The rare burrowing skink (Sephina alberti) is endemic to the northern Kunene Region.

**Taxonomy, systematics, biogeography and conservation status**

*Taxonomy* is the science of naming different species, systematics elucidates the evolutionary relationships and affinities between species, and *biogeography* is the study of the geographic distribution of those species. Although these closely related subjects are often considered to be "pure science", that is of academic value with no immediate useful function, these disciplines are critical for the informed development of effective biodiversity management plans.

A national long-term goal, for instance, is to define the conservation status of each Namibian species. The first information needed is "which species is this?" (*taxonomy*), and the second is, "how different is it to related species?" (*systematics*). The next bit of required information is "where does this species occur and why?" (*biogeography*). Finally, traditional conservation biology supplies the answer to questions such as "what is the population trend of this species?" Answers to these questions provide the basis for describing conservation status.

**What is this thing called BIODIVERSITY?**

*By Mike Goeth and Phoebe Barnard*

The term biodiversity, short for biological diversity, was coined in the late 1970s and at that time was roughly synonymous with "number of species". The term came into increasingly common use in the 1980s, and today covers such a wide range of topics as to be practically meaningless. Wildlife conservation, preservation, wildlife management, conservation biology, sustainable utilisation, genetic resources and rural community empowerment are just a few of the major topics covered under the umbrella of "biodiversity".

Strictly speaking, biodiversity refers to the sum total of variation of all animal and plant life, from ecosystem variation all the way down the hierarchical ladder to individual genetic variation. With one contemporary view that ecosystems are themselves functioning organisms (made up of "colonies" of species), they can also be regarded as living entities. The Gaia theory takes this train of thought to its logical conclusion: that planet Earth herself can be regarded as a single but very complex living organism which depends on the healthy functioning of all her various components to continue existing.

At first glance, the focus on genetic variation may seem to be just the latest trend in popular science, but it is in fact a conceptualisation of what scientists and conservationists have known for a long time: that the more evolutionary options (genetic variation) at your disposal, the more likely your chances of surviving major events. As the realisation dawned that it was to man’s future benefit to ensure the survival of the greatest number of evolutionary options, it also became apparent that significant numbers of species were being driven to extinction, primarily by mankind’s activities. This trend was most apparent with the systematic destruction of the world’s tropical rain forests: a classical case of short-term benefits winning out over future options.

These concerns came to a head in 1992 when the international community was presented with the Convention on Biological Diversity at the Earth Summit in Rio de Janeiro. President Sam Nujoma, along with 160 other heads of state, signed this treaty at the historic conference. The timing of these events has particular relevance to Namibia, as she had in February 1990 adopted the post-colonial national Constitution at the start of the upsurge in global environmental matters. Namibia at Rio could present one of the most environmentally progressive national Constitutions in the world.

Namibia had been following progressive programmes in biodiversity conservation since the establishment of the first reserves in 1907, and the systematic collecting of museum specimens in the mid-1800s. Our accumulating knowledge of Namibian frogs, for instance, illustrates this trend: two
species were recorded for the territory in 1886, three by 1894 and six by 1910. A total of ten species were listed in 1934 and a major checklist published in 1955 listed 24 species. The total rose to 31 by 1971 and the latest account lists 45 known species in Namibia. We predict the final diversity of Namibian frogs will be around 60 species.

The Convention, also called the Biodiversity Treaty, is comprised of 41 articles. The guiding principles are that each country has the sovereign right to exploit its own resources, and that activities within one country should not damage the environment of another. In this regard, conservation measures are set out, and access to genetic resources is regulated, as is technology transfer, biotechnology, biosafety, and intellectual property rights. Strong emphasis is placed on promoting the sustainable use of biodiversity, and assuring the equitable distribution of benefits.

The Convention, though, helps one to focus on critical issues and to set national priorities and long-term goals. These should be implemented with the understanding that if every country looks after its own biodiversity, global concerns will be eliminated. So, although all the issues addressed in the Convention are not necessarily relevant to Namibia, the Convention presents a reasonable overview of most of the issues with which Namibians should be concerned. Therefore, by implementing the Convention, Namibia will go a long way towards satisfying its own national requirements.

