

Book Review

Biodiversity in Southern Africa. Volume 1: Patterns at Local Scale – the BIOTA Observatories

N. Jürgens, D. H. Haarmeyer, J. Luther-Mosebach, J. Dengler, M. Finckh & U. Schmiedel (eds). Klaus Hess Publishers, Göttingen and Windhoek, 2010. xx + 801 pp. Price €75.00 (For all three volumes. Sold as a set only). ISBN 9783933117441 (Volumes 1, 2 and 3, hardback).

BIOTA AFRICA is an ambitious, long-term environmental monitoring program. Jürgens *et al.* (2012) state, ‘The basic aims of the project were to provide scientifically sound data on biodiversity, its environmental driving factors, and its changes in time for selected observation sites representing major biomes and ecosystems of the African continent.’ The reasons for establishing BIOTA were to provide, in the African context (from <http://www.biota-africa.org>), scientific support for sustainable use and conservation of biodiversity, a continental observation network, contributing to GEOSS (Global Earth Observation System of Systems), a network for observing land degradation and for developing measures to combat desertification, and a network for capacity development and rural development. BIOTA Southern Africa is the largest project within the broader BIOTA AFRICA framework, the others being the tropical Biota West Africa and BIOTA East Africa, and the Mediterranean BIOTA Maroc (Morocco).

There are 37 BIOTA Biodiversity Observatories in southern Africa, mostly following a north–south gradient in Namibia and the west coast (Cape) region of the Republic of South Africa, between latitudes 18° and 34°S. Six biomes are covered, loosely from north to south (with the number of observatories): Woodland Savanna (5); Thornbush Savanna (7); Namib Desert (4); Nama Karoo (7); Succulent Karoo (9); and Fynbos (5). The last two biomes are southern winter-rainfall dominated regions. Mean annual rainfall and season of rainfall dominance largely define the biomes of south-west Africa, with the highest rainfall in the north-east, e.g. Okavango Province of Namibia, and interior regions generally, declining to the west, coastally, e.g. the Namib Desert. One observatory, Alpha, near the borders of South Africa, Namibia and Botswana, encompasses the classic parallel sandridges of the Kalahari Desert, within the Thornbush Savanna biome. Most (26) observatories were established in 2001, eight in 2004 (forming an east–west transect across central Namibia), and the last three later again and for

which few observations were presented in Volume 1 reviewed here.

Despite the overall transect nature of the design of the BIOTA project, 16 observatories are actually contiguous (or closely adjacent) paired sites, most of which were established to compare contrasting grazing regimes and histories; one pair in the Fynbos has contrasting geology, while a pair in north-eastern Namibia in Woodland Savanna include fire and grazing in the paired contrasts. A strength of the project is the conformity obtained in site layout and sampling design: one square kilometre, consisting of 100 row/column-labelled one-hectare grid squares, with one half of each one-hectare square free of survey disturbance (apart from visitation to regularly monitor fixed vegetation plots); rigorous and consistent, systematic approach to data gathering in the fields of remote sensing, weather and climate, soils, biological soil crusts, lichens, vascular plants, and four groups of invertebrates (termites, true bugs, butterflies and moths, and millipedes – not necessarily surveyed at all observatories). While selection of insect groups may have partly reflected available taxonomic expertise (and tractability), it is surprising ants were not included. Vertebrates and human land-use were not investigated comprehensively. Admirable conformity was also achieved in the analysis and presentation of systematically gathered datasets for each observatory (the bulk of Volume 1, covering results from 2001 to 2009), and the 60 pages devoted to methods provide sufficient detail to enable the reader to understand clearly the procedures followed and their justification. An appropriate balance between the use of remote sensing of abiotic variables and actual biological survey seems to have been struck, and while most biotic groups were only surveyed once or twice an effort was made to monitor vegetation plots annually at many observatories. Reasons were not given for the absence of information on particular biotic groups or lack of annual vegetation monitoring, but missing data elements are an unfortunate shortcoming.

A second strength of the project has been the incorporation of numerous academic and student research activities around the observatories, and the final section in each observatory account describes site-specific and broader studies that included data gathered at the observatory (usually as part of a larger sample of focussed observations in the surrounding region); many of these studies have been published in the scientific literature. The strong international contribution, particularly from

Germany, in providing funding and scientific leadership to the BIOTA program, is no doubt partly responsible for this outcome, but equally pleasing is the strong local involvement by African universities and local communities in academic research and observatory monitoring (e.g. use of local ‘para-ecologists’).

One would hope that authorities seeking to establish new long-term ecological monitoring networks at the (sub-) continental scale would carefully examine the BIOTA model and its documentation, including this massive three-volume work. In the Australian context (TERN: <http://www.tern.org.au>), one hopes that the plants and critters, central to ecosystems, are

given as much emphasis as high-tech scanners and ‘flux’ measurers!

JULIAN R.W. REID

*The Fenner School of Environment and Society,
Australian National University
Canberra, Australian Capital Territory, Australia
Email: julian.reid@anu.edu.au*

REFERENCE

- Jürgens N., Schmiedel U., Haarmeyer D. H. *et al.* (2012) The BIOTA Biodiversity Observatories in Africa – a standardized framework for large-scale environmental monitoring. *Environ. Monit. Assess.* **184**, 655–78.