BOOK REVIEW

Polis, Gary A. 1990. The Biology of Scorpions. Stanford University Press, Stanford, California. 587 pp. (Price $85.00.)

The editor of this volume, Gary Polis, and a determined crew of nine contributors have compiled an impressive assemblage of fact and esoterica about world scorpions; 485 pages of text in all and covering morphology, systematics, paleontology, biogeography, population biology, ecology, behavior, environmental physiology, neurobiology, venom toxicology, and even mythology. The comprehensiveness of coverage and the terse, highly readable style of the book suggest what might be its hidden purpose—the attraction of young scientists into an open field of overlooked research. The first two chapters, a full third of the book, give excellent preparation for literature reading and research on scorpions. There are diagrammatic summaries of basic anatomy (Hjelle) and group systematics, with lucid descriptions of biogeography and paleontology (Sissom). The epic restudy of the scorpion fossil record by Kjellesvig-Waering (published 1986) is carefully summarized so that even a physiologist can follow the emergence of the group from gill-breathing descendants of a eurypterid line (Silurian aquatic forms), through the appearance of terrestrial fauna (probably upper Devonian) and their peak in species diversity during the Carboniferous (at least 13 superfamilies compared to the modern three). We are reminded that the 1400 species surviving today are remarkably similar to their Paleozoic ancestors although mere remnants of what once was. There are useful keys to modern families, subfamilies and genera, with clear drawings of diagnostic features used to distinguish them.

The middle third of this book is dedicated to life history (Polis and Sissom), behavior (Warburg and Polis), ecology (Polis) and predator-prey relations (McCormick and Polis) of scorpions. Here we learn just how little is known about such basic characteristics as embryology (perhaps a dozen works in all, the most complete published before 1900), post-natal growth and sexual development (some live 25 years). Most scorpions live in deserts or temperate regions of the world as solitary, cannibalistic burrowers. Given the impracticalities of working in deserts at night, one is sympathetic to Polis's assertion that "ecology is the least known aspect of scorpion biology," and is deserving of much greater attention. Here Polis has been a vanguard, utilizing portable UV lights (scorpion cuticle fluoresces under UV) to make broad-ranging observations of natural habits, population biology and community structure. Many unanswered questions arise in these pages, especially concerning tropical scorpions, which are virtually unstudied.

This section is the book's center of mass, and while it may suffer from eclecticism, it should provide strong stimulation for further field-oriented research. Judging from the number of coffee stains, these were for me the most difficult and important chapters to read.

The last third of this volume contains excellent summaries of environmental physiology (Hadley), neurobiology (Root) and venom biochemistry/pathophysiology (Simard and Watt). Here we learn about the peculiar, often unique, aspects of scorpion physiology and biochemistry that have enabled these animals to invade harsh environments and to thrive as nocturnal insectivores. For desert species, a water-impermeable cuticle, low basal metabolism and conservative periods of activity outside the burrow were predictable responses to heat and water stresses. But who could have imagined the array of non-visual cues these animals use in darkness to capture prey and to locate suitable mates. Scorpion toxins have attracted the greatest outside attention, mostly from vertebrate physiologists and biochemists who use them as tools for studies of nerve and muscle excitability. As the primary structures of these peptides become known, new questions emerge concerning structure/function relationships of protein macromolecules and phylogenetic relationships within an ancient group of organisms. Indeed, these invertebrate incarnations of evil are very good preparations for all sorts of biology, from molecular to evolutionary levels of study. The book ends with a practical chapter on field and laboratory methods (collection, rearing, dissection, preservation) and a wonderful synopsis of scorpion lore, both mythological and historical, by Cloudsley-Thompson.

Thumbing back through these pages, straightening folded corners and reading notes penciled in the margins, I am struck again by the overall good quality of research on scorpions and the care with which it has been presented here. One senses in the doing and the writing a special affection for these animals so long feared and neglected by humans. It is as though justice has finally been done and we are witness to the certain injection of a new subject into our science.

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