



SOURAKOV A. & WARREN CHADD R. 2022: THE LIVES OF MOTHS: A NATURAL HISTORY OF OUR PLANET'S MOTH LIFE. Princeton University Press, Princeton and Oxford, vii+288 pp. ISBN 978-0-691-22856-3. Hardcover. Price USD 29.95.

Andrei Sourakov works as collection coordinator at the McGuire Center for Lepidoptera & Biodiversity, Florida Museum of Natural History. His main research areas are chemical ecology, systematics and the biogeography of Lepidoptera. He is the author of over 60 scientific publications and co-author of several prestigious scientific monographs, such as *Books of Caterpillars* (ISBN 978-1-78240-506-1). *The Lives of Moths*, written together with journalist Rachel Warren Chadd, is his third monograph, and provides readers with basic information about the biology and diversity of moths over ten chapters (Fig. 1). The book essentially consists of an introduction and two main sections, accompanied by a selection of high quality photographs and illustrations.

The “Introduction” begins with a brief description of the main author’s first encounter with moths in the 1970s followed by remarks concerning the structure of the book. It continues with two more general subchapters “What is a moth?” and “Moth Classification”. The subchapter “What is a moth?” contains a brief dis-

cussion on the origin of moths, their differences from caddisflies and butterflies, and also their ecological importance. In “Moth Classification”, the authors present the diversity of moths and provide a selection of moth families along with illustrations of their most iconic representatives. This subchapter continues on page 281 with the chapter “Moth Families”, where the currently valid classification of moth families, with information on their generic and species diversity, is described.

In the first section of the book, the authors present the reader with information on the biology, current classification and ecological interactions of moths. In the second section of the book, the authors offer the reader a tour of different types of ecosystems around the world, highlighting the most interesting facts as well as their most attractive inhabitants.

The first chapter of the first section, “Life Cycle”, is divided into five subchapters (“Eggs and oviposition”, “The ever-changing caterpillar”, “Pupae”, “Metamorphosis”, “Adult moths”) during which each stage of moth development is discussed. The next chapter deals with the “Interactions” of moths, both among themselves and with other organisms. In five subchapters, the authors draw the reader’s attention with interesting details about “Courtship and mating”, “Feeding as adults”, “Predators and defenses”, “Parasitoids, parasites, fungi, and pathogens”, and “Sound production”. The third chapter is also the first chapter of the second section of the book and introduces readers to the diversity of “Moths of Tropical Rainforests”. Based on the title of the chapter, the reader might expect a simple overview of most of the iconic moth species that live in the tropics, however, the opposite is true. The chapter is comprised of six subchapters (“Rainforest diversity”, “Rainforest plants and flowers”, “Coevolution and mimicry”, “Tropical moths with unusual habits”, “Seasonal changes and migrations”, “Effects of deforestation and climate change”) that deal with various ecological aspects related not only to moths, but also to the ecosystem itself. The chapter ends with species cards for eight tropical moths selected from different biogeographical regions. Continuing the theme, “Moths of Grasslands and Meadows” consists of seven subchapters (“Diverse grassland ecosystems”, “Moths of Cerrado”, “The African savanna”, “The Australian savanna”, “Grassland islands in the mountains and meadows”, “Moths of the meadows”, “A range of temperate grasslands”) that introduce the reader to various grassland habitats around the world and their spectacular moth fauna. The chapter ends with seven moth species cards, illustrating their distribution and fascinating life cycles. The sixth chapter, “Moths of Deserts & Tundra”, guides the reader through the fauna of extreme habitats. In nine subchapters (“Extreme habitats”, “Subtropical desert moth communities”, “Moths on cacti”, “Moths on yuccas”, “Moths on palms”, “Wood borers”, “Moths on mesquite”, “Moths of the tundra”, “Tundra moth communities”) the authors pick out the most fascinating adaptations of moths to life under difficult climatic conditions. As previously, the chapter ends with a brief overview of the life of some selected moth species, e.g., *Sysphinx hubbardi* Dyar, 1902. “Moths of Temperate Deciduous Forests” begins with an extraordinary photograph of

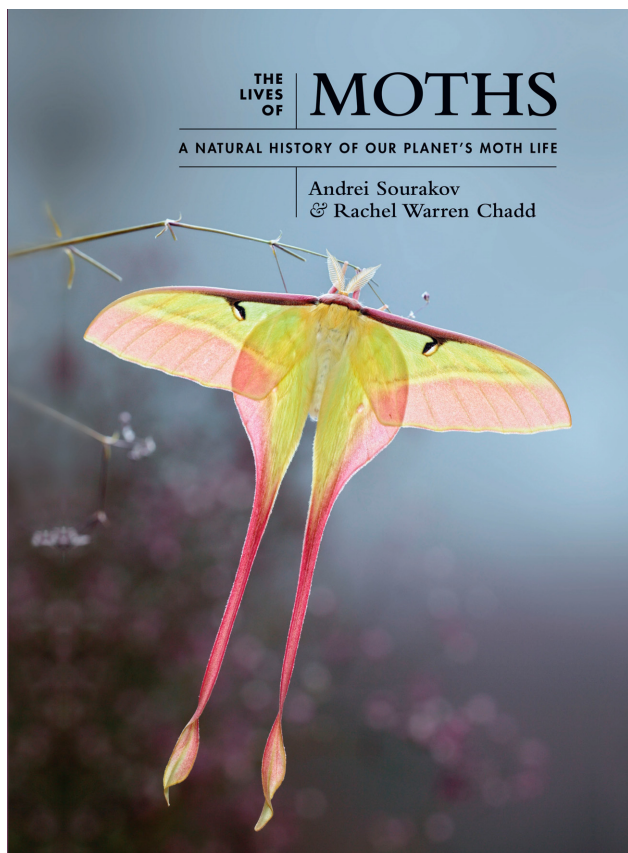


Fig. 1. The book cover (from Sourakov & Warren Chadd, 2022).

