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Book Review: *Lepidoptera Iranica* – A captivating journey into the fascinating world of Iran's butterflies and moths

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ABSTRACT. The book "*Lepidoptera Iranica*" is a comprehensive and meticulously researched publication that explores the butterfly and moth fauna of Iran. Edited by Hossein Rajaei and Ole Karsholt, the book includes contributions from seventy-three Iranian and international researchers over 13 years. The book provides a historical review of lepidopterology in Iran and discusses the general patterns of *Lepidoptera* fauna in the country. It also estimates the number of *Lepidoptera* species waiting to be discovered in Iran and includes a gazetteer of elusive localities of Iranian *Lepidoptera* records. The final chapter is a comprehensive catalogue of the *Lepidoptera* of Iran, including a checklist of all 4,812 known species, as well as information and notes on their taxonomy, distribution, and biology. The book serves as an important tool for scholars, preservationists, and enthusiasts, and highlights the importance of continued research and conservation efforts in the country.

Key words: *Lepidoptera*, Iran, biodiversity, catalogue, checklist, conservation

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Butterflies and moths are widely admired for their stunning colors, delicate patterns, and intricate wing structures, making them some of the most fascinating and enchanting insects in the world. These insects belong to the order *Lepidoptera*, which is characterized by the presence of scales on their wings and bodies. Iran is renowned for its diverse and abundant wildlife, and lepidopterans are no exception. In fact, Iran is considered to be one of the most significant regions in the world in terms of lepidopteran diversity (Rajaei & Karsholt, 2023). Its unique geographical location and varied climatic conditions have created a range of habitats that have facilitated the evolution of an exceptionally rich and diverse array of butterflies and moths.

The megaproject, *Lepidoptera Iranica* is an important initiative aimed at advancing our understanding of the fascinating world of Iranian *Lepidoptera*. The book, *Lepidoptera Iranica* (Fig. 1) presents the findings of this project and provides readers with an in-depth exploration of the butterfly and moth fauna of Iran. It is a comprehensive and meticulously researched publication that is sure to captivate both lepidopterists and general readers alike. The book is edited by Hossein Rajaei and Ole Karsholt,

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two experts in the field, and includes contributions from seventy-three Iranian and international researchers during 13 years. The final draft was also peer-reviewed by more than 20 expert lepidopterists. The book discusses the history of scientific studies on the Lepidoptera of Iran, starting from 1828 with the first description of a *Zygaena cuvieri* Boisduval, 1828 collected by French physician and entomologist Guillaume-Antoine Olivier, who travelled to Iran in 1796. The first two checklists of Lepidoptera were published in 1967 and 1970, but they contained errors and were not updated. In 2014, a new checklist was published by Turkish entomologists, but it also contained errors and was not peer-reviewed. The lack of a comprehensive checklist of Lepidoptera in Iran poses challenges for conservation and management programs. To address this issue, the authors of *Lepidoptera Iranica* have compiled a comprehensive catalogue of all known lepidopteran taxa in Iran, including distributional data and updated taxonomic notes. The book is intended to serve as a baseline for future monitoring programs and to aid researchers, conservation officers, and management organizations.

The book is organized into seven chapters, each of which provides a different perspective on the lepidopteran fauna of Iran. The first chapter introduces the Lepidoptera Iranica project, which aims to document the diversity and distribution of Iranian butterflies and moths through fieldwork and museum collections. The second chapter is a historical review of lepidopterology in Iran, subdivided into six chronological eras, it concisely introduces the pioneers of Lepidoptera researches as well as the contemporary lepidopterists who currently study this group. This chapter highlights the important contributions of Iranian and foreign scientists to the study of Iranian lepidopterans, as well as the challenges and opportunities facing lepidopterology in the country. The third chapter provides a brief introduction to the phylogeny and higher-level classification of Iranian Lepidoptera, with a focus on the major superfamilies and families found in the region. This chapter includes a discussion of the relationships between Iranian lepidopteran fauna and those of neighboring countries, as well as the biogeographic patterns that have shaped their evolution. The fourth chapter discusses the general patterns of the Lepidoptera fauna of Iran, including the number of species and their distribution across different biomes and regions of the country. This chapter also highlights some of the unique and endemic species found in Iran, as well as the threats to their conservation. The fifth chapter is particularly interesting, as it estimates the number of Lepidoptera species that are waiting to be discovered in Iran. The authors use a range of methods, including extrapolation from all 4,812 known species and their distribution, which are estimated to be over 9,000 lepidopteran species in Iran. This highlights the importance of continued research and conservation efforts in the country, as many of these species may be endangered or threatened by habitat loss, climate change, and other human activities. The sixth chapter is a gazetteer of elusive localities of Iranian Lepidoptera records, which provides a valuable resource for researchers and collectors who are interested in finding and studying lepidopteran fauna in Iran. The gazetteer includes information on the geographical coordinates, elevation, and habitat characteristics of these localities, as well as notes on the historical and current status of lepidopteran fauna in these areas. The final and yet the most important chapter is a comprehensive catalogue of the Lepidoptera of Iran, which includes a checklist of all known species, as well as information and notes on their taxonomy, distribution, and biology. In this chapter, the authors reviewed all taxonomic publications on the fauna of Iran, including papers, books, short reports, congress contributions and historical regional checklists, and updated all old taxonomic data, besides, the materials of many institutional and private collections were examined and added.

