

PREFACE

Insects are the world's most diverse group of animals, making up more than 58% of the known global biodiversity. They inhabit all habitat types and play major roles in the function and stability of terrestrial and aquatic ecosystems. Insects are closely associated with our lives and affect the welfare of humanity in diverse ways. At the same time, large numbers of insect species, including those not known to science, continue to become extinct or extirpated from local habitats worldwide. Our knowledge of insect biodiversity is far from complete; for example, barely 65% of the North American insect fauna has been described. Only a relatively few species of insects have been studied in depth. We urgently need to explore and describe insect biodiversity and to better understand the biology and ecology of insects if ecosystems are to be managed sustainably and if the effect of global environment change is to be mitigated.

The scientific study of insect biodiversity is at a precarious point. Resources for the support of taxonomy are tenuous worldwide. The number of taxonomists is declining and the output of taxonomic research has slowed. Many taxonomists are reaching retirement age and will not be replaced with trained scientists, which will result in a lack of taxonomic expertise for many groups of insects. These trends contrast with an increasing need for taxonomic information and services in our society, particularly for biodiversity assessment, ecosystem management, conservation, sustainable development, management of climate-change effects, and pest management. In light of these contrasting trends, the scientific community and its leadership must increase their understanding of the science of insect biodiversity and taxonomy and ensure that policy makers are informed of the importance of biodiversity for a sustainable future for humanity.

We have attended and contributed to many scientific meetings and management and policy gatherings where the future, the resource needs, and importance of insect taxonomy and biodiversity have been debated.

In fact, discussion of the future of taxonomy is a favorite pastime of taxonomists; there is no shortage of "taxonomic opinion." Considerable discussion has focused on the daunting task of describing the diversity of insect life and how many undescribed species are out there. However, we felt that there was a need for an up-to-date, quantitative assessment of what insect biodiversity entails, and to connect what we know and do not know about insect biodiversity with its impact on human society.

Our approach was to ask authors to develop accounts of biodiversity in certain orders of insects and geographic regions and along selected subject lines. In all categories, we were limited by the availability of willing contributors and their time and resources. Many insect groups, geographic regions, and scientific and societal issues could not be treated in a single volume. It also was apparent to us, sometimes painfully so, that many taxonomists are wildly over-committed. This situation can be seen as part of the so-called taxonomic impediment – the lack of available taxonomic expertise is compounded by an overburdened community of present-day taxonomists with too much work and perhaps too much unrealistic enthusiasm.

In Chapter 1, we introduce the ongoing challenge to document insect biodiversity and develop its services. Chapter 2 provides a comprehensive overview of the importance and value of insects to humans. The next two sections deal with regional treatments and ordinal-level accounts of insect biodiversity. These approaches were a serious challenge to the contributors who had to compile information from a wide array of sources or, alternatively, deal with situations in which accurate information simply is insufficient. In Part III, we document some of the tools and approaches to the science of taxonomy and its applications. Perspective is provided on the past, present, and future of the science of insect taxonomy and the all-important influence of species concepts and their operational treatment on taxonomic science and insect biodiversity. Contributions

on the increasing role of informatics and molecular approaches are provided, areas with ongoing controversy and differences of opinion. These chapters are followed by contributions on the applications of taxonomic science for which biodiversity information is fundamental, including the increasing impact of adventive insects, pest detection and management, human medical concerns, and the management and conservation of biodiversity. The book ends with an historical

view of the continuing attempts to document the extent of world insect biodiversity.

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