MOTHS OF TEMPERATE DECIDUOUS FORESTS

AUTOMERIS IO

Io Moth

Stunning eyespots



SCIENTIFIC NAME	<i>Automeris io</i> (Fabricius, 1775)
FAMILY	Scythridae
NOTABLE FEATURES	Large eyespots on hind wings, female's forewings darker than male's
WINGSPAN	2–4 in (50–100 mm)
SIMILAR SPECIES	Other <i>Automeris</i> species, such as <i>A. louisiana</i> (coastline of Gulf of Mexico)

Leaflike at rest—with yellow forewings if male and brown if female—the Io Moth hides the beautiful eyespots on its hind wings. If startled, it flips its forewings upward, suddenly exposing “eyes” that can rival those of a raptor in size and brightness, scaring off small bird predators. This defensive behavior is a bluff, as the moth has no chemical protection and cannot defend itself with rapid flight. These moths do not feed as adults as their proboscis is greatly reduced. They live for only one to two weeks.

BREEDING HABITS

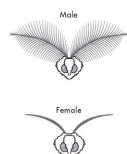
The species is distributed from Costa Rica to Canada and, depending on location, can breed continuously or go into winter diapause. Males use their serrate antennae to locate females, following the pheromone trail they produce. The females, which mostly take flight only after mating, can lay around 300 eggs in batches of 20 to 30, so must visit at least 10 to 15 sites.

SPIKY, STINGING CATERpillARS

The caterpillars are initially brown and feed in groups on a variety of plants, from oak and birch to willow and cherry. Later they become green with a candy stripe of white and red, and feed alone. Rather than deriving their defenses from

plant chemicals, they produce their own toxins via glands that are connected to their numerous syringe-like spines, which can deliver a painful sting. When mature, the larvae spin a thin, strong cocoon, pulling together leaves for added protection, so the cryptic pupa can overwinter in harsh northern climates or survive prolonged droughts.

→ The male (top) is smaller and has lighter forewings than the female. The hind wing eyespots are composed of wide single-like scales in light and dark colors that give them an iridescent appearance, with similar pure white scales in its UV-reflecting center. The black ring of the eyespot and the rest of the wing are covered with longer, narrower scales.



Sensitive antennae

The sexual dimorphism (difference between males and females) extends beyond wing coloration in the Io Moth and many other silk moths. The male's antennae, for instance, are wider with more sensilla, which enables him to locate a female following the vagrant trail of pheromones she releases.



Fig. 2. The species card of *Automeris io* (Fabricius, 1775) (from Sourakov & Warren Chadd, 2022).

the bilateral gynandromorph of *Endromis versicolora* (Linnaeus, 1758), one of the Europe's most iconic moths. Six subchapters (“*Spring abundance*”, “*Moths on oaks*”, “*Moths on maples*”, “*Cryptic geometrids*”, “*Caterpillar silk*”, “*Armed, dangerous, and eccentric*”) then explore the various biological phenomena typical of species found in deciduous forest habitats. The chapter closes with six species cards, including notable moths such as the North American *Automeris io* (Fabricius, 1775) (Fig. 2) and the European *Catocala fraxini* (Linnaeus, 1758).

“*Moths on Coniferous & Wetlands Plants*” contains six subchapters (“*Coniferous forests and watery habitats*”, “*Choosing conifers*”, “*Silk moths on conifers*”, “*Inching and looping through the needles*”, “*Moths living in and around water*”, “*Moths in wetlands*”) that explore the moth diversity of coniferous forests and aquatic habitats, detailing their strategies for survival in these habitats. Eight moths are listed in the species card section, starting with *Graellsia isabellae* (Graells, 1849), arguably the most beautiful moth in Europe. The authors also introduce readers to various pests of conifers, such as *Bupalus piniaria* (Linnaeus, 1758) and *Panolis flammea* (Denis & Schiffermüller, 1775), together with their biology. The chapter preceding “*Glossary*”, “*Index*”, “*Resources*” and “*Acknowledgments*”, is dedicated to “*Moths in Agroecosystems & Around Homes*”. This short chapter is comprised of three subchapters (“*Moth survival in a human world*”, “*War on “pest” moths*”, “*Moths in storage*

areas and homes”) and reviews the adaptive strategies of various pest species (polyphagy, resistance to pesticides, etc.), before ending with four species cards of destructive pest species, such as *Hyphantria cunea* (Drury, 1773) and *Helicoverpa zea* (Boddie, 1850).

In conclusion, *The Lives of Moths: A Natural History of Our Planet's Moth Life* is an excellent publication written for moth enthusiasts and amateur or professional entomologists. This book, as well as the entire series, does an excellent job of providing the reader with the most interesting and essential facts, in this case about the various species of moths, from the most colourful to the drab-looking but economically important pests, in a way that is not too formal. However, compared to, for example, *Moths: Their Biology, Diversity and Evolution* by David C. Lees and Alberto Zilli (ISBN: 9780565094577), the book could contain a little bit more information and illustrate more species of moths, or their larval stages, from each of the ecosystems covered. Additionally, the quality and selection of some of the images used in the species cards could be improved upon. Comparing these two publications, *Lives of Moths* gives one the impression of being more of a coffee table book than a serious, fact-filled scientific publication. Nevertheless, this book should not be missing from any public, school or scientific library, not least thanks to the very favourable price of the printed copy.

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