



## REVIEW

### *Understanding Galápagos: What You'll See and What It Means*

by Randy Moore and Sehoya Cotner  
New York: McGraw-Hill, 2014. 425 pages

reviewed by **Kenneth S Saladin**

Commercial tourism in the Galápagos Islands began in 1958, soared dramatically in the 1990s, and now attracts more than 170 000 tourists per year. Such a burgeoning business sustains an abundance of books on the Galápagos, ranging from pocket field guides to coffee table photo books. But no other travel guide to my knowledge has undertaken what Randy Moore and Sehoya Cotner have done in *Understanding Galápagos: What You'll See and What It Means*. The operative words are *understanding* and *what it means*. *Understanding Galápagos* is meant to redress the paucity of evolutionary insight in other guidebooks, which tend, as the authors say, to “gloss over evolution without linking it to what visitors actually see in the archipelago.”

Moore and Cotner begin with a primer on the basic principles of evolution as applied to the archipelago. Chapter 1 is a lucid essay that should be easily understandable even by nonscientists, explaining how the island life demonstrates such fundamental principles as mutation, genetic drift, gene flow, and adaptation. However, the founder effect, so important in island biogeography, is curiously absent.

When I learned about the Galápagos as a teen, I pictured the islands as an uninhabited, unspoiled wilderness, still in a pristine state. But when I first visited the islands thirty-seven years later, I was astonished to find a profusion of hotels, restaurants, Internet cafes, gas stations, pool halls, dive shops, fishing docks, a busy harbor, and streets bustling with taxis. How wrong my early image had been; how greatly the state of nature had been disrupted by residents and tourists. Chapter 2 of *Understanding Galápagos* surveys this human engagement in a year-by-year timeline from the discovery of the archipelago in 1535, through US military occupation in World War II and repeated offers to purchase or lease the islands, to current issues of tourism and battles to protect and restore the ecosystem.

As one who teaches courses on the Galápagos, I found this chapter full of interesting and useful insights and corrections of widespread misconceptions about Galápagos history. Having been there nine times, I could see this history in the context of sites I have visited. However, most visitors to the islands have never been there, cannot visualize this history in terms of places they have seen, and are there primarily for the wildlife and volcanic geology. Readers may find this 58-page timeline a bit of a hurdle standing in the way of geological and biological chapters of more immediate interest. It might have been more aptly positioned as an appendix or a segue into chapter 11, “The Future of Galápagos.”

Chapter 3 concerns the volcanic geology and climate of the islands and chapter 4 is a handy guide, island by island, of what the average visitor will see. The latter will be a welcome resource to ecotourists who, as they cruise to the next destination, may want to read ahead and learn what to expect of that site; or who, upon leaving a site, might like to read about the deeper significance of what they just saw. For each island, Moore and Cotner provide a synopsis of its other historical names, whether Darwin visited there, its age and physical geography, whether it is inhabited, and what animals and plants visitors usually see there. There follows an engaging narrative description of the island's visitor sites, trails, and beaches; the most conspicuous aspects of the landscape and wildlife; and a bit of the island's history.

Chapters 5 through 10 are on the natural history of the birds, reptiles, mammals, fish, invertebrates, and plants. These chapters are perhaps best digested after one has had a swim or hike and returned to the boat with notes, photos, and memories of the species seen. For each species, Moore and Cotner provide the common and scientific names, comparisons to similar species, where the species can be seen, residence status (endemic, introduced, and so on), the human impact on their populations, IUCN conservation status (least concern, threatened, or endangered), and then usually a wonderfully engaging fulfillment of the book's titular promise, an explanation of "what it means." Chapter 5 has one of the best available descriptions, for its length, of the evolutionary biology of the Galápagos finches.

One needn't have a biology background to enjoy and profit from this book. Yet those who have had a course that covered fundamental principles of evolution will find captivating insights into how the animals and plants seen at first hand demonstrate so many familiar textbook concepts. In all my trips to the Galápagos, I have never had a local guide who seemed very knowledgeable about evolution. Some were indifferent to the subject, some were patently creationist, and one was outspokenly contemptuous of evolution and Darwin. Most of my guides have been eminently helpful for species identification, but their remarks have been largely limited to descriptive natural history of the species and geological formations we've seen. For visitors who want some evolutionary insight, *Understanding Galápagos* will fill the void.

The islands are like a biology textbook that comes alive at one's very feet, if one knows what to look for. Moore and Cotner are professors of biology at the University of Minnesota and have led over thirty trips to the Galápagos. They combine a highly engaging writing style with a solid command of the natural history. They do the best job of any writers I have seen in bringing out the evolutionary lessons to be learned on a typical weeklong tour of the archipelago.

Readers who want just a quick run-down of the most visible species in the islands, however, might feel a little daunted by the many theoretical digressions in these chapters. Between one species and the next, the reader finds academic discourses on genetic drift, cooperative polyandry, mate-choice mathematics, definitions of species, mitochondrial DNA, hybridization, lekking, siblicide, parent-offspring conflict, and other basic principles of sociobiology and natural selection. Fascinating stuff for me, but perhaps a bit much for readers who just want to know the distinguishing marks of a species and a bit of its behavior. Many readers might have preferred, for example, a quick rundown of the core biology of all fourteen finches and then a discussion of the evolutionary principles on display in

this group. Between the discussions of the medium ground finch and of the large ground finch, for example, come nearly three pages on the significance of beak sizes in finches, evidence of heritability of beak size, and how the medium ground finch demonstrates basic Darwinian tenets of natural selection. Descriptions of the four mockingbird species are intermingled with discourses on mockingbird origins, mitochondrial DNA, molecular phylogeny, altruistic nest helpers, and genetic drift in small populations. It is a little hard to spot where the theoretical discussion ends and the next species is introduced. It might have worked better to describe all the finches, then the theoretical aspects of Galápagos finch evolution; all the mockingbird species, then the theory.

Chapter 11, “The Future of Galápagos,” is an insightful read but not a happy one for those who love these islands. It discloses in stark and dismal figures how much the Galápagos have been damaged by immigration, fishing and farming, and the tourism industry and infrastructure it requires. Among the problems darkly looming are introduced species from goats and pigs to fire ants and wasps, the tons of trash generated in the towns, illegal fishing fueled by lucrative prices for shark fins and sea cucumbers in Asian seafood markets, and the tension between those who would preserve the natural ecosystem as unspoiled as possible and residents who feel a right to fish and farm as they please in their own country.

*Understanding Galápagos* ends with a checklist for recording the species one sees (chapter 12) and with eight appendices providing GPS coordinates of the visitor sites and major features of the terrain, information about accommodations and how to tour the islands, site names and species that commemorate Darwin, rules of the Galápagos National Park, information for scuba divers, photographic tips, advice about how to pack for the trip, and contact information for organizations worldwide that support the work of Galápagos conservation and welcome one’s further engagement and contributions. Ten pages of literature references support Moore and Cotner’s admirable credibility and the assiduous fact-finding that went into this book.

*Understanding Galápagos* has a center section of 50 color photos of the islands’ scenery, animals, and plants, and 74 black-and-white illustrations dispersed throughout the chapters. Nevertheless, one should not count on this book as a field guide to species identification. The descriptions of animal and plant species suffer from being only verbal, with few photographs or even line drawings to aid in their recognition. For field recognition, I recommend taking an inexpensive, rugged, pocket-size photographic field guide such as *Wildlife of the Galápagos* (Fitter and others 2002). But for true insight and delightful reading while cruising from one island to the next, you can’t do better than Moore and Cotner. This is clearly the most biologically intelligent guidebook to the Galápagos for those who want more than just a species description, location, and a bit of behavior and natural history of each species. Some people already suffering from “sticker shock” at the expense of visiting the Galápagos may gulp at the added expense for this book, about \$66, when other guidebooks to the Galápagos are available for \$20 or less. But its evolutionary insightfulness and up-to-date information amply repay the investment.

## REFERENCES

Fitter J, Fitter D, Hosking D. 2002. *Wildlife of the Galápagos*. Princeton (NJ): Princeton University Press.

**ABOUT THE AUTHOR**

Kenneth S Saladin was a founding board member of the NCSE and is Distinguished Professor of Biology at Georgia College & State University. He is the author of three college textbooks of human anatomy and physiology. Since 2002, he has taught a course on the natural and cultural history of the Galápagos Islands and has led nine travel groups to the Galápagos, especially on student study abroad. He is a major donor to ecosystem restoration projects in the Galápagos and infrastructure projects at the Charles Darwin Research Station.

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