

BOOK NOTICE

ANURAG AGRAWAL. 2017. **Monarchs and Milkweed: A Migrating Butterfly, A Poisonous Plant, and Their Remarkable Story of Coevolution.** (ISBN-13: 978-0-691-16635-3, hbk). Princeton University Press, 41 William Street, Princeton, New Jersey 08540, U.S.A. (Orders: press.princeton.edu). \$29.95 US, 295 pp., color photos, drawings, graphs, 7" × 9".

From the publisher: Monarch butterflies are one of nature's most recognizable creatures, known for their bright colors and epic annual migration from the United States and Canada to Mexico. Yet there is much more to the monarch than its distinctive presence and mythic journeying. In *Monarchs and Milkweed*, Anurag Agrawal presents a vivid investigation into how the monarch butterfly has evolved closely alongside the milkweed—a toxic plant named for the sticky white substance emitted when its leaves are damaged—and how this inextricable and intimate relationship has been like an arms race over the millennia, a battle of exploitation and defense between two fascinating species.

The monarch life cycle begins each spring when it deposits eggs on milkweed leaves. But this dependency of monarchs on milkweeds as food is not reciprocated, and milkweeds do all they can to poison or thwart the young monarchs. Agrawal delves into major scientific discoveries, including his own pioneering research, and traces how plant poisons have not only shaped monarch-milkweed interactions but have also been culturally important for centuries. Agrawal presents current ideas regarding the recent decline in monarch populations, including habitat destruction, increased winter storms, and lack of milkweed—the last one a theory that the author rejects. He evaluates the current sustainability of monarchs and reveals a novel explanation for their plummeting numbers.

Lavishly illustrated with more than eighty color photos and images, *Monarchs and Milkweed* takes readers on an unforgettable exploration of one of nature's most important and sophisticated evolutionary relationships.

Anurag Agrawal is a professor in the Department of Ecology and Evolutionary Biology and the Department of Entomology at Cornell University. He lives in Ithaca, New York.

I've had a long standing interest in poisonous plants, and therefore I clued in on part of the subtitle of this book, *A Poisonous Plant*. Agrawal fascinates the reader with the history and chemistry of cardenolides in plants. Little did I know, that a similar, if not the same, cardenolide (ouabain) is self-produced in humans to regulate heart rate and strength of contraction. But don't go out and eat any milkweeds (*Asclepias*)! Scientific evidence suggests cardenolides strongly influence heart function in vertebrates, and milkweeds produce these toxins (or medicines) as a defense against herbivores that eat the plant tissues. Chapter 3, *The Chemistry of Medicine and Poison*, includes a discussion on medicinal properties of cardenolides, Chemistry 101, Like Oil and Water, Coevolutionary Chemistry, and A Diversity of Toxins. I thoroughly enjoyed this rich chapter in the book. —Barney Lipscomb, Botanical Research Institute of Texas, Fort Worth, Texas, U.S.A.