A National Biodiversity Task Force was established in 1994 to oversee the production of a biodiversity country study. This is meant to be a state-of-the-art description of what is already known (biodiversity in the term’s broadest sense) about Namibia.

A Ministry of Environment and Tourism Committee provides input into the task force. This committee also solicits input from other major players such as the Ministries of Fisheries and Marine Resources; Agriculture, Water and Rural Development; Education and Culture; the University of Namibia, and NGOs such as the Desert Ecological Research Unit of Namibia (DERUN).

To the layman, all this sound like severe bureaucratic proliferation. This is true, but for good reason: the effective implementation of the Biodiversity Convention requires the dedicated input from all spheres of Namibian society and thus requires a consultative approach.

The present task force is a hodgepodge of interested scientists from different sectors who represent a broad range of disciplines: economists, sociologists and ecologists, with a particular emphasis on taxonomists and biogeographers. Namibia is fortunate in having a fair share of these taxonomists and biogeographers, as all strategies and management plans are ultimately based on the specific knowledge provided by these specialist scientists.
Namibian biodiversity inventory

An estimate 185 000 species of plants, animals and other living organisms occur in Namibia. This figure is by no means accurate, and in many groups, only a small proportion have actually been documented. Estimates are extrapolated by specialist scientists (taxonomists), the process being essentially one of comparing the known quantity of diversity versus the rate at which new species are discovered. Birds and mammals are relatively well-known, although new species regularly crop up. Invertebrates are particularly poorly known, perhaps 5 percent of Namibian species having been documented.

1. Little Bee-Eater
2. Dwarf chameleon (Bradydion pumilum)
3. The White Lady spider (Leuchochestris spp.) is restricted to the Namib Desert
4. Lithops ruschiorum is a succulent plant endemic to the Namib.
5. Tree frog in Caprivi (Leptopelis bocagei)
The global situation, however, is in fact just the opposite. A huge inverted pyramid of politicians, bureaucrats, managers, programmes, agencies, institutions and consultancies is dependent on a dwindling population of these basic data collectors. In fact, the International Union of Biological Systematics recently proclaimed the taxonomist an endangered species. The mean age of a taxonomist today is 48 years, and although they are generally tough and long-lived, they are retiring at a great rate, and students are discouraged from entering the field because of poor funding and misunderstanding of the field's critical role.

The problem seems to be that society at large has until recently not adequately valued the fundamental "building-block" information that taxonomists and biogeographers provide.

The public concept of biodiversity is usually associated with species richness, i.e. how many types of trees and ferns occur in a forest, or fishes and terrapins in a river. The process of compiling these data is called inventory. The layman can certainly appreciate that the difference between a community of 20 species of birds in a semi-arid woodland and a riverine forest with 200 species is one of complexity, so species inventories are necessary for the effective description of any area.

The least known of Namibian and global ecosystems is the marine. Habitat-wise, the marine system contains an estimated 400 times the volume of terrestrial habitat. In addition, scientists, being terrestrial mammals themselves, have neglected aquatic environments, which further spreads the relative information gap. Conversely, some groups of plants and animals are far better known than others, also for practical reasons: trees are better known than insects because there are fewer species of trees, they are more widely valued in the human economy, they are more visible, and more easily collected and classified.

From a global perspective, Namibia is in a very good position regarding our available information base. This enviable position can be credited to past institutional support for the need of systematic biodiversity inventories. These institutions include the National Museum of Namibia, the National Botanical Research Institute and the Ministry of Environment and Tourism, and their predecessors.

**Aethomys namaquensis is common in Namibia.**

**MIKE GRIFFIN**

*The authors: Born in the USA, Mike Griffin settled in Namibia in 1975 when he joined the State Museum as a mammal curator. He has worked for the Ministry of Environment and Tourism since 1977, and is now employed as a "Small animal biologist". Mike's current activities include the compilation of Red Data Books on Mammals, Reptiles, and Amphibians. His research specialities are lizards, rodents and bats (which are also his hobbies).*

**PHOEBE BARNARD**

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