansii* (*Flora of southern Africa* and *Flora zambesiaca* distribution) has been perceived by some as a genetic aberration of *M. africana* throughout its distribution range. *M. pillansii* resembles a robust version of *M. africana*, and has often been observed in association with it as single, solitary individuals. Moreover, fruiting has never been observed, staminodes (sterile stamens) are always present, and reproduction is by root suckers. Mr John Burrows (Buffelskloof) maintains that molecular studies to determine the genetic distance between the two are required. **An investigation into the possibility of polyploidy, and also whether or not this phenomenon is a random crossing-over event, can lend insights into speciation events. The recognition of the formal taxonomic status of *M. pillansii* can also be clarified.**

5. Strong floodlights cast a spectacular glow on Table Mountain (Cape Town, South Africa) during the tourist season. This has been happening for a few years. **But, how do plant pollinators (e.g. moths) and dispersers (e.g. cryptic nocturnal ants) react to increased photoperiod, and what impact does this have on the fynbos flora (e.g. *Disa* and *Pelargonium*)?** Pollinators and dispersers may undertake increased or decreased visits (moths attracted to light; altered flight patterns of moths; smaller seed stores by ants). This disruption of mutualisms may affect the reproductive outputs of plants. Predictive theories need to be developed for this (e.g. components of the flora that will be most affected; rates and extent of disrupted mutualisms) and the trade-off to the tourist industry should be addressed.

6. **The floristic affinities of the uplands associated with Rift Valley scarp in southern Africa would make an interesting biogeographic study.** The northernmost areas presumably are associated with the *Flora of Tropical East Africa* region whereas those more south are associated with the *Flora zambesiaca* region. Studies undertaken by the likes of Chapman, White and Wild provide narrative accounts hereof, but to date hypothesis testing has not taken place. Similarity coefficients and correlation analyses using simple species data (presence-absence or abundance) can elucidate the extent to which certain areas differ from each other floristically (eg. Nyika Plateau, Misuku, Mafinga and Viphya), and very importantly, the plausible reasons for these patterns. **A similar study based on geological and floristic correlations would be ideal for the Chimanimani, Great Dyke and Vumba areas.** ❑

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SOME NOTES ON MAKING KEYS THAT WORK (AT LEAST IN THEORY)

by Hugh Glen

So now you have your taxonomy done, descriptions written, types set out…what else? Well of course you need to make sure that the users can identify the taxa you have delimited. Now all of us have encountered keys like that in **Figure 1** (from Metcalf 1954). Although this key is zoological, its botanical counterparts are all too familiar to anyone who has had to identify a difficult specimen.

In fact, there is little mystery to constructing a key that should work. The theory is well known,

KEY TO THE COLLEGE PARK SPECIES OF THE GENUS *PARADOXUS*
BY
CHARLES M. BARR

a. Imago winged
  b. Imago with elytra obsolete
    c. Wings sometimes wanting
      d. Elytra of wingless forms red ..... *alba*
      dd. Elytra of wingless forms red ..... *niger*
    cc. Wings always wanting
      e. Wings, if any,would be blue ..... *rubra*
      ee. Wings, if any, would not be other than blue ..... *rubra*
        ..... var. *rubra*
bb. Adults brachypterous; elytra not obsolete except in most specimens
  f. Wings present, frequently wanting; if wanting always green ..... *gus*
  ff. Wings not absent, at times present; if present, always invisible
    g. Posterior foremost
      h. Dorsal surface vetrally exposed ..... *horus*
      hh. Ventral surface dorsally exposed ..... *fredi*
    gg. Anterior aftermost
      i. Venter keeled, starboard femora swollen, causing slight list to port
      j. Venter not keeled, or if so, not really ..... *upsedaisi*
      jj. Venter keeled, port femora enlarged, causing list to starboard ..... *formunown*

aa. Imago not wingless
  k. Wings not green
    l. Wings green
      m. Elytra triangular, apical end nearest scutellum ..... *lordhelpus*
      mm. Elytra apical, triangular en nearest scutellum
        n. Disk of elytra smooth, impunctate ..... *angus*
        nn. Disk of elytra rough, glabrous ..... *sandi*
    ll. Wings not other than green
      o. Wings never green ..... *dewii*
      oo. Wings never blue ..... *trumanii*
      ooo. Wings never red ..... *stalinii*
  kk. Wings not black ..... *nigrus*

Figure 1. *A taxonomist's nightmare*

though it took me a quite unnecessarily long time to find the relevant literature. Practical choice of characters is more of a grey area, and may prove difficult. The method I shall outline here works quite well enough with a pencil and lots of scrap paper, but it underlies all the computer programs to write keys that I have ever seen; indeed, it is hard to see how one could be written that does not use this logic.

Before getting involved in the logic itself (which is simple, if a bit abstract), it may be advisable to make quite sure that we know the differences between a **character**, a **suite of characters** and a **character state**. A **character** is the indivisible "atom" of descriptive information, and it takes more than one state. So is the statement "leaves…" a character? No, because leaves may be present or absent, they may be simple or compound, they may be arranged several different ways, they may be sessile or petiolate, they may be of different shapes and sizes and so on and on. Some years ago I tried to generate a list of characters for describing cultivated trees, and leaves featured in about 35 characters. These characters are all to be found in the same part of the plant, so the statement "leaves…" may be what ties together a **character suite**. In order to demonstrate different kinds of **characters**, let us look at some that specifically describe leaves. Knowing that these are handled differently is not crucial to making keys manually, but computer programs tend to expect one to know this part.

Wherever I quote specific characters, the part < in angle brackets > is a memory-jog that does not appear in the final key or description. For example, a character written here as "leaves < length > " would appear in the finished product as "leaves…mm long".

Consider the character "leaves < presence > ". It can take two logical **states**: "leaves present" or "leaves absent". I use this character to distinguish between ordinary (deciduous or evergreen) trees and stem succulents like *Cereus* or *Euphorbia*, so maybe I really mean "leaves present [at some stage in the year]" or "leaves [always] absent". There is no third choice here; one cannot by this definition have a state of partial presence. This character is necessarily two-state (binary): characters like this are ideal for key-forming, but in practice rather scarce when dealing with real plants.

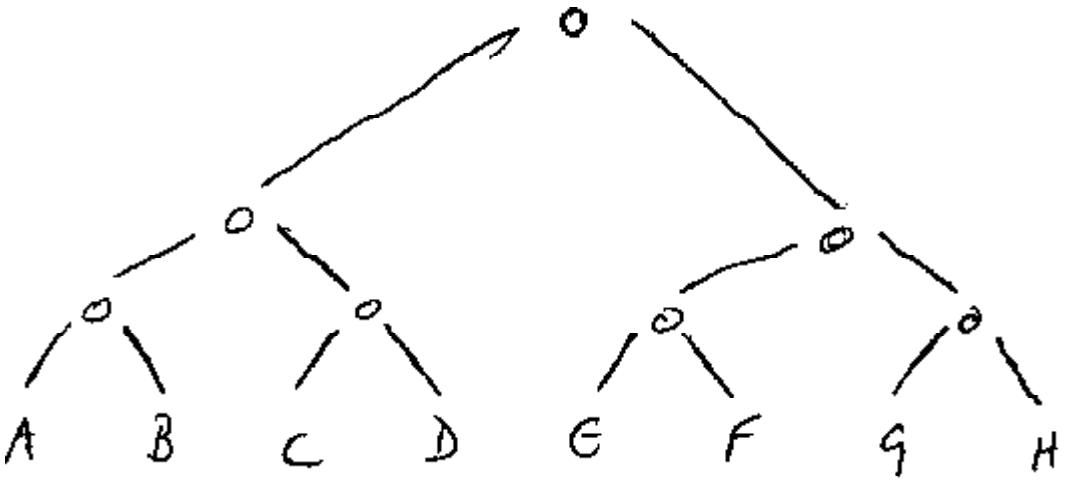
Now look at a character like "leaf margin < outline > ". Leaves may have entire, crenate, serrate, dentate…(etc.) margins. There are several possible states, and usually the states tend to fade into one another. Characters like this can be used for key forming, provided that the taxa in the keys show clear gaps between states. If this provision is not adhered to, the key becomes unworkable.

Finally there are counted and measured characters. An example of the former would be the number of leaflets in a pinnate leaf, and the latter might be the length of a leaf. Again, these can be used in keys, provided that there are clear gaps in the ranges shown by different taxa or groups of taxa. What do I mean by clear gaps? Consider a key couplet that says "Leaves up to 10 cm long / Leaves 10 cm or longer". Clear enough for leaves 7 or 15 cm long, but what about the inevitable one that is exactly 10 cm long? Which side does it go?

