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BOOKS *et al.*

ENTOMOLOGY

Butterflies and the people who love them

A meandering investigation hints at how much is left to learn about these charismatic insects

By **Anurag A. Agrawal**

The idea of a life cycle is ubiquitous, from industrial resource extraction, production, consumption, and disposal to the various stages through which biological entities pass. And yet there was a time, not so long ago, when the concept of a life cycle was foreign. Imagine 17th-century observers of the Lepidoptera, watching them move from egg to caterpillar to butterfly. What did they make of these creatures? "Are they two species or three?" they might have wondered.

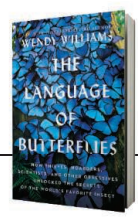
In *The Language of Butterflies*, Wendy Williams chronicles some of the key events in the history of butterflies, spanning the geologic record to current population declines. The book flits from personal journey, to the work of scientists, to the biology of butterflies, weaving a conversational and accessible lyric. The target audience is interested naturalists, butterfly lovers, and science enthusiasts who want to know more about the lives of butterflies and those who chase them.

At her best, Williams digs deeply into the lives of both butterflies and scientists—reporting, for example, on the spectacular discoveries, personal life, and writings of Maria Sibylla Merian. One of the great naturalists of the 17th century, Merian directly observed insects in Europe and Suriname, beautifully rendered their life cycles, and connected the dots between egg, caterpillar, and butterfly in insightful books. Williams's treatment of the accumulation of knowledge about butterflies through history—from Merian's journey to the current state of biological knowledge—is informative and illuminating.

Although *The Language of Butterflies* frequently shifts topics and lacks a thesis or core message, several threads bear notice. For example, the book advances the notion that there is something special about color being eye-catching to many animals. Unfortunately, Williams fails to offer insight into the evolution of color, its diversity, and its impact on ecological interactions. One is left wondering how much of a butterfly's coloration is dictated by the mating benefits it confers, advertisement of toxicity to their predators, and evolutionary pressure to absorb particular wavelengths of light. Do the contributions of these pressures vary among species?

Midway through the book, the focus turns to one of the world's most popular insects, the monarch butterfly. Williams narrows in on the smaller California population of monarchs, which often receives less attention than the hordes in the east that travel to Mexico. Here, we meet schoolchildren and entomologists and learn about the coevolutionary interaction between monarchs and milkweed, the species' only larval food source.

Sometimes Williams's poetic license obscures her point, as when she discusses the evolution of the Lepidoptera: "When flowers evolved, they gradually enslaved some of the moths and turned them into butterflies, who would perform important duties for their flower masters." Even so, as she reveals, there is still much to learn about how species such as the monarch transform from egg to caterpillar to butterfly, about the nature of their long-distance migration, and about the causes of their population declines in both eastern and western North America.



The Language of Butterflies
Wendy Williams
Simon and Schuster, 2020.
240 pp.

Although an exclusive focus on monarchs would be easy to defend, Williams also writes about conservation efforts for lesser-known butterflies—for example, the Fender's blue butterfly, which relies on a rare lupine to complete its breeding cycle. The Fender's blue conservation project in Oregon mirrored an earlier conservation success, that of the endangered large blue in Europe. In both cases, Williams documents how unraveling the basic biology and entire life cycle was critical to bringing these butterflies back.

Still, I would have liked to have seen stronger comparisons across different species. How do the ecologies of monarchs and Fender's blue butterflies differ, for example, and what does this mean with regard to each species' role as a conservation case study? What have we learned about evolution from the divergent strategies that different butterfly lineages have taken?

While *The Language of Butterflies* unlocks no intellectual puzzles, it does extend the common view of butterflies beyond mere eye candy to connect readers to nature and biology in a potentially generative manner. ■

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