Overall, *Lepidoptera Iranica* is an excellently written publication that will captivate individuals intrigued by Iran's natural history and biodiversity. It provides an extensive range of data regarding the Lepidoptera fauna in Iran, as well as an account of the past and present state of lepidopterology in the country. The book is an important tool for scholars, preservationists, and enthusiasts looking to investigate and safeguard Iran's abundant and diverse Lepidoptera population.

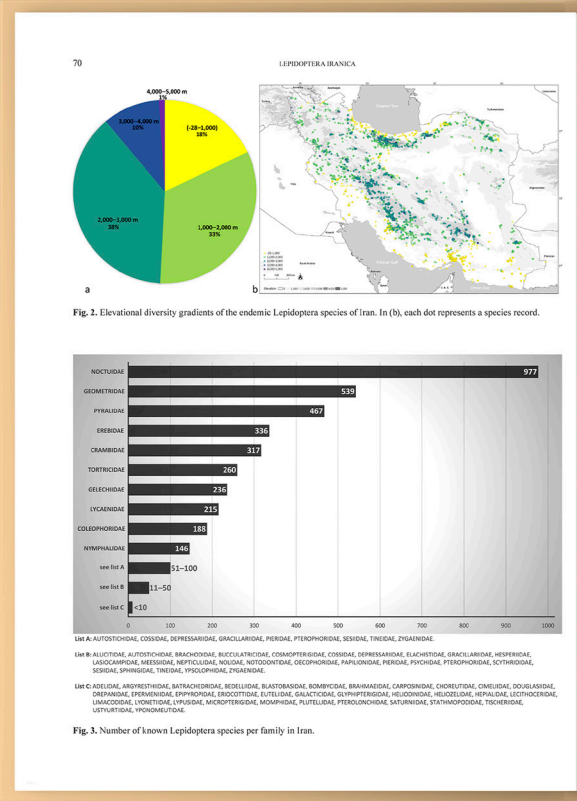
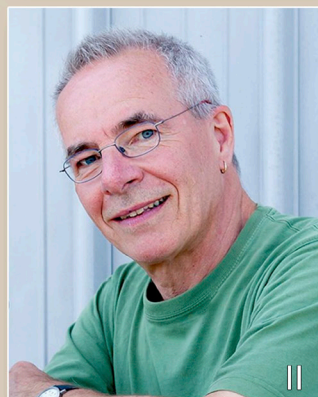
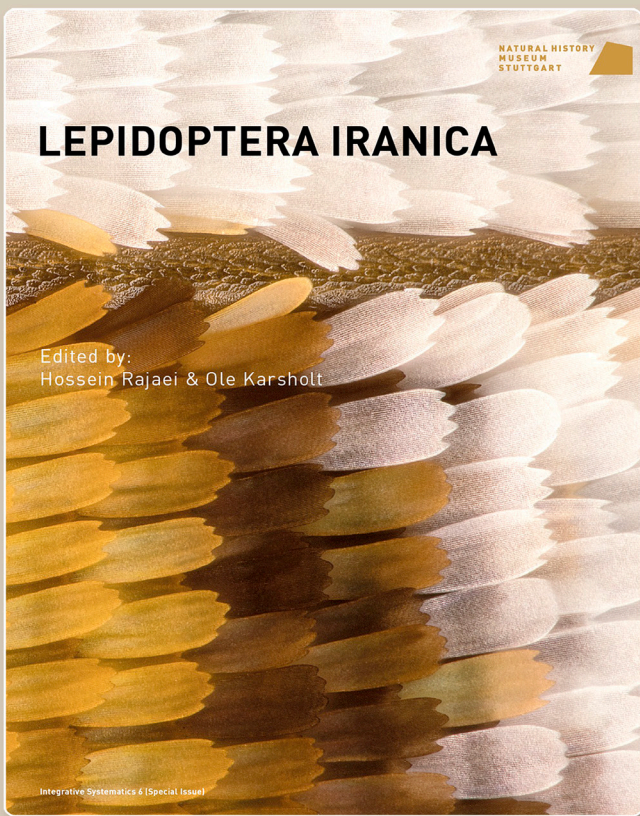
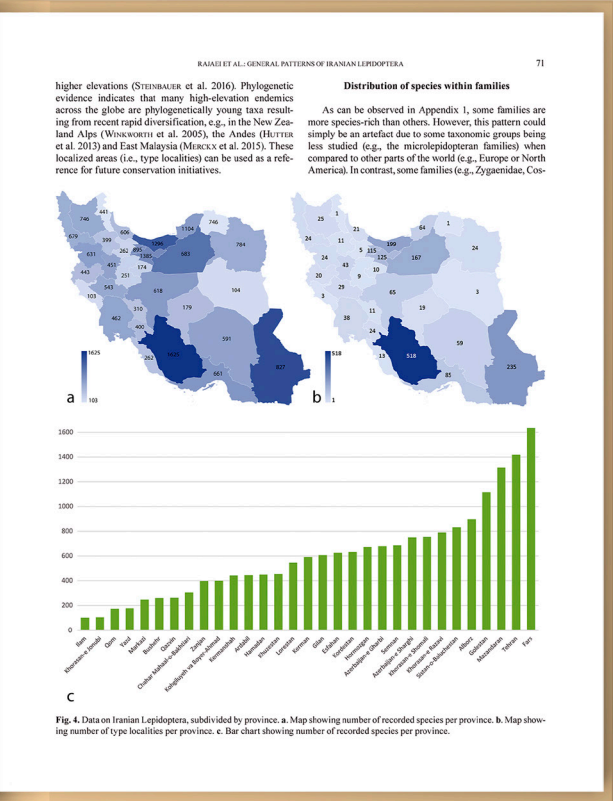


