

Varanoid Lizards of the World, edited by Eric R. Pianka and Dennis King with Ruth Allen King. 2004. Indiana Univ. Press.

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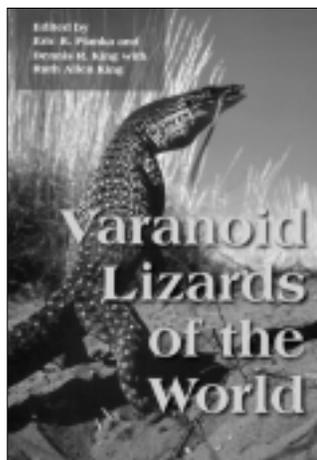
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**Varanoid Lizards of the World**, edited by Eric R. Pianka and Dennis King with Ruth Allen King. 2004. Indiana University Press, 601 North Morton Street, Bloomington, Indiana 47404-3797, USA (iupress@indiana.edu). 602 pp. Hardcover. US \$89.95. ISBN 0-253-34366-6.

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Monitor lizards and their close relatives have always been a source of interest and fascination among herpetologists and laymen alike. Despite this, until the 1980s general works on varanids were largely limited to those by Mertens (1942a; 1942b; 1942c) for the living species and Fejérváry (1918; 1935) for the extinct taxa. Recently, interest in these lizards has undergone a renaissance with the publication of important volumes devoted to individual taxa, for example: Auffenberg (1981; 1988; 1994), Lenz (1995), and Murphy et al. (2002), as well as general works and symposia, such as: Böhme and Horn (1991), Bennett (1998), Horn and Böhme (1999), and Green and King (1999), and books on varanid paleontology (Molnar 2004). This brief listing does not even begin to account for the enormous wealth of current pub-



lications focused on the husbandry of these forms. This new book, edited by Pianka, King, and King, which purports to be a “comprehensive account of virtually everything important that is known about monitor lizards and their allies,” is divided into three major sections. The first is focused largely on phylogeny and biogeography, the second and longest is committed to species by species descriptions, and the third discusses the evolution of body size and its importance to reproduction and also examines captive care.

In their introduction Eric Pianka and Dennis King briefly explain that their goal was to compile a single volume reference work about monitor lizards and their allies that touches not only on the systematics of individual species, but also examines their collective biogeography, paleontology, and other important features of their biology. A significant discussion of the paleontology of varanoids by Australian paleoherpetologist Ralph Molnar follows the introductory chapter and occupies 58 pages of this 602-page book. It is the most detailed and up-to-date paleontological review of the group and it also contains a very useful annotated inventory of terrestrial fossil varanoids, updating that of Estes (1983).

There are occasional confusing or erroneous statements in Molnar’s review. For example, he notes that the oldest “necrosaur” traces back to the Albian of Utah (Early Cretaceous, about 112–99 million years mya). This can only be the fossil originally described by Cifelli and Nydam in 1995. However, this fossil was later shown by Nydam (2000) to be that of *Primaderma*, which is a monstersaurian not a “necrosaur.” Molnar at first refers to *Primaderma* as the oldest land-dwelling platynotan. Later when he discusses monstersaurs in detail, Molnar claims that members of this taxon date back to at least the Late Cretaceous, and that the oldest forms were found in Asia. However, a mere paragraph afterward, Molnar states: “*Primaderma nessovi* is the oldest known monstersaur...its remains were found in the [Early Cretaceous] Cedar Mountain Formation of Central Utah” (page 28). Unfortunate oversights such as this should not have escaped the editors.

The first section of the book concludes with two relatively brief chapters. One, by Pianka and Molnar, is concerned with the biogeography and phylogeny of varanoids generally, although its focus is on the genus *Varanus*. The final chapter in the first section, contributed by Jennings and Pianka, summarizes hypotheses about the tempo and timing for the radiation of Australian monitor species. Their analysis suggests that Australian goannas have undergone repeated and episodic speciation, that the increasing aridity of Australia during the later Tertiary apparently helped drive this diversification and radiation, and that the Australian varanid radiations appear to parallel those of pygopods.

In Part II, the individual species accounts are broken up into four sub-groupings: African varanid species, Asian varanid species, Australian varanid species, and other varanoids. Each subsection contains its own bibliography, and virtually all species descriptions contain all or most of the following subdivisions: nomenclature, geographic distribution, fossil record, diagnostic characteristics, description, size, habitat and natural history, reproduction, movement, population genetics, physiology, fat bodies, testicular cycles, and parasites. Range maps varying in their level of detail are also usually included. Some species accounts are supplemented by tables summarizing morphometric, physiological, or breeding data, or graphs, such as that showing the relation-

ship between body mass and snout-vent length in *Varanus gouldii*. Nearly all species accounts provide a black and white photo above the text for each description, along with duplicate, but separately organized color print, showing a typical representative, usually an adult. These photographs vary in quality, size, and detail.