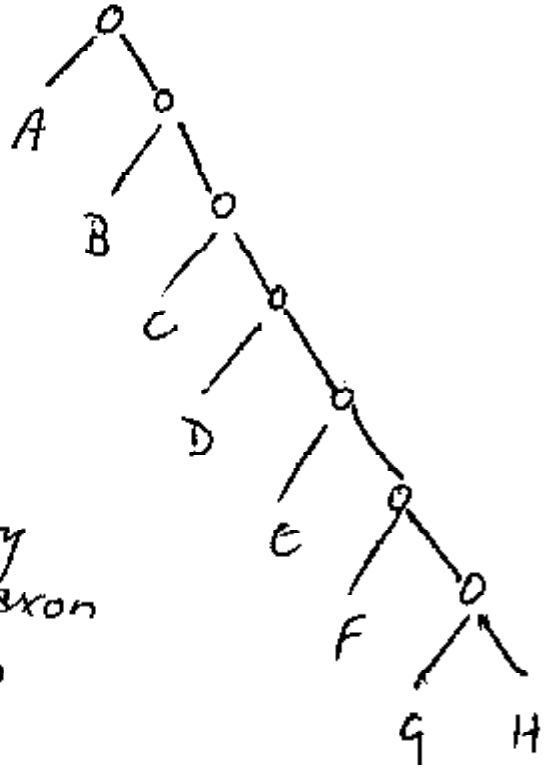
Let us first set up some basic rules for the logic that follows. These are not strictly mathematical axioms, but more in the nature of guidelines.

1. I assume a group of 8 taxa and a sufficient number of characters, the states of which are mutually exclusive. A group this size is small enough to work easily with, but large enough to be interesting. As for the characters, their only essential feature is that **the states are mutually exclusive, and do not have intermediates**.
2. Rigorous proofs are not given here. Firstly, they are easily found in two quite accessible papers (Osborne 1963a, 1963b), and secondly, the mathematical details can be far more difficult than the concepts for a semi-numerate botanist (like the present author) to understand.
3. To start with, we assume that (3.1) all characters have only two states each, (3.2) all taxa are equally common and (3.3) all characters are equally easily observed. Later, we shall examine the effects of breaking each of these

• ***Continued on page 43***



2A - This key splits each group in half



2B - This key isolates one taxon at each step

Figure 2. Diagrammatic representation of key-forming strategies. A–H are taxa, O's are decisions. For more details, see text.

▸ *Continued from page 41*

rules in turn. For now, it will suffice to observe that in the absence of any evidence to the contrary, it simplifies the job to assume 3.2 and 3.3 are normally true.

To demonstrate the assertions made below, I shall represent the keys by tree-diagrams, in which the lines represent possible routes through the key, and dots where the line segments join represent choices that must be made (for example: leaves present or absent). The taxa being keyed out are represented by letters A–H.

Point 1. ***At each step in the key, the best character to use is that which divides the remaining group of taxa most nearly equally***.

Consider the keys in **Figure 2a** and **2b**. In **Figure 2a** I have split the eight taxa first into groups of four, then 2, then one. It is easy to see that one needs three steps to identify **any** of the eight taxa. In **Figure 2b** I have gone to the other extreme, and separated each taxon out individually. Count up the number of steps in the key, and divide by the number of taxa to obtain the mean path-length for this key: for the case shown here, it is $(1+2+3+4+5+6+7+7)/8 = 35/8 = 4.375$. Obviously, each step is a new opportunity for an inexpert user to make a mistake, so the shorter the key, the more error-proof it is. This is one reason why, all other things being equal, a key that looks like **Figure 2a** will be more robust than one that looks like **Figure 2b**.

Point 2. ***For a dichotomous key, the minimum number of characters which can be used is given by*** **($\log_2 n$)** ***rounded up to the nearest integer, where n is the number of taxa to be separated.***

The most difficult part of this is the way it is expressed. Look at **Figure 2a** again: here it took no more than three characters to separate eight taxa. A ninth taxon would require the use of a fourth character, but four characters can separate 16 taxa…and so on. The key in **Figure 2b**, on the other hand, implies the use of no less than seven different characters to separate the eight taxa. Of course, in the real world, things are seldom if ever that simple, and the more characters the better one's chances of finding one that varies suitably at each step. This is why assumption 1 above does not specify how many characters are to be used: it varies with the number of taxa and, more significantly, with the shape of the key.

Point 3. ***A practical method*****.**

Surprisingly, that is all the theory that one needs to produce a workable dichotomous key. But theory needs to be put into practice to be any use, so let us examine how to do that. Now here there is room for many divergent ways. One could use a computer to run the key-forming routines of DELTA or PANKEY, or create one's own key-forming program or, as shown here, use a pencil an a piece of paper. All use the same strategy.

Start by making a table that looks like that in **Table 1**. Here the taxa are rows and the characters columns, though it is easy enough to imagine them the other way round. Instead of labelling the columns 1, 2,…as has been done here, it would be better to use assertions about the characters, such as leaves present/absent, sessile/petiolate…Then a + in a cell indicates that for that taxon the first alternative is true, and a - that the second holds. In **Table 1** I have used ? to indicate unknown or variable.

In the last line of **Table 1** I have counted up the numbers of plusses and minuses. Note that any one of the first three characters would be an ideal

Table 1. *Distribution of characters among 8 taxa.*

Characters	1	2	3	4	5	6	…
Taxon A	+	+	+	+	-	?	
Taxon B	+	+	-	+	-	?	
Taxon C	+	-	+	-	-	?	
Taxon D	+	-	-	-	-	?	
Taxon E	-	+	+	?	-	?	
Taxon F	-	+	-	-	-	?	
Taxon G	-	-	+	+	-	-	
Taxon H	-	-	-	-	+	+	
Scores (+/-)	4/4	4/4	4/4	3/4	1/7	1/1	

start to this key. In fact characters 1 to 3 are the ideal three that will separate all eight taxa by the shortest route. Characters 4 and 6 cannot be used to start the key, as they are each unknown (or variable) for at least one taxon. Character 5 is the same for all taxa but one (H), and so would be a very poor start. Assume we start with character 1. Write it down in words, and concentrate on the half of the table for which it is in the + state. Note now that characters 2 and 4 vary across taxa in the same way (maybe all simple-leaved taxa have pink flowers). One can use character 4 as an **accessory** to character 2. It is good to use both, as it means that if either one is missing from a specimen, one can go on using the key.

Writing down characters 2 and 4 gives the second lead in the key, and so one goes on to the last couplet, which separates taxa G and H. Here characters 3, 4, 5 and 6 can all be used to separate these two taxa. It is only necessary to be careful with the wording of the last two.

Point 4. ***What about counted and measured characters?***

The only way to handle these is to look and see if there is a gap in the ranges where you need one, and use that gap to transform them into binary characters. For example, if our 8 taxa had leaves 10-20, 15-25, 10-30, 12-40, 60-80, 65-100, 70-120 and 80-150 mm long, the binary character would be "leaves up to 40 / over 60 mm long". There used long ago to be a key-forming program that did this (Morse 1974); why more recent programs do not is beyond me, as it is not a difficult trick to write the necessary computer code.

Point 5. ***Breaking the equally frequent / equally observable rules***.

Suppose you know that two of our eight taxa are much more common than the others. In particular, let taxon A occur 450 times in every 1000 unknowns, B 430 and the others 20 each. Then we can go back to **Figure 2** and re-calculate the path lengths, but this time we have 1000 identifications, and not eight. The key in **Figure 2a** still shows a mean path length of 3 (it has to), but what about **2b**? Work it out. This time we have (450 + (430*2) + (20*3) + (20*4) + (20*5) + (20*6) + (20*7*2))/1000 = (450 + 860 + 60 + 80 + 100 + 120 + 280) /1000 = 1860/1000 = 1.86 steps! In other words, when there are a few very common taxa among many relatively rare ones, it makes sense to pull them out first.

Similarly, a few very easily observed characters among many which are hard to see or interpret, or are seldom seen, should ideally be used first. This can be shown the same way (try it).

Point 6. ***Breaking the binary rule*****.**

Is the rule that says all couplets in a key must have neither more nor less than two leads, set in concrete? This depends entirely on the editor of the journal to which you submit your paper. ***It is not part of the logic of keys at all***, but merely custom.

Suppose all "couplets" actually had three leads. Return to **points 1 and 2**, and start again. All that changes is that fewer characters are needed to key out a given number of taxa. However, it is that much more difficult to ensure that the states are not only mutually exclusive, but are seen as such by the user. As the logic of this case is so similar to that described in **points 1 and 2**, I shall not repeat it here.

Suppose, however, that each character has a different number of states. The "tree-logic" of constructing the key is or should be fairly obvious by now, but one must consider the user. How is s/he to know how many states (leads) each "couplet" has? In particular, suppose the key uses the bracketted format required by some journals, and runs over one or more pages. How is the user to know that one lead is over the page? If this problem is solved satisfactorily, there is no logical reason why a key should not have a variable number of leads per "couplet". Here is one suggestion, which is intended more to stimulate debate than as a hard and fast rule.