Fig. 2. Elevational diversity gradients of the endemic Lepidoptera species of Iran. In (b), each dot represents a species record.

Fig. 3. Number of known Lepidoptera species per family in Iran.



higher elevations (STEINBAUER et al. 2016). Phylogenetic evidence indicates that many high-elevation endemics across the globe are phylogenetically young taxa resulting from recent rapid diversification, e.g., in the New Zealand Alps (WAINWORTHY et al. 2005), the Andes (HILTON et al. 2013) and East Malaysia (MARCX et al. 2015). These localized areas (i.e., type localities) can be used as a reference for future conservation initiatives.

Distribution of species within families

As can be observed in Appendix 1, some families are more species-rich than others. However, this pattern could simply be an artefact due to some taxonomic groups being less studied (e.g., the microlepidopteran families) when compared to other parts of the world (e.g., Europe or North America). In contrast, some families (e.g., Zygaenidae, Cos-

Fig. 4. Data on Iranian Lepidoptera, subdivided by province. a. Map showing number of recorded species per province. b. Map showing number of type localities per province. c. Bar chart showing number of recorded species per province.

Figure 1. The front cover and two specifically chosen pages from the current book. **I.** Hossein Rajaei (State Museum of Natural History Stuttgart); **II.** Ole Karsholt (Natural History Museum of Denmark).

ACKNOWLEDGMENTS

The invaluable contributions of lepidopterists to the field of Iranian Lepidoptera are highly commendable, and we are grateful for their efforts in shedding light on the richness and diversity of this important group of insects in Iran. Their remarkable achievements and insightful publications are a testament to their passion and expertise in the study of butterflies and moths.

REFERENCE

Rajaei, H. & Karsholt, O., eds. (2023) Lepidoptera Iranica. *Integrative Systematics: Stuttgart Contributions to Natural History*, 6, I–XVI. <https://doi.org/10.18476/2023.997558.0>