The African varanid section had a wide range of authors and, as with all the other sections, the amount of detail varied from species to species. All known African species (*Varanus albigularis*, *V. exanthematicus*, *V. griseus*, *V. niloticus*, *V. ornatus*) and the relatively recently described Middle Eastern *V. yemenensis* (Böhme et al. 1987, 1989 [note: these two citations are incorrectly listed in the book's bibliography and are corrected here]) are discussed. The account by Michael Stanner describing the desert monitor, *Varanus griseus*, consumes the greatest percentage of this section, about 45%, but fails to resolve whether or not this species is actually venomous as some earlier reports claimed (Ballard and Antonio 2001; Sopiiev et al. 1987).

The Asian monitor section describes 23 species, with that for *Varanus salvator* split into two separate segments: one devoted to the nominate form and the other to the various subspecies. It is heavily dominated by German authors and, therefore, many of the species descriptions include diagnostic characters containing references to hemipeneal (and sometimes hemiclitoral) characters that are derived from Böhme (1988). Unfortunately, no general discussion of the specialized terms regarding these important genital characters is provided in this volume and the book's glossary also lacks any definitions to assist unfamiliar readers. Considering that these and many other authors place great significance on these morphological characters to differentiate many varanid species, this deficiency must be corrected in any future editions to ensure comprehensiveness.

In the Asian monitor section several individual species members of the so-called "*Varanus indicus* group" are described separately from the nominate taxon and similar partitioning was also made for members of the "*V. prasinus* group" (which in this volume includes: *V. kordensis*, and *V. macraei*; but not *V. beccari*, and *V. bogerti*). None of the Asian monitor chapters are as detailed as that for *V. griseus*, however, the two segments concerned with *V. salvator* and its subspecies, when combined, come close. The others, all succinct reviews, average about four or five pages each.

The section on Australian monitors has the greatest number of authors and, not surprisingly, the majority are Australians (the one dealing with *V. keithhornei* was even contributed by "Croc Hunter" Steve Irwin). One significant difference between this section and those for the African and Asian monitors is that each Australian species contains a list of specimens in the major Australian museum collections. Many of these specimen lists appear quite exhaustive and all are potentially very useful to any varanid researcher doing work on these species. Unlike for the previous two sections, I could not detect any missing or incorrectly cited references, but similar to these earlier sections, the amount of detail provided for any given Australian species varies. Generally, these descriptions were all concise and averaged somewhere between six and ten pages.

The "Other Varanoids" section contains accounts for *Lanthanotus*, both living species of *Heloderma*, and the Late Cretaceous monstersaur, *Estesia mongoliensis*. *Estesia*, which did not merit a color photo, although a black and white print of the skull

leads the chapter, is the only fossil taxon treated in its own individual segment (about two pages) despite the fact it was discussed earlier in Molnar's chapter. Not even the gigantic Australian varanid, *Varanus priscus* [*Megalania prisca*] warranted its own chapter, although this latter species went extinct much more recently in the Pleistocene. All subspecies for *Heloderma* are discussed within the chapters about the two species and their range maps also include subspecies information (both chapters are by *Heloderma* expert, Daniel Beck). Eric Pianka's short chapter on *Lanthanotus* is notable for demonstrating how little is known about this important taxon, particularly concerning its diet and times of activity, as well as reproductive, thermoregulatory, and foraging behaviors.

The book concludes with a two-chapter section. The first, by Pianka, draws an important relationship between body size and reproductive tactics, and basically argues that body size influences reproduction more strongly than phylogeny, particularly: egg mass, clutch size, clutch mass, neonate snout-vent length, and neonate body mass. Pianka also notes that clutch sizes for larger species are normally smaller than those produced by the smaller species and that maternal snout-vent length is a more potent influence on clutch size within a given species than between any two species. The final chapter, by Hans-Georg Horn, examines the captive care of monitors with an eye toward biological, technical, and legal difficulties, and he discusses many relevant issues including: difficulties providing the proper diets, distinguishing males from females, the problems involved with distinguishing between two species showing very similar appearance, problems involving the proper lighting and construction of enclosures, and the effects of various laws, including CITES legislation, on the captive conservation of monitors.

This book will likely be an important single-volume source about varanoid lizards for some time to come. Despite some mostly minor editorial oversights, including those mentioned above, some of which may have resulted from the sudden and unfortunate death of Dennis King during the production of this volume, I believe this book to be a welcome and important addition to the library of any herpetologist. Its importance lies not only in what information it manages to include within its covers, but also in its indication of the significant work still remaining for the more complete understanding and conservation of these important reptiles.

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