In most keys, leads are labelled ("1a/b", "2/2'" etc.). Suppose, instead of writing simply "1a. Tree…/ 1b. Herb…"), one wrote "1 a/3 Tree…/

1 b/3 Woody shrub or suffrutex…/1 c/3 Herb…". Then it would not matter if 1b and 1c landed on different pages. The note "/3" tells the user that there are **three** possibilities to consider. No doubt there are other ways of conveying the same information, no matter how the key is printed.

Point 7. *Multiple-entry keys*.

Suppose your specimen has very conspicuous red flowers, but the collector, being a good and conscientious conservationist left the corm to grow again next year. Suppose, also, that the key makes no mention of flower colour, but that the first (of 192) couplets is a corm character. Is there a solution other than profanity? Yes. It is called a multiple-entry key, and is incredibly difficult to reproduce without a computer.

Here the approach differs radically from that of a standard dichotomous key. Instead of starting with a "best" character, then taking the next character that someone else chose, and so on down the one and only route to an answer, one may take any convenient character or group of characters in any order, and find one of an infinite number of routes to either an answer or total confusion. It is easiest to describe the use of such a key step-by-step, though any number of steps may actually happen simultaneously. For any group of taxa, each character is true for some, and the key in this case is either a list of which taxa show which character, or (less easily reproduced) which characters are true for each taxon. The technology for the second possibility is largely obsolete, being based usually on edge-punched cards, so let us concentrate on the former. Suppose the specimen is an African tree with pinnate leaves and orange flowers. One would have a list of all African plants, all trees, all pinnate-leaved plants and all plants with orange flowers—or some relevant subset of each. Now look for the names that occur on all four lists: the result will be a relatively short list of taxa showing the characters available. Now look for some more characters (tree c. 20 m tall, frost tender, flowers bell-shaped, perhaps). Eventually one will come out at an answer (*Spathodea nilotica*, in this example). Here it is not the compiler but the user who needs a good strategy. The compiler's job is simply to include as much information as possible, so that as many characters as possible may be used—or ignored, in poor specimens. The user's best strategy is to know which characters are rare in the data-set and try to use those first, in order to shorten the list of possibilities that need checking, as much as possible as fast as possible.

Clearly, this is best done by computer, but pencil-and-paper keys of this kind have been published (e.g. Meyer 1969).

And finally: now we have our key, what remains? Obviously, it should be tested by someone who had no part in writing it on material not used in its construction before being published. The restriction on the tester ensures that the "mental shorthand" of the key-writer is trapped and made intelligible to the user, and the requirement for new material ensures that the key will work in "real-world" situations. As an example of the "mental shorthand" problem, consider the "leaves < presence > " character near the beginning of this note. I know that a deciduous tree in winter counts as "leaves present", because I designed the character set that way, but would anybody else unless it was better explained?

One part is still missing from the ultimately useful publication. Well, several actually, but this is not the place to discuss synonymy, type citations, voucher specimens or pictures. The point here is that in capturing the information needed to create a working key, you have also captured the information needed to make comparable descriptions. Do not throw away information because you cannot or do not need to use it in a key; here is where all that data is put to good use. If you captured your data in the same logical sequence for each taxon, it is now easy to write a description from the same information as was used in making the key. And what is a logical order? I would say first the vegetative characters that are always (or mostly) there, then the flowers, then the fruit, in each case working from obvious, large characters to cryptic, small ones or from the outside inwards; giving, of course, due regard to making something that will read well when strung together.

Thus character 1 may be " < lifespan of foliage > ", with states "deciduous" or "evergreen", character 2 " < habit > " with states tree / shrub / herb /…etc., character 3 " < plant height > " and so on. Put values to these and string them together and the result comes out something like "Deciduous tree 3–5 m tall…" and so on for the full set of characters. Advantages of this are (1) descriptions are directly comparable (within the limits of available information—you will not be able to pin a particular name to a stray fruit (for example) if the fruit of the plant with that name is unknown) and (2) you can be certain without checking that any character used in the key is also mentioned in the description. ❑

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O B I T U A R Y

Rosemary Holcroft (December 1942 – February 2000)

▲ *Rosemary Holcroft (1942–2000) (Photo: National Botanical Institute, Pretoria).*

Rosemary Holcroft (Roos), botanical artist with the Botanical Research Institute (BRI) 1975–1985, died at her home in Southport, KwaZulu-Natal, South Africa, on Friday February 4, 2000.

Rosemary Temperley was born in Nairobi, Kenya, in December 1942. She was educated at the Msongari Loreto Convent. The family moved to South Africa in 1960. She received a teacher's diploma from the University of Cape Town Ballet School and spent ten years teaching ballet in Cape Town and Pretoria.

After seeing an exhibition of botanical art at the Pretoria Art Museum in 1974, Rosemary began a

Fine Arts course with the University of South Africa; she did not complete the degree. She began working as a self-taught botanical commercial artist, taking up a part-time post with the BRI in 1975. In the following ten years, she built up an impressive list of published works (mainly BRI publications) and group exhibitions.

On resigning from the BRI in 1985, she bought a 4x4 vehicle and travelled to Namibia. Subsequent trips included Botswana, Swaziland, Lesotho and Namibia along the Kunene River. She never lost her passion for the flora and fauna around her.

From 1987–1994 the South African National Council for the Blind employed Rosemary as a hostel supervisor. Health problems forced her to retire in 1994; she moved to Southport on the KwaZulu-Natal South Coast, where she enjoyed the mild climate and subtropical surroundings. She continued painting in watercolours and "dabbling in oils", but botanical works had become too taxing.

Rosemary married Michael Roos, a commercial artist, in 1964. They had one son. After Michael's death, Rosemary married computer consultant Leslie Holcroft. They were later divorced. She is survived by her only son, Marc.❑

Gillian Condy
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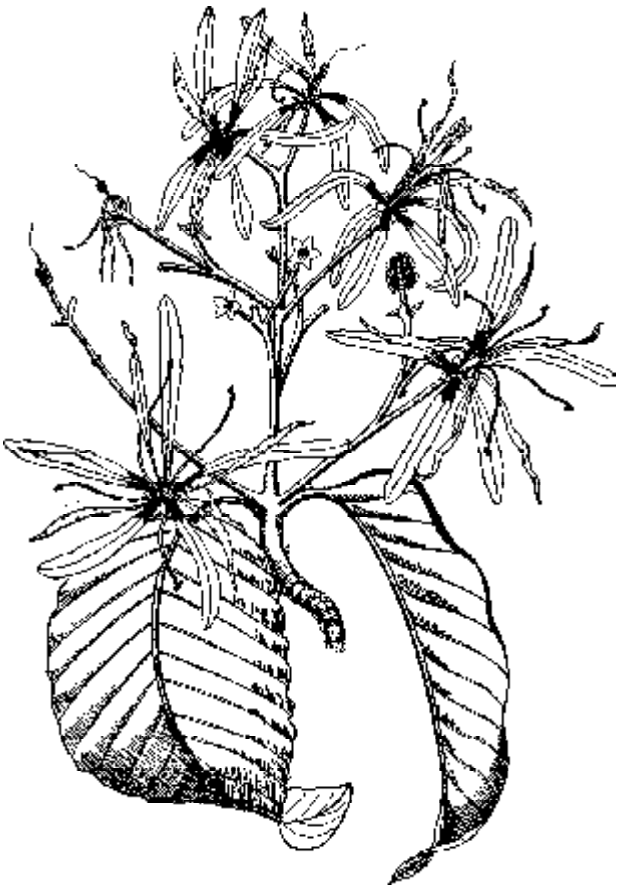

▲ *The Cape Chestnut* (Calodendrum capense, *Rutaceae), drawn by Rosemary Holcroft for Donald Killick's* A Field Guide to the Flora of the Natal Drakensberg, *published in 1990.*

CBD: an awakening or an inconvenience?

by Moffat Setshogo

The seventh meeting of the Global Biodiversity Forum (GBF), held in Harare, Zimbabwe, on 6–8 June 1997, was conceived to explore synergies between the CBD and CITES. The Forum focused on three themes where synergies existed between CBD and CITES. These were: non-detrimental export and sustainable use, community-based resource management: myth or reality, and access to floral resources. A workshop on access to plant resources was designed to enhance the understanding of Article 15 of the CBD on Access to Genetic Resources and to explore linkages and synergies between the CBD and CITES with respect to this issue.

Since the inception of the CBD most nations have attempted to strengthen and revise structures governing access to genetic resources. The question that most are addressing is how to oblige the requirements of the CBD without compromising the national sovereignty over genetic resources. Before the entry into force of the CBD, the practice was one of free for all. Genetic resources were being collected and processed into new products by the private sector of the industrialised nations, to be sold at exorbitant prices to the countries of origin of the genetic material. Countries did not benefit from the commercial exploitation of their resources. Weak legal frameworks often governed access to genetic resources and this often caused disputes.

Most countries, particularly developing ones, have gone back to the drawing boards to re-draw national policies on regulation of access to their plant genetic resources. Frameworks for controlling access to genetic resources are often technically inadequate. Most have learnt through the hard way of having lost genetic resources that have been converted into products from which they do not get royalties. Now they want to cover themselves on such aspects. The CBD obliges all members to endeavour to create conditions that facilitate access to genetic resources by other Contracting Parties for environmentally sound uses and to minimise restrictions to the Convention's objectives. Countries' new regulations also take into account that no country is self-sufficient in genetic resources.

There has been a renewed interest in the potential use of plant substances as consumer goods, as well as such aspects of human welfare as medicine and agrochemistry. Such attention has been directed to tropical developing countries, which still have their plant diversity intact. Collaborative work is, in most cases, carried out through mutual agreements between the parties concerned. There are, however, some instances where this relationship is not balanced; it is these imbalances which have prompted most countries to reevaluate their regulations. This exercise is, for instance, being undertaken in some SABONET countries. While the regulations are being updated, most countries are uneasy about issuing research permits, particularly those dealing with research on economic plants.

In Botswana, the task of drafting a national policy on regulation of access to plant genetic resources was given to the National Plant Genetic Resources Centre (NPGRC). A draft policy document was submitted in February 1999 and is still being considered by relevant authorities. The SABONET-Botswana team has contributed extensively to this exercise, particularly when it came to the rare and endangered plants and other plants with 'sensitive' uses.

The delay in re-drafting regulations has seemed rather lengthy and unfair to most genuine researchers. It is common knowledge that there is too little expertise in southern Africa to carry out research on all taxa. The region will therefore

continue to welcome collaborative research with outside partners, as long as the playing field is level. ❑

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The role of aquatic plant propagules in the biodiversity of floodplain vegetation

A study at the Peter Smith Herbarium, PSUB (Maun, Botswana)

The importance of biodiversity in every ecosystem has been acknowledged in many publications. E.O. Wilson coined the term "biodiversity" from the words "biological diversity" in 1981. It has been considered one of the main contributors to ecosystem stability (Naem *et al*. 1994; Heywood 1996; Tilman 1996). It has also been suggested that ecosystem functioning is more efficient in more diverse ecosystems. This is mainly due to more species within different *functional groups* and more *trophic levels* (Ehrlich & Wilson 1991).

The riverine system of the Okavango attains its uniqueness from its location within the semi-arid environment of northern Botswana. This wetland ecosystem of 25 000 km^2, with a permanent body of waterof 6 000 km^2, has a high diversity of animals and plants not common elsewhere around it. The riverine system floods seasonally, filling most of the floodplains on its route southwards via several tributaries. The system is characterised by several different vegetation communities, among them communities of aquatic plants. The aquatic plants of the delta have been studied mainly from the point of view of distribution. For example, the SABONET Aquatic Plants Training Course held on Mboma Island covered aspects of the systematics and geographic distribution of the plants. The diversity of these, however, has not been investigated. An inventory of some of the aquatic plants of the delta has been compiled (Ellery & Ellery 1997), but did not cover aspects of their diversity. The RAMSAR Convention, under which the wetland is ratified, emphasises the need for a site management plan (RAMSAR Treaty 1999) and the current study will contribute to the development of such a plan.

Floodplains in particular tend to show dynamic states in the diversity of aquatic plants as they form a transition zone between terrestrial and aquatic vegetation. When flooded, they maintain a diverse community of aquatics, and when dry, are dominated by mainly semi-aquatic grasses. Floodplains that have not been flooded for more than two flooding season show succession from wetlands to terrestrial vegetation.

This study, through use of observational and experimental data seeks to address the diversity status of aquatic plants in the floodplains. Emphasis is put on investigating the contributions of bank (soil or ground propagules) and drift (water-carried propagules) components to aquatic plant biodiversity in the floodplains. The study was established through regular survey of the floodplain during flooding, assessment of bank

Table 1. *List of aquatic plants.*

Gentianaceae (Floating)
N nouchalli
N indica
Cyperaceae (Surface)
Cyperus articulatus
Schoenoplectus corrymbossus
Poaceae (Surface)
A macrum
B erecta
C dactylon
E stagnina
P repens
P obtusifolium
S sphacelata
Onagraceae (Floating)
Ludwigia stolonifera
Najadaceae (Submerged)
Najas horridus
Polygonaceae (Surface)
Percicheria limbatum
Leguminosae (Surface)
Marsileaceae (Aquatic fern) (Submerged)
Marsilea spp.
Potamogetonceae (Submerged / Floating)
Potamogeton thumbergii
Hydrocharitaceae (Submerged)
Lagarosiphon muscoides
Algae (Surface)
Characeae (Submerged)
Nitella spp.
Utriculariaceae (Submerged)
Utricularia spp.

germinations and collections from drift propagules. Two research sites in the delta have been established, namely Xaxaba (upstream) and Nxaraga (downstream) floodplains. Both bank and drift propagules are investigated at the sites. Vegetation surveys are also carried out.

Survey of aquatic plant communities during flooding as well as during rainy season have contributed to the aquatic plant list in Table 1. The list presents the genera as well as the plant species occurring in the floodplains.

The preliminary results of the study of aquatic plant biodiversity in the delta suggest that diversity in the floodplains may be due to the cumulative result of different processes. These processes may also act on the different plant propagules differently. Bank propagule studies show that Cyperaceae dominate in abundance per unit area, this may be due to the persistence of the Cyperaceae propagules in the banks during the dry seasons. A significant number of Cyperaceae are also trapped as drift propagules, i.e. as dry corms. It is also evident that some of the aquatic plant genera that were identified in the floodplains during the flooding period did not appear in the bank study. This suggests that some of the propagules may not be bank viable, e.g. seedlings of *Ludwigia stolonifera.* However, it was noted that birds disturbed the bank experiments, which altered their diversity. There is also a high impact on the bank propagules by fires that affect the dry floodplains. Soil samples collected where fires had occurred showed a very low diversity of plants; the propagules were probably burned by the fire which burned the peat to a depth of 10–15 cm. The assessment of diversity in the two floodplains did not suggest any differences in levels of diversity. However, the floodplain in Xaxaba showed a gradient in aquatic plant diversity (*Simpson–Wiener diversity index*), increasing from less frequently flooded to more frequently flooded sections. This is mainly due to the stability of the frequently flooded sections in maintaining diverse aquatic plant communities (Naem *et al*. 1994; Heywood 1996; Tilman 1996).

The floodplain aquatic plant communities at these sites are characterised by *Cyperus articulatus* and *Schoenoplectus corymbosus*. These two sedges are dominant in the floodplains, with a coverage of about 50% per unit area.

The results suggest that submerged aquatic plants appear after a substantial rise in water levels in the floodplains, in this case after two

months of flooding. The drift samples show that some of the propagules are introduced to the floodplains system by water flow (dispersal), e.g. floating *Ludwigia* seedlings and *Utricularia*. These were most commonly trapped in drift nets. The semi-aquatic Poaceae seem to colonise the floodplains from underlying rhizomes; these include *Cynodon dactylon* and *Brachiaria erecta*. Poaceae appear in the early stage of flooding.

Further studies will focus on more quantitative data collection from the sites to assess the state of biodiversity from bank and drift propagules. These will include improvements in current experimental procedures (building a bird-proof greenhouse), as well as conducting plant ordination to establish the aquatic plant communities across the floodplains. Further emphasis will be placed on the spatio-temporal analysis of the communities as well as the role dry season fires play on the hydrology of the tributaries and consequently on the diversity within floodplains. ❑

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THE PAPER CHASE

by Hugh Glen, Christopher Willis and Janice Golding

The object of this column is to keep an eye open for literature that SABONET users may find useful. This will mostly be new publications, but may well include older information in answer to questions such as "what's the best key to …". It is neither possible nor desirable that the flow of such information should be one-way, from Pretoria outwards, so would readers please feel free to submit notes and useful information to the address at the end of this column. Full-length book reviews have been moved to their own column, as they seem to be flourishing.

The citation of an item here does not imply any guarantee of its contents or even its existence; very often the compiler has not seen the documents referred to.

The following theses have recently appeared in the Mary Gunn Library:-

Baijnath, H. 1977. *Taxonomic studies in the genus* Bulbine *Wolf, sensu lat*. D.Phil., Reading. (If I were Italian, I should mutter *Vecchia, ma ancora bella* [Old, but still beautiful].)

Wand, S.J.E. 1999. *Ecophysiological responses of* Themeda triandra *Forsk. and other southern African C_4 grass species to increases in atmospheric CO_2 concentrations*. Ph.D., University of Cape Town.

Recent new books include:-

Anon. 1997. *Southern African Environmental Directory*. Woodbay, Hout Bay.
ISBN 978-001027-6823. Paperback, pp.160, A4.
This is where one looks up the essential features

of any organisation involved with the environment in southern Africa. Almost certainly, each SABONET office will find it indispensable (but taxonomists like this contributor would probably make much less use of it).

Anon. 1999. *The Global Taxonomy Initiative*. American Museum of Natural History, New York. No ISBN. Paperback, pp. 18, A4.
At the opening of this particular millennium, productions like this pose a dilemma. On the one hand, the culture of instant gratification suggests that efforts like this one are a waste of time, since they bear no immediately visible fruit. On the other, logic suggests patience, as the only way political resistance to the idea of adequate funding for taxonomy can be worn down is by the attrition of many volumes such as this gathering dust in libraries used by politicians.

Ballance, A. & King, N. 1999. *State of the environment South Africa 1999 – an overview*. Department of Environmental Affairs and Tourism, Pretoria. ISBN 0-621-29435-1. Paperback, pp. 48, A4.
Sad to say, the design of this book is a triumph of art over practicality. They wanted to look Environmentally Friendly, and so printed on what looks like recycled newsprint. They wanted to print colour photographs, so they did. What a pity that it is simply not possible to print colour dots saturated enough to do justice to the original pictures on paper that rough. It makes the whole product look cheap and nasty.

Boulos, L. 1983. *Medicinal plants of North Africa*. Reference Publications, Alganac MI. ISBN 0-917256-16-6. Hardcover, pp. 286, quarto. Price US$ 39.95.
For each of 369 species one learns the areas where the plant grows (naturally or cultivated), the plant=s Arabic and English names – sometimes Berber and French as well, and uses and sources for more information. Almost a third (107) of the species treated are illustrated with a full-page line drawing. Not surprisingly, the largest family is Asteraceae, with Lamiaceae and Legumes (sens. lat.) close behind; these three families account for a quarter of the book. The other species are divided among 94 families. As Boulos points out, the area he covers has one of the longest continuous recorded histories of medicinal plant use anywhere else in the world.

Boulos, L. 1999. *Flora of Egypt* vol. 1 (Azollaceae to Oxalidaceae). Al Hadara, Cairo. ISBN 977-5429-14-5. Hardback, pp. 419, quarto.
Sub-saharan readers may wonder what the relevance of a basically Mediterranean flora is to SABONET. Answer: Surprisingly many taxa are found on both sides of the desert. This book covers less of the plant kingdom than us oldies might expect, as Boulos places the monocots at the end of the sequence. I look forward to the next two volumes. The misapprehension that Täckolm & Drar=s (1941–1969) flora was still being published in one-family fascicles led to some surprise at seeing the new, but most welcome, flora. The dust-jacket of Boulos=s flora is beautifully illustrated and so more informative than the cover of its predecessor, but I miss El-Hadidi=s visual pun (once he explained it to me). If one looks at a map of Egypt aligned with north to the right, the course of the Nile can be seen to trace out the Arabic word Amisr@, which is the name of the country in Arabic. The cover design of fascicles of the previous flora of Egypt was based on this.

Cronk, Q.C.B. & Fuller, J.L. 1995. *Plant Invaders: the threat to natural ecosystems*. Chapman & Hall, London. ISBN 0 412 48380 7. Paperback, pp. xiv + 241, small quarto. Price GBP 25.00.
What makes this book even more important to southern African readers is that several of the case studies involve plants that are problematic or worse here, and the reports include practical recommendations to combat the problems.

Du Puy, D., Cribb, P. Bosser, J. Hermans, J. & Hermans, C. 1999. *The Orchids of Madagascar*. Royal Botanic Gardens, Kew. ISBN 1 900347 70 9. Hardback, pp. 386, A4. Price GBP 49.50.
This is an annotated checklist in which we are given notes on protologue, typification, synonymy and as many as possible (one line each) of distribution, habitat, altitude, flowering time, life form, phytogeography, substrate (all

with references) and references to description and illustrations, for each species. Taxa are strictly in alphabetical order. Numerous species and their habitats are illustrated in 48 colour plates. Unusually, each item in the bibliography is annotated with virtually a highly abbreviated summary of its contents. In short, this is another example that should be added to the pot when a future ABlack Book@ for southern Africa is discussed.

Holdgate, M. 1999. *The Green Web: a union for world conservation*. Earthscan, London. ISBN 1 85383 595 1. Paperback, pp. 308, small quarto. Price GBP 17.50.
The title of this book led me to expect another volume of ecopolitics; in fact it is a history of IUCN, and distinguished from many if not most histories of worthy bodies by being readable. The author is well-placed for his task, as he was Director-General from 1988 to 1994. Most unusually for a book of this nature, hidden among all the pictures of pompous Worthies taking themselves Seriously is one of a person who is clearly smiling for some reason other than that he has been asked to Asay cheese@.

Jain, S.K. & DeFilipps, R.A. 1991. *Medicinal plants of India* (2 volumes). Reference Publications, Alganac MI. ISBN 0-917256-39-5. Hardback. Pp. 408 + 450, quarto. Price US$ 94.95.
Very much the twin of Boulos=s work on North Africa from the same stable, this work deals with 1844 species **C** no wonder it needs two volumes. The format is exactly the same as that of Boulos=s, but because India is the place it is, there are common names in more languages. The recorded history of Indian medicinal botany is almost as long as that of the subject in Egypt. Both books include species that extend into the SABONET area.

Linder, H.P. & Kurzweil, H. 1999. *Orchids of southern Africa.* Balkema, Rotterdam. ISBN 90 5410 445 7. Hardback, pp. xii + 492 + 92 pp colour plates. Price ZAR 600.00, Euro 90.00.
This is what an orchid volume of the *Flora of southern Africa* would look like if it had colour pictures. Everything one wants in a flora is here. One can only agree with Schmid=s review in *Taxon* 49: 138–139 (which see for more details) that A… this is a stupendous effort and a truly magnificent work that should endure for a good while@.

MacRae, C. 1999. *Life etched in stone: Fossils of South Africa.* Geological Society of South Africa, Johannesburg. Hardback ISBN 0-620-23388-5, paperback ISBN 0-620-23390-3. Pp. 305, A4. Price: ZAR 460.00 + R25.00 postage, packaging and insurance.
This is easily the most beautiful book to be published in South Africa in 1999. Stunning pictures, fascinating text and outstanding design make it a Amust-have@ (for both institutions and individuals, if only as an example of what a well-made book should look like), despite the price. Parenthetically, the price quoted is from the publisher=s information; an informant has seen it at ZAR550.00 in a bookshop in Pretoria.

Matthew, P. & Sivadasan, M. Eds. 1998. *Diversity and taxonomy of tropical flowering plants*. Mentor Books, Calicut. ISBN 81-900324-3-7. Hardback, pp. 330, quarto. Price: Rupees 900.00 or US$ 150.00.
The papers in this volume promise to be of vital interest to many readers. One hopes the binding (which looks like the work of novice apprentices) survives the heavy use the text deserves. Harriman, in his review in *Taxon* 48: 432**B**433 (1999), reports that foreigners would be advised to buy this book through the German agents rather than the Indian publisher; the agent=s price translates to about US$ 50.00, which is closer to (but still more than twice) the Indian internal price. Harriman says quite rightly that this festschrift has something for everyone: I shall benefit from Van der Maesen on wild plants as genetic resources for crop improvement and Nicolson on the Forsters (who, incidentally, visited the Cape in the eighteenth century, but did not write up all the specimens they collected there), while my Better Half gets the benefit of Cook on aquatic plants. There are ten other papers of equally high calibre.

Ohrnberger, D. 1999. *The bamboos of the world*. Elsevier, Amsterdam. ISBN 0-444-50020-0.

Hardback, pp. 585, quarto.
For each taxon, including cultivars, this volume gives nomenclature (including misapplied names), common names if any, very few diagnostic characters, all fitted into one line, distribution and horticultural notes (also one line each). Is this a model that PRE should consider when planning the next edition of the ›Black Book‹?

Polhill, R. & Wiens, D. 1998. *Mistletoes of Africa.* Royal Botanic Gardens, Kew.
ISBN 1 900347 56 3. Hardback, 370pp, A4.
Price GBP 70.00.
A good friend with an interest in parasitic plants once said that sportsmen get athlete's foot, but botanists get mistle-toes. That this might be a desirable condition is shown by the splendid pictures in this book, which is much more visually attractive than a traditionally produced flora, but not as beautiful as MacRae's fossils. Do the colour-coded margins only assist the user, or do they also cheapen the overall appearance? One suspects the latter. A mildly surprising feature, given recent Kew productions, is the absence of a searchable, full-text CD-ROM in the back. For another, fuller review, see SABONET News 4: 236–237.

Spencer, R. 1995. *Horticultural Flora of south-eastern Australia* vol. 1. UNSW Press, Sydney.
ISBN 0 86840 206 0. Hardback, pp. 358, quarto.
Price AU$ 79.95.
At last, a garden flora for the **top** half of the world! (Australians know that the custom of putting North at the top of a map is no more than a dull Eurocentric convention.) This volume treats ferns, fern-allies and gymnosperms, and I cannot wait to liberate it from the library. Equally, I am looking forward with great interest to the remaining three volumes. It will be good to be able to consult a garden flora that takes note of subtropical areas. One of the most striking differences between Roger Spencer's flora and the old standby *European Garden Flora* is that the new one has glossy coloured pictures of at least some of the plants it deals with. Wish we had an African equivalent.

Wood, J.R.I. 1997. *A handbook of the Yemen flora.* Royal Botanic Gardens, Kew.
ISBN 1 900347 31 8. Hardback, pp. 474, quarto.
Price: GBP 75.00.
A splendid gold-bordered picture set off against a black background on the front cover **C**there is no dustjacket **C** gives the tone for this book. Inside, one finds an account of the whole flora of North Yemen (but not South Yemen, which used to be called Aden when I was a lad). All the expected introductory etceteras of a well-brought-up flora (history, landscape, vegetation) are there. There are keys to genera within families, but all the fern and fern-allied genera share a common key. Where a genus warrants it, there is a key to the species. Each taxon has a brief description and supplementary notes on distribution and identification; where justified, these notes may be extensive **C** a case in point is the endlessly fascinating *Juniperus procera.* Reading Wood's notes on this tree at the northern end of its range, I could not help wondering whether the points he makes might not go far to explaining the solitary tree at Inyanga (Zimbabwe; the next individual is in Malawi), its southern limit. Maybe this thought belongs with the ideas for future research projects elsewhere in this number; if so, it would go some way to answering Wood's introductory comment on new floras being a brake rather than a spur to further exploration and discoveries. Sadly, there are no citations of protologues, types or voucher specimens here. With the solitary exception of this lacuna, one may with good reason misquote Gilbert and Sullivan to welcome this work as Athe very model of a modern major Flora@.

John Anderson bids us remind readers of the existence of

Anderson J.M. ed. 1999. *Towards Gondwana Alive*. NBI, Pretoria. ISBN 1-919795-43-X. Paperback, pp. 140, A4. Price ZAR 50.00.

Loads of gorgeous colour printed well on decent paper, illustrating numerous thought-provoking ideas. For more detail, see *SABONET News* 4: 220.

Janice Golding draws our attention to:

***Biodiversity and Conservation* 8** (1999)
◗ **Central European vascular plants requiring priority conservation measures—an analysis**

from national Red Lists and distribution maps (M. Schnittler & K.-F. Günther). Pages 891–925. Uses simple scoring methods (0, 1, 2Y) to set conservation priorities for threatened species (new IUCN categories) using data sets derived from national and global Red Data List assessments. The parameters used are threat status and 'conservation responsibility', the former determined from the world's proportion of a particular species represented in Central Europe. This paper emphasises that highly threatened species require the highest conservation priority, and the wide application of Red Data Lists.

◗ **Endangered stands of thuriferous juniper in the western Mediterranean basin: ecological status, conservation and management** (T. Gauquelin, Bertaudier, N. Montes, W. Badri. & J.-F. Asmode). Pages 1479–1498.

◗ ***Neosparton darwinii* (Verbenaceae), a restricted endemic species. Is it also endangered?** (S.M. Zalba & A.J. Nebbia) Pages 1585–1593.

***Biological Conservation* 89** (1999)

◗ **The treatment of uncertainty and the structure of the IUCN threatened species categories** (M. Colyvan, .A.Burgmann, C.R. Todd, H.R. Akçakaya & C. Boek). Pages 245–249. Points out common errors that assessors make owing to ambiguities and inconsistencies of the criteria associated with the new IUCN categories. It attempts to resolve this by introducing the notion of thresholds or minimum-maximum limits, using philosophies of logical reasoning and semantics.

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◗ **Economic science, endangered species, and biodiversity loss** (Erwin Bulte & G.C. van Kooten). Pages 113–119.

***Conservation Biology* (in press)**

◗ **Making consistent IUCN classifications under uncertainty** (H.R. Akçakaya, S. Ferson, M.A. Burgmann, D.A. Keith, G.M. Mace, & C.R. Todd). A response paper to Colyvan *et al*. (above) which states that uncertainty (with regards to data quality and people's attitude to uncertainty) is inherent in Red Listing and that consistent assessments are in fact possible without changing the underlying tenets of the new IUCN categories and criteria. The methodology is mathematical and applies fuzzy number logic and decision rules by characterising and categorising different kinds of uncertainty. This paper is the basis for the RAMAS Red List software, a package designed to aid Red Data List assessments. (See *Dealing with DDs* for more information on the software.)

Christopher Willis draws our attention to:

***Annals of the Missouri Botanical Garden* 86** (1999)

◗ **The long-proboscid fly pollination system in *Gladiolus* (Iridaceae)** (Peter Goldblatt and John C. Manning). Pages 758–774.

***Biodiversity and Conservation* 9** (2000)

◗ **Patterns of plant diversity in Africa south of the Sahara and their implications for conservation management** (Jon C. Lovett, Stephen Rudd, James Taplin and Christian Frimodt-Møller). Pages 37–46.

***Conservation Biology* 14(1)** February 2000

◗ **Choice of species-area function affects identification of hotspots** (Joseph A. Veech). Pages 140–147.

◗ **Identification of conservation-worthy areas in northern Zululand, South Africa** (Ant Maddock & Grant A. Benn). Pages155–166.

***Plant Systematics and Evolution* 218** (1999)

◗ **Pollination of seven *Plectranthus* spp. (*Lamiaceae*) in southern Natal, South Africa** (C.J. Potgieter, T.J. Edwards, R.M. Miller & J. Van Staden). Pages 99–112. This study on the pollination of seven species of varying corolla-tube lengths shows a correlation between floral tube length and proboscis length of insect visitors, many of which are recorded for the first time as pollinators of *Plectranthus*.

***South African Journal of Botany* 65(5&6)** December 1999

◗ **The responses of grass species to grazing intensity in the miombo woodlands of the Chibombo District of the Central Province, Zambia** (A.E. Cauldwell, U. Zieger, G.J.

Bredenkamp & J. du P. Bothma). Pages 310–314. "The greatest abundance of grass species in the Decreaser group, therefore, suggests that if an area of miombo woodland is to be managed to promote biodiversity, the grazing intensity must be light".

◗ **Systematic studies in subfamily Celastroideae (Celastraceae) in southern Africa: two new species of *Gymnosporia* from the Maputaland Centre of Endemism** (Marie Jordaan & A.E. van Wyk). Pages 315–320. *Gymnosporia arenicola* and *G. markwardii*, two new species, are described and illustrated.

◗ **Demand, propagation and seedling establishment of selected medicinal trees** (Thiambi R. Netshiluvhi). Pages 331–338.

◗ **The genus *Lessertia* DC. (FabaceaeCGalegeae) in KwaZulu-Natal (South Africa)** (M.-J. Balkwill & K. Balkwill). Pages 339–356.

◗ **Chromosome number and morphological variation in *Lachenalia bulbifera* (Hyacinthaceae)** (Riana Kleynhans & J.J. Spies). Pages 357–360.

◗ **Micropropagation of members of the Hyacinthaceae with medicinal and ornamental potential—A review** (S.A. McCartan & J. van Staden). Pages 361–369.

◗ **Studies in Cyperaceae in southern Africa 36: *Cyperus marginatus*, a complex of three entities** (J. Browning, K.D. Gordon-Gray & C.J. Ward). Pages 374–381.

◗ **The taxonomic position of *Pelargonium appendiculatum* (Geraniaceae)** (Elizabeth M. Marais). Pages 404–406.

◗ **The vegetation of old-fields in Transkei** (N.A.C. Smuts, G.J. Bredenkamp, L. Mucina & J.E. Granger). Pages 414–420.

◗ ***Lycium mascarenense* (Solanaceae), a new species from the Mascarene Islands, Madagascar and south-eastern Africa** (Andor M. Venter & A.J. Scott). Pages 428–430.

◗ **A new species of *Ornithogalum* subgenus *Urophyllon* (Hyacinthaceae) from central South Africa and southern Namibia** (Clare Archer & R.H. Archer). Pages 431–433.

◗ **Uses of *Colophospermum mopane* (Leguminosae: Caesalpinioideae) by the Vhavenda** (J. Madzibane & M.J. Potgieter). Pages 440–443.

***Taxon* 48** (November 1999)

◗ ***Neophoenix* (Pottiaceae), a new African moss genus found through soil diaspore bank analysis** (Richard H. Zander & Heinjo J. During). Pages 657–662. *Neophoenix matoposensis* is a newly described taxon obtained after forced growth from soil of experimental fire plots in southern Zimbabwe. The new genus "is appropriately named for the mythical bird that dies in fire and is reborn from ashes".

◗ **The International Organization for Succulent Plant Study (IOS): its role and potential services to the international scientific community** (G.F. Smith, H.-D. Ihlenfeldt, J. Thiede, U. Eggli & D. Metzing). Pages 715–720.

◗ **Four new genera of woody Apiaceae of Madagascar** (Ben-Erik Van Wyk, Patricia M. Tilney & Pieter J.D. Winter). Pages 737–745.

◗ **Should small herbaria have voting rights?** (Tarcisco S. Filgueiras, Gerrit Davidse, Joseph H. Kirkbride, Jr., Fernando Chiang, Ricardo Rueda, Fernando O. Zuloaga). Pages 767–770. ❑

Reference

Täckholm, V. & Drar, M. 1941–1969. *Flora of Egypt*. 4 volumes. Cairo University Press, Cairo.

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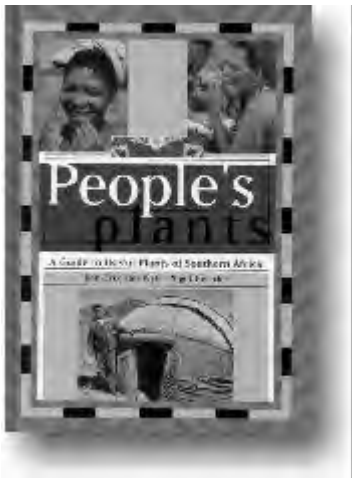
BOOK REVIEW



People's Plants. Van Wyk, B.-E. and Gericke, N. 2000. Briza Publications. ISBN 1 875093 19 2. English. 351 pp. Hard cover, 245 x 172 mm.

The "people's plants" are richly represented in southern Africa's flora, forming a colourful and essential component of our natural heritage. Ben-Erik van Wyk and Nigel Gericke have produced a wonderfully illustrated broad overview of the useful plants of the sub-region, and have rightly included exotic as well as indigenous species. Clearly these authors have sought to attract a wide readership ranging from ecotourists to academics, and in this they should be largely successful. Although a number of ethnobotanical volumes have appeared locally in recent years, these have typically focused on one or other sub-discipline (usually medicinal); none has dealt with such wide-ranging indigenous plant knowledge as **People's Plants**, or illustrated it so thoroughly. The information presented incorporates both historical accounts from the literature and previously unpublished field informant contributions. In so doing, the authors have broadly reviewed the major ethnobotanical taxa and contributed fresh information.

The twenty chapters fall within three main parts, each profiling plants linked to particular topics:

- Part 1 on *food and drinks* contains chapters on cereals, seeds and nuts, fruits and berries, vegetables, roots, bulbs and tubers, and beverages.
- Part 2 deals with *health and beauty* aspects, and covers general medicines, tonic plants, mind and mood plants, women's health, wounds, burns and skin conditions, dental care, perfumes and repellents, and soaps and cosmetics.
- Part 3 on *skills and crafts* comprises chapters on hunting and fishing, dyes and tans, utility timbers, fire-making and firewood, basketry, weaving and ropes, and thatching, mats and brooms.

Each chapter has a general introduction to the species, listed alphabetically according to their botanical names. Plant families and common names are also given. The text accompanying each profile makes for easy and informative reading. With some plants falling into more than one category, and certain categories overlapping (e.g. beverages and tonic plants), cross-referencing has been necessary and has been suitably accomplished.

Given that over 650 taxa are covered and often illustrated (every second page is a photograph or plate) in just 351 pages, the information provided is necessarily brief. This simply serves to whet the reader's appetite! However, the text will still admirably fulfil two of the authors' stated intentions, "to raise awareness of the role plants play in people's daily lives", and "to stimulate ongoing scientific documentation of indigenous knowledge". Notably, greater coverage is provided for those plants that are especially valued culturally (e.g. marula, p. 114), those in vogue (e.g. *Hypoxis*, p. 146), and those with potential for new product development and associated community development (e.g. *Harpagophytum*, p. 146 and *Sceletium*, p. 172). This emphasis is to be welcomed.

Personal communications are acknowledged in the text, as are some of the literature references cited at the end of the chapter. It is unfortunate though that a more thorough referencing system has not been adopted for **People's Plants**, as the text is currently of limited use to researchers seeking the original published sources. In the

case of some species such as *Pancratium tenuifolium* (p. 170), information on plant constituents and pharmacology is provided, but no sources are listed in the text and no obvious reference is to be found in the chapter's tail-end section on references and further reading. One is left wondering whether such information is being presented for the first time.

A staggering range of useful plant categories and species has been covered by this volume, resulting in a book that will be of interest to everyone from interested layfolk to natural products chemists. **People's Plants** makes for an intriguing browse as well as serving as a useful reference volume. The layout is well presented, and it is illustrated with a superb selection of some 530 glossy photographs, which have been beautifully reproduced. This fine book is to be recommended for life and social science libraries, as well as the shelves of all those interested in the "people's plants" of southern Africa.❑

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PLEASE NOTE that this list gets updated every issue of our newsletter. In order to avoid frustration and possible disappointment, our readers are advised to please use the most recent list available. Some of the addresses listed in previous editions of the newsletter may no longer be relevant.

SPECIAL APPEAL: Should you be aware of any changes to one or more of the addresses listed below, or would like to be added to the list, please notify ***Christopher Willis***, at ***ckw@nbipre.nbi.ac.za*** so that the list can be updated on a regular basis.

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NOTE: Additional South African botanists' e-mail addresses can be accessed on the internet at the following address: http://www.ru.ac.za/departments/herbarium/SAHWG/address.html

The web page entitled "Southern African Botanists' addresses" was prepared by Peter Phillipson, Rhodes University and the Selmar Schonland Herbarium, Grahamstown, with thanks to Nigel Barker and Les Powrie.

SWAZILAND

National Herbarium (SDNH)
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This address can be used to contact Gideon Dlamini, Titus Dlamini or Bongani Dlamini at the National Herbarium. ***Insert the name of the person in the subject line.***

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Botanists working on southern African plant taxa

This section lists e-mail addresses of a few of the botanists living outside southern Africa that are working with southern African plant taxa. If you would like to be included in this list, please notify one of the editors together with the names of the families/taxa you are working on.

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Queensland Herbarium, Toowong, Queensland
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Ms Yvette Harvey - y.harvey@rbgkew.org.uk (Capparaceae; Lamiaceae; Sapotaceae)
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Prof. Dr LJG van der Maesen - jos.vandermaesen@algem.pt.wau.nl (Fabaceae; Mesembryanthemaceae)
Dr Ir Jan J Wieringa - Herbarium Vadense (WAG) - Jan.Wieringa@algem.pt.wau.nl (Fabaceae (Leguminosae): *Aphanocalyx*, *Bikinia*, *Icuria*, *Monopetalanthus* and *Tetraberlinia*)

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Uppsala University
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Mr Mattias Iwarsson - mattias.iwarsson@botan.uu.se (Lamiaceae: *Leonotis*)

SWITZERLAND

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University of Missouri-Columbia - Dunn-Palmer Herbarium (UMO)
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WALES

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Last updated 26 April 2000 ❑

Regional News Update

News from Angola

What's happening in mopane and miombo vegetation in Lubango and Namibe

The rich biodiversity of Angola is well-known—we have edible plants, timbers, craft plants, medicinal plants, and many others. But every day, we witness the indiscriminate destruction of our forests for use as medicines, wood and charcoal (Photo 1).

This situation is due to the movement of people into previously protected areas. High population densities have exerted a considerable impact on the region's vegetation. To survive, the local population chops down all the important trees that

▲ *Photo 1. The end of the acacias, Munhengo (Namibe). (Photo: Luanda Herbarium, Angola)*

▲ *Photo 2. Destruction of* Colophospermum mopane, *Munhengo (Namibe). (Photo: Luanda Herbarium, Angola)*

▲ *Photo 3. Miombo deforestation, Namphanda (Lubango). (Photo: Luanda Herbarium, Angola)*

grow in the areas surrounding their homes. The wood is used as fuel and for producing charcoal, as well as for building material.

The surrounding ecosystems are inadequately protected against such activities, for example, *Colophospermum mopane* is becoming threatened. Trees are often cut before they reach adult age (Photo 2). The situation is the same in miombo vegetation. Many of the important genera, such as *Brachystegia*, *Julbernardia* and *Isoberlinia*, are disappearing (Photo 3).

We are very worried about the degradation of our forests: mutual efforts to stop the deforestation and delay the erosion are urgently needed. ❑

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News from Lesotho

National Botanical Collecting Expedition to Ha Mohale, 17–22 January 2000

Introduction

There were nine participants in this collecting trip: three members of the National Working Group (Mr M. Polaki, Ms Mohloboli and Ms Kose), the four SABONET-Lesotho members and Mr Mahlelebe from the LHDA.

The aim of the trip was to collect plant specimens (both herbarium and living specimens), especially rare ones, from the Grid 2829 AC (Ha Mohale area). This is not a well-collected area and will be affected by the construction of the Mohale Dam.

Mr Thulo Qhotsokoane, the National SABONET-Lesotho Coordinator, organised transportation

through the National Environment Secretariat (NES). Mr Mahlelebe also assisted with transportation.

Places where collections were made

Ha Koporale (17/01/2000, morning) In the grassland biome. *Chrysochoma* sp. indicates overgrazing. Collecting was done on the west-facing mountain slope; this is a moderately wet/damp area. Substrate is loamy soil with some rocky areas. There was also a presence of *Berkheya* sp., which we are monitoring. About 40 specimens were collected in this area.

Molikaliko Valley (17/01/00, afternoon) Collecting took place in one of the wetlands that will be flooded by the Mohale Dam. Aquatic plants like *Mentha* sp. (Koena) and many other species dominate this area. There was no presence of *Berkheya* sp. Six different species were collected.

Ha Mohlabane (18/01/00) This is above Likalaneng and the Senqunyane valley in the grassland biome with a few patches of shrubs. Collecting was done on the southeast-facing slope. Due to the steepness of the slope, grazing seemed moderate. Substrate was moist/damp loam soil. Grasses and some perennial herbs dominated. There was no trace of *Berkheya* sp.here. About 60 specimens were collected in this area.

Ha Liau (19/01/00) Above the Senqunyane Bridge in the grassland biome. Collecting was done on the northwest- facing slope. Substrate was moist/damp loam soil. This looked like a moderately grazed area, dominated by *Themeda* sp. There were traces of *Berkheya* sp. About 40 specimens were collected here.

Likalaneng Plateau (20/01/00) In Thaba-Putsoa, above Ha Mofa and Litsaneng in the grassland biome. Collecting was done on the west-facing slope. Substrate is loamy soil, which is well moist/damp. This was a recently burned area with a low biodiversity. About 50 specimens were collected.

Molimo Nthuse Valley (21/01/00) Near Molimo Nthuse Lodge. Collecting took place in the valley facing west. Dominated by shrubs and a few grass patches. Substrate is loamy soil, which is moist/damp. High biodiversity; there was no trace of *Berkheya* sp. About 50 specimens were collected.

Conclusion

About 400 herbarium specimens and many living specimens were collected during this trip. The living specimens were planted at the National University of Lesotho (NUL) Botanical Garden (this included rare plants such as *Eucomis autumnalis, Boophane disticha, Gladiolus* sp., *Cotyledon orbiculata* and many more). Due to the high humidity of the area some specimens were damaged by fungi and we were left with about 300 herbarium specimens of which about 60% are of a high quality. As this was the first national botanical collecting trip in Lesotho, I personally think it was a success. ❑

Motebang Molise
Roma Herbarium
National University of Lesotho

News from Namibia

We are sure that all Gillian Maggs-Kölling's friends will be happy to hear that she had a healthy baby boy on March 16 and they are both well. Also in the nature of a birth, we are pleased to announce that our National Botanic Garden, which lies directly below the institute, is to be officially opened by the Minister of Agriculture, Water and Rural Development on April 19 this year. Henk Dauth is hard at work planting in the desert house. The gardens look very lush, as Windhoek has had a couple of wonderful downpours.

The cyclone that brought such misery to Mozambique and the northeast of South Africa this season, brought welcome rains to parts of Namibia. The south in particular received quite good downpours, although coverage was patchy. Several collecting trips are planned for the south,

including the Diamond Area over the next six months. The rains would also have made collecting in the northeast a valuable exercise, but the problems on our border have made it inadvisable to work in the area.

WIND has had a good period for data capture again, although we are facing a backlog of German-English label translations. This is holding up our progress, because we can't have half the herbarium in boxes waiting for translation. This year will be a difficult one, as we have one staff member away doing Honours, two upgrading their qualifications part-time, one resignation and one with a new baby. Scary stuff.

At last our new SABONET vehicle is back from Plant and Fleet, where we had our additional equipment added. In general we need long-range fuel tanks, a roofrack, an additional water tank and a second spare wheel. The maiden voyage will be undertaken from 23 to 29 March to the southwest, just east of the Diamond area, to collect mesembs as well as seed for the genebank. We will let you know how it went in the next news update. The last time we went south, we were turned back by several rivers in flood and there has been more rain since, so we are expecting to have an adventurous trip!

Regards to all once again, and thank you to SABONET for the vehicle. ❑

News from South Africa

Chironia collecting trips

The genus *Chironia* L. (Gentianaceae) was named after Chiron, the Greek centaur, who was the legendary father of medicine and also studied astronomy, music and art. This is a genus of moisture-loving plants with pinkish-mauve flowers. *Chironia* plants are suffrutescent or herbaceous, annual or perennial, erect or straggling. The leaves are opposite and sometimes in a basal rosette. Flowers are in a lax cyme or occasionally solitary. The anthers are sometimes spirally twisted, while the fruit may be capsules or berry-like.

Over the past few months, I have had the privilege of really 'getting my hands dirty'. Studying part-time for a Masters degree on the taxonomy of *Chironia* L. in southern Africa, has afforded me the opportunity of FIELDWORK! I have visited *Chironia* sites from Langebaan on the West Coast to Kosi Bay on the East Coast as well high up on the Amatola Mountains.

Water-loving *Chironia* is found in marshy, vlei-type areas. It was most disturbing to observe the amount of disturbance that these habitats have had to endure. The sad result is that these sensitive plants appear to be losing their niche. This does not mean that I did not find any. Those species that I did stumble upon were spread out in the most magnificent sheets of pink. These plants thrive in their tiny bit of unspoiled space.

No field trip is possible without the help of people who live, work and play in the area. I would like to take this opportunity to thank the staff at the Compton Herbarium for all their assistance while I visited the herbarium. Thanks also to Dr Dee Snyman for pointing me in the right directions. Many thanks are also due to Elise Cloete for taking the time to escort me to various *Chironia* sites in the eastern Cape. Rhoda and Cameron MacMaster of Stutterheim still send me *Chironia* specimens. I have also learnt a lot while tagging along on *Hypoxis* trips with Yashica Singh. Here is a selection of pictures, guaranteed to educate and entertain!

• ***Continued on page 70***

▲ C. krebsii *on top of the Amatola Mountains. (Photo: Nikaya Arumugam)*

▸ ***Continued from page 69***

References and further reading

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Pooley, E. *1998.* A field guide to wild flowers—KwaZulu-Natal and the eastern region. *Natal Flora Publications Trust, Durban.*

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• ***Continued on page 72***

▲ C. palustris *subsp.* palustris *(left) and* C. peduncularis *(right) at East London. (Photo: Nikaya Arumugam)*

▲ Hypoxis *hunter, Yashica Singh, gets hooked onto a fence in her haste to get to her plant and is rescued by Syd Ramdhani (Stutterheim).(Photo: Nikaya Arumugam)*

▲ C. linoides *subsp*. linoides *in a marsh behind the fourth dune at Betty's Bay. (Photo: Nikaya Arumugam)*

▲ *The beautiful star-shaped flower of the Christmas berry,* C. baccifera *(left) and its breath-taking habitat (right), at the Robberg Nature Reserve in Plettenberg Bay. (Photo: Nikaya Arumugam)*

▲ *A parting shot of Mapelane, with some of the tallest forested dunes in the world.(Photo: Nikaya Arumugam)*

▲ *Taking a break at the Strandloper Cave are (from left to right) Syd Ramdhani, Alice Bosa and Elise Cloete (left). Stunning waterfalls at the Mkambati River Mouth (right). (Photo: Nikaya Arumugam)*

▸ ***Continued from page 70***

News from Zimbabwe

Postgraduates return

We are happy to have three of our officers back after thirteen months of absence. Soul Shava was studying for a Masters in Environmental Education at Rhodes University. Claid Mujaju and Ezekeil Kwembeya were at the University of Cape Town reading for a Masters in Systematics and Biodiversity Sciences. Their return brings great relief to Nobanda who has quickly unloaded the responsibilities of Education, Herbarium, and Garden Curation onto the trio.

Thank you to the sponsors—WWF and SABONET.

National Botanic Garden Entrance Fees

As promised in the last edition of SABONET News, we are now in a position to give you more details about the entrance fees for the National Botanic Garden. Parking fees commenced on 4 January 2000, whereas the entrance fees are with effect from 1 April 2000.

Category	Single Entry	Annual Ticket
Parking (car + driver)	$10	$500
Adult	$5	$350
Children	$2	$250
Dogs	$2	$100
Organised school groups	FREE	

Nozipo Nobanda
National Coordinator, SABONET-Zimbabwe

Each edition of *SABONET News* is the result of a team effort, and the editors would like to sincerely thank the following people and organisations that have contributed to, and helped in preparing, the 12th issue of *SABONET News*:

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Gideon Smith
Pieter Winter
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In the August 2000 edition of *SABONET News*...

- Profile: Titus Dlamini (Swaziland)
- COPV, Nairobi, Kenya
- International Botanic Gardens Congress, Asheville, North Carolina, USA
- SABONET's Postgraduate Students
- Computerisation of southern African herbaria
- *SABONET Report Series*
- The Paper Chase
- Regional News Update

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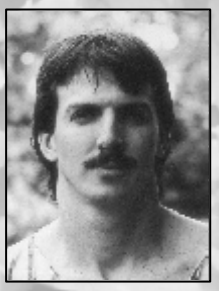

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