Book Reviews

The Springbok *Antidorcas marsupialis* (Zimmerman, 1780)

J.D. Skinner and G.N. Louw

Transvaal Museum Monograph No. 10, 1996
49 pp.
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Few, if any, scientists would be more eligible to write a monograph on the springbok than John Skinner and Gideon Louw. Both have researched this species extensively and also have wide experience of other ungulate species to place the information in context.

Why a book on the springbok? Africa has a spectacular variety of antelope species, but few are adapted to the semi-arid and arid plains. The springbok is one of the best examples of an African antelope adapted to such conditions and has, therefore, been of great academic interest. Skinner and Louw believe that the springbok will also be of increasing economic and recreational importance in the near future. This species is very suitable for game ranching and as R.R. Hofman states in the foreword, 'conservation through utilization must become the guiding principle for the lasting protection of Africa's spectactularly rich wildlife'.

The first chapter deals with prehistory and historical background. The abundance, distribution and migrations of the springbok are discussed. Chapter 2 examines morphology and includes information on the skeleton, digestive system, pelage, kidneys and reproductive organs. In Chapter 3, which deals with ecology and physiology, the authors show that the springbok can compensate for poor nutritional conditions by both selective and opportunistic feeding. The animals can also respond swiftly to unpredictable favourable conditions by reproducing rapidly. Thermoregulation and water requirements are also considered in this chapter. Chapter 4 deals with behaviour, of which sexual behaviour is covered most thoroughly. In Chapter 5 the authors discuss game ranching. Practical aspects such as stocking, meat production, cropping rate and capture are considered. Chapter 6 is the conclusion and the authors ruminate on the available knowledge and the shortcomings. They conclude that 'the literature on springbok biology is, with notable exceptions, rather fragmented and inclined to be superficial'. Nevertheless, they are still able to give a composite picture of the adaptive biology of the springbok, in spite of these shortcomings.

This book is a slim, hard-back edition with numerous graphs, drawings and tables to illustrate the text. The authors not only summarize most of what has been published on the springbok, but also present it as a cohesive whole and make valuable suggestions for future research. I thoroughly enjoyed reading this book and can recommend it to any biologically trained scientist.

One point of criticism, however: I found descriptions/discussions on research results sometimes too brief, and would have liked more information. The scope of possible readers could have been widened by a more comprehensive treatise.

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Ecomorphology of fishes

Luczkovich, J.J., Motta, P.J., Norton, S.F. & Liem, K.F. (Editors)

Dordrecht: Kluwer, 1995
312 pp.
ISBN 0 7923 3744 1

Packaged in this volume are 13 papers originally presented at a Symposium on the Ecomorphology of Fishes held during the 1992 Annual Meeting of the Americal Society of Ichthyologists and Herpetologists in Urbana-Champaign, Illinois (Anon, 1992). They are supplemented by an Introduction, a review of the development of the Russian school of ecomorphology which provides an excellent bibliography, two unsolicited papers submitted to the journal *Environmental Biology of Fishes* in the normal course of events, and a Summary and Index. The inclusion of a Prelude appears superfluous, since the points addressed here are all covered in other sections of the package. I found their analogy (page 7) that 'science progresses like a spiral along the axis of time, sometimes revisiting earlier ideas at other times and locations' difficult to conceptualize. The fugue model of Hofstadter (1980) may better describe the return to original ideas and concepts, but at a higher level of understanding. It should be noted that some of the other papers presented during the symposium have found their published expression elsewhere, for example Gallis (1993).

The 'wrapping' to the package is more difficult to unravel. Readers wishing to quote these papers may be somewhat perplexed: the reverse fly-leaf states that the publication is Part 16 of the series Developments in Environmental Biology of Fishes, edited by Eugene K. Balon; the title page states that the papers are reprinted from the *Environmental Biology of Fishes* 44 (1–3) with addition of a species and subject index, the volume being edited by Luczkovich, Motta, Norton & Liem; while the consecutive nature of pagination (beginning at the fly-leaf title) suggests that the contributions are the *de facto* papers. From the lists of references given within the volume, it would seem that the authors themselves hold to this last view.

Liem (1991: 763) states that ecomorphology 'interprets organic design in the context of the behavioural strategies of the organism in nature' and that 'ecomorphologists try to quantify the performance of a particular design of an organism using behavioural, ecological, biomechanical and functional morphological approaches'. In this volume, design performance is documented with respect to resource and niche partioning, community structuring, and the degree to which evolutionary pressures have produced convergent or divergent morphologies in bony fishes. In the Introduction and in terms of process, Motta, Norton and Luczkovick iden-

tify the correlation of an organism's form with particular features of its ecology as the starting point for ecomorphological studies. A functional analysis follows, providing the causal mechanism for the correlation. This then allows a prediction of the role or morphology in assessing the potential niche (and with it ecological constraints of the realized niche). The incorporation of phylogenetic components may then be used to examine convergence, divergence and parallelism, and to describe adaptive character complexes.

Adhering to these principles and processes, the papers in this volume address the relationships of ecomorphology to foraging, respiration, locomotion, sensory functions, reproduction, and phylogeny and evolution. The volume covers an enormous amount of scientific ground. The papers may not be relaxed bedtime reading, but there is a great wealth of information and food-for-thought to be gleaned from their pages. Some points serve as illustration:

Motta, Clifton, Hernandez and Eggold employ multivariate statistical techniques, including principal components analysis, canonical correspondence analysis and clustering, to examine the correlation between diet and microhabitat utilization in ten species of seagrass fishes. Despite the fact that the inclusion of coded morphometric variables simplifies interpretation of the 3-D PCA plots, the groupings are obtained on the basis of equal weighting of the characters, and are difficult to compare with those formed by cluster analysis with the Bray-Curtis index (untransformed mean values for each species). In summary, the authors find that morphology is generally a poor predictor of diet, except for a group of mid-water planktotrophic filter feeders (*Harengula jagtuana*, *Anchoa hepsetus*, *Menidia peninsulae*), characterized by similarities in body and fin shape, eye and mouth position, and jaw protrusibility. It is interesting to note that no contemporaneous dietary data have existed for the last species. The generation of information (I-) statistics from the raw data matrices and the use of multidimensional scaling ordination techniques on the dissimilarity matrices (Field *et al.* 1982, Clarke & Ainsworth 1993) might have thrown some light on the relative importance of each morphological trait in formation of a particular group, and on those traits that correlated best with diet.

Martin's paper, which reviews the literature on adaptations of intertidal fishes to emergence from water, should find an avid readership among South African marine ecologists. We have a strong tradition of research in this coastal zone. The fact that 'skippers', 'remainers' and 'tidepool emergers' are not merely stranded by ebbing tides could well act as a catalyst to further ecological research here.

Ecomorphology of Fishes goes a long way to satisfying Balon and Liem's desire to see a much-needed synthesis of ecomorphological ideas, underpinned by solid data and analysed by modern techniques. Perhaps its true value lies in the fact that it serves to concentrate the mind on those problems associated with the definition of the species' niche in morphological terms. It should find a suitable home on the shelves of most institutional reference libraries.

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Africa: a natural history

Chris & Tilde Stuart

Southern Book Publishers, 1995
Price: R130.00

Africa: a natural history is a neat, 170-page coffee-table book with a dust-cover adorned with a magnificent Anthony Bannister photograph of the Spitzkoppen in Namibia at sunset. In a small book, the authors have tackled an enormous topic which they have packaged sensibly and knowledgeably. Apart from the introductory chapter which details very briefly the geology, climate, vegetation and biodiversity of Africa, six subsequent chapters describe the major African biomes, namely savanna, desert, forest, mountain, fynbos, fresh water and marine. The closing chapter discusses conservation and contemporary problems such as desertification.

The Stuarts' book is generously splashed with good colour photographs throughout. Cut-out photos of animals and plants pop up everywhere lending a friendly atmosphere by breaking the monotony of squares of text and photographs. Maps and charts are large, elegantly simple and easy to interpret, adding greatly to the educational value of the book. As has become the publishing trend lately, interesting snippets of information are provided in boxes separate from the main text. The box entitled 'Those were the days' (page 105) on the historical occurrence of elephants in the Fynbos Biome is a lovely example. In today's terms, the book is very reasonably priced.

For the average South African traveller for whom the gates to Africa have opened only recently, the publication of the book is well timed. It provides an overview of the origin, function and biology of Africa's major biomes. It is the kind of book that every family in Africa should have lying around. From an educational perspective it should prove invaluable to secondary-school pupils and, perhaps, first-year university students, as a source of condensed information on Africa's natural history.

There were, however, two aspects of the book which bothered me. The first was the vegetation map of Africa (page 4) which depicts an area well defined by academics as the Succulent Karoo Biome, but which is shown on the map as the 'Grassland/shrub land transition'. This same description is shown for the Nama Karoo-grassland biome ecotone. The

authors never explain what they mean by this ambiguous categorization. The equivocal attention afforded the zone is most unfortunate considering that the Succulent Karoo Biome, including Namaqualand, is the desert with the highest species diversity of plants on the planet! This aspect receives no mention whatsoever in the chapter entitled The African Drylands. Any book attempting to fly the biodiversity flag cannot afford to relegate one of the most unique hot spots of plant speciation on the planet to a 'grassland/shrub land transition'. The Succulent Karoo has arguably never supported a grass component anyway.

Secondly, I gained the impression that the book was unbalanced by being heavily biased towards the natural history of animals throughout. For example, the savanna chapter devotes less than two pages to a discussion of the savanna vegetation, but a hefty 17 pages to the animals which inhabit the African savannas.

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