



How to use this book

Grzimek's Animal Life Encyclopedia is an internationally prominent scientific reference compilation, first published in German in the late 1960s, under the editorship of zoologist Bernhard Grzimek (1909–1987). In a cooperative effort between Gale and the American Zoo and Aquarium Association, the series has been completely revised and updated for the first time in over 30 years. Gale expanded the series from 13 to 17 volumes, commissioned new color paintings, and updated the information so as to make the set easier to use. The order of revisions is:

Volumes 8–11: Birds I–IV

Volume 6: Amphibians

Volume 7: Reptiles

Volumes 4–5: Fishes I–II

Volumes 12–16: Mammals I–V

Volume 3: Insects

Volume 2: Protostomes

Volume 1: Lower Metazoans and Lesser Deuterostomes

Volume 17: Cumulative Index

Organized by taxonomy

The overall structure of this reference work is based on the classification of animals into naturally related groups, a discipline known as taxonomy—the science in which various organisms are discovered, identified, described, named, classified, and cataloged. Starting with the simplest life forms, the lower metazoans and lesser deuterostomes, in Volume 1, the series progresses through the more complex classes, concluding with the mammals in Volumes 12–16. Volume 17 is a stand-alone cumulative index.

Organization of chapters within each volume reinforces the taxonomic hierarchy. In the case of the volume on Insects, introductory chapters describe general characteristics of all insects, followed by taxonomic chapters dedicated to order. Species accounts appear at the end of order chapters.

Introductory chapters have a loose structure, reminiscent of the first edition. Chapters on orders, by contrast, are highly structured, following a prescribed format of standard rubrics that make information easy to find. These chapters typically include:

Thumbnail introduction

Scientific name

Common name

Class

Order

Number of families

Main chapter

Evolution and systematics

Physical characteristics

Distribution

Habitat

Behavior

Feeding ecology and diet

Reproductive biology

Conservation status

Significance to humans

Species accounts

Common name

Scientific name

Family

Taxonomy

Other common names

Physical characteristics

Distribution

Habitat

Behavior

Feeding ecology and diet

Reproductive biology

Conservation status

Significance to humans

Resources

Books

Periodicals

Organizations

Other

Color graphics enhance understanding

Grzimek's features approximately 3,500 color photos, including nearly 130 in the Insects volume; 3,500 total color maps, including approximately 100 in the Insects volume; and approximately 5,500 total color illustrations, including approximately 300 in the Insects volume. Each featured species

of animal is accompanied by both a distribution map and an illustration.

All maps in *Grzimek's* were created specifically for the project by XNR Productions. Distribution information was provided by expert contributors and, if necessary, further researched at the University of Michigan Zoological Museum library. Maps are intended to show broad distribution, not definitive ranges.

All the color illustrations in *Grzimek's* were created specifically for the project by Michigan Science Art. Expert contributors recommended the species to be illustrated and provided feedback to the artists, who supplemented this information with authoritative references and animal specimens from the University of Michigan Zoological Museum library. In addition to illustrations of species, *Grzimek's* features drawings that illustrate characteristic traits and behaviors.

About the contributors

All of the chapters were written by entomologists who are specialists on specific subjects and/or taxonomic groups. Topic editors Arthur V. Evans and Rosser W. Garrison reviewed the completed chapters to insure consistency and accuracy.

Standards employed

In preparing the volume on Insects, the editors relied primarily on the taxonomic structure outlined in *The Insects of Australia: A Textbook for Students and Research Workers*, 2nd edition, edited by the Division of Entomology, Commonwealth Scientific and Industrial Research Organisation (1991). Systematics is a dynamic discipline in that new species are being discovered continuously, and new techniques (e.g., DNA sequencing) frequently result in changes in the hypothesized evolutionary relationships among various organisms. Consequently, controversy often exists regarding classification of a particular animal or group of animals; such differences are mentioned in the text.

Grzimek's has been designed with ready reference in mind, and the editors have standardized information wherever feasible. For **Conservation status**, *Grzimek's* follows the IUCN Red List system, developed by its Species Survival Commission. The Red List provides the world's most comprehensive inventory of the global conservation status of plants and animals. Using a set of criteria to evaluate extinction risk, the IUCN recognizes the following categories: Extinct, Extinct in the Wild, Critically Endangered, Endangered, Vulnerable, Conservation Dependent, Near Threatened, Least Concern, and Data Deficient. For a complete explanation of each category, visit the IUCN Web page at <<http://www.iucn.org/themes/ssc/redlists/categor.htm>>.

In addition to IUCN ratings, chapters may contain other conservation information, such as a species' inclusion on one of three Convention on International Trade in Endangered

Species (CITES) appendices. Adopted in 1975, CITES is a global treaty whose focus is the protection of plant and animal species from unregulated international trade.

In the species accounts throughout the volume, the editors have attempted to provide common names not only in English but also in French, German, Spanish, and local dialects.

Grzimek's provides the following standard information on lineage in the **Taxonomy** rubric of each species account: [First described as] *Raphidia flavipes* [by] Stein, [in] 1863, [based on a specimen from] Greece. The person's name and date refer to earliest identification of a species, although the species name may have changed since first identification. However, the entity of insect is the same.

Readers should note that within chapters, species accounts are organized alphabetically by family name and then alphabetically by scientific name.

Anatomical illustrations

While the encyclopedia attempts to minimize scientific jargon, readers will encounter numerous technical terms related to anatomy and physiology throughout the volume. To assist readers in placing physiological terms in their proper context, we have created a number of detailed anatomical drawings. These can be found on pages 18 to 33 in the "Structure and function" chapter. Readers are urged to make heavy use of these drawings. In addition, many anatomical terms are defined in the **Glossary** at the back of the book.

Appendices and index

In addition to the main text and the aforementioned **Glossary**, the volume contains numerous other elements. **For further reading** directs readers to additional sources of information about insects. Valuable contact information for **Organizations** is also included in an appendix. An exhaustive **Insects family list** records all families of insects as recognized by the editors and contributors of the volume. And a full-color **Geologic time scale** helps readers understand prehistoric time periods. Additionally, the volume contains a **Subject index**.

Acknowledgements

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