

naturalists, the plates and photographs deliver in spades. It may have not seemed that way before this year, but now we know we need to understand bat biology a lot more than bats need to understand us humans.

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THE SOLITARY BEES: BIOLOGY, EVOLUTION, CONSERVATION.

By Bryan N. Danforth, Robert L. Minckley, and John L. Neff; artwork by Frances Fawcett. Princeton (New Jersey): Princeton University Press. \$45.00. xiii + 472 p. + 16 pl.; ill.; subject and taxonomic indexes. ISBN: 9780691168982. 2019.

Public awareness of bee declines and consequences for natural systems and food security has sparked a fascination with pollinators and motivation to help them. Emphasis to date has been focused on honey bees, the well-studied and managed social species that are not native in most of their current range. Their cultural significance and importance for agriculture means the needs of honey bees are generally considered over those of wild, native solitary bees, which are diverse and in gardens and parks all around us, yet more misunderstood. Enter *The Solitary Bees*, arguably the most complete account of solitary bee biology, evolution, and conservation, and filling a textbook gap yearned for by mellittologists for years. No volume is as current and comprehensive on the topic of these important wild pollinators.

To say bees are charismatic is an understatement, and *The Solitary Bees* is filled with entertaining examples, anecdotes, and vignettes that illustrate their unique and incredible lives. Readers are carried chapter by chapter, as the vivid story of solitary bees unfolds beginning with their evolution and diversification, then reproduction, nest building and development and, finally, as pollinators and conservation needs.

This volume is more textbook than field guide; drawn images, photographs, and figures richly illustrate life history, rather than acting as a reference for taxonomic identification. The book is not activity-centered with applied approaches to “saving the bees”; for example, those seeking schematics or instruction to build bee hotels or pollinator gardens. However, the outcome for readers of any skill level is a deep understanding of bees and their needs. Nestled in between field guides and pollinator action-oriented works, *The Solitary Bees* adds synergy to any at-home or in-laboratory library.

Our laboratory selected *The Solitary Bees* as the book club publication we discuss in weekly meetings, and it has upgraded our knowledge of bee natural history and evolution. For example, we had collec-

tive appreciation that bees evolved from hunting wasps but were surprised to learn current understanding hypothesizes a highly derived group of thrip-collecting wasps as the origin of bees (thrips are tiny insects often feeding on flowers). The book is also filled with data-rich tables that are a great source of new research questions and ideas. Tables summarize findings on a variety of topics from the literature, much of which is difficult to collect from regional or societal journals, and seldom accessible to the public. In this regard, *The Solitary Bees* is invaluable for future generations of students and researchers, and this literature-combing exercise exerted by the authors is among the volume’s most valuable offerings.

Danforth et al. express that their life-long fascination with solitary bees is partly due to a bee’s simplicity of being: rapidly moving from reproduction to nest building to foraging, and over a short activity period. In contrast, the contribution of this volume is nothing near simplistic or short. *The Solitary Bees* represents what will be the standard go-to textbook on these fascinating and diverse pollinators for years to come.

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WASP. *Animal Series.*

By Richard Jones. London (United Kingdom): Reaktion Books. \$19.95 (paper). 207 p.; ill.; index. ISBN: 978-1-78914-161-0 (pb). 2019.

TROUT AND CHAR OF THE WORLD.

Edited by Jeffrey L. Kershner, Jack E. Williams, Robert E. Gresswell, and Javier Lobón-Cerviá. Bethesda (Maryland): American Fisheries Society. \$79.00. xxvi + 831 p.; ill.; index. ISBN: 978-1-934874-54-7. 2019.

Although the 21 chapters in this volume are not clustered into sections, the book can be easily organized into three. The first section, an introduction plus five chapters, reviews fundamental biology (systematics, ecology, life histories) and cultural values of trouts, chars, and freshwater relatives, subfamily Salmoninae, family Salmonidae. The second section consists of 11 chapters, totaling over 400 pages; each chapter is a review of trouts and chars by geographic region. The last section of four chapters examines management and conservation of native and introduced populations, and the potential effects of global climate change on these coldwater-adapted fishes. Each chapter includes a well-stocked reference section, providing an aspiring fisheries biologist or a veteran ichthyologist with a good resume of significant literature.

The first section of this volume could serve as a stand-alone primer summarizing trout and char

systematics and ecology. Two chapters (by Keeley and Whiteley et al.) outline our current understanding of salmonine phylogenetics. The chapter by Jonsson et al. is an elegantly clear introduction to life-history strategies and variability exhibited by trout and char, as well as their freshwater relatives huchen, taimen, and lenok. A main point of their chapter, to be reasserted the third section of the volume, is the high degree of integration of salmonid fishes into their landscape and the necessity to conserve at the scale of the watershed.

The second section comprises substantive chapters on the primary regions of trout and char biodiversity: North America, the North Atlantic, northwestern Europe, Russia, and Japan; as well as useful introductions to native Mediterranean Basin trouts and the swarm of endemic southeastern Europe/southwestern Asian trouts. The chapter on Mexican trouts, related to congeners in the Cordillera to the north, and the two chapters reviewing the odd endemic trouts of the Mediterranean Basin, southeastern Europe and southwestern Asia host wonderful illustrations (Mexican trouts) or high-quality photographs (North Africa; southeastern Europe) of these poorly understood taxa, as well as resumes of discovery that are not generally appreciated by those of us who view the map of salmonids with a central point in the Arctic Ocean, and the outer boundary around the 35th parallel (north). The two chapters on Russian and Japanese trout and char diversity and life histories condense and document decades of high-quality research, opaque to scientists not fluent in those languages. There are also nice chapters providing coverage of salmonines introduced into the Southern Hemisphere as sport fisheries. The concluding chapters on conservation and management are timely, summarizing the substantial pressures on native trout populations, and anticipating their future amplification.

I count more than 120 authors for this compilation. The editors are to be congratulated on the sheer magnitude of this collective, and for the production of what is the best and most current one-stop review of the diversity and basic biology of these beautiful fishes.

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ALLIGATORS: THE ILLUSTRATED GUIDE TO THEIR BIOLOGY, BEHAVIOR, AND CONSERVATION.

By Kent A. Vliet; Photographs by Wayne Lynch. Baltimore (Maryland): Johns Hopkins University Press. \$49.95. viii + 291 p.; ill.; index. ISBN: 9781421433370 (hc); 9781421433387 (eb). 2020.

This volume consists of 14 chapters, two appendixes, an index, and more than 100 color photographs. It is clearly designed to be an attractive and informative coffee-table book, not a reference source. Few citations are given to support statements, but there is no bibliography or list of key research papers provided. However, the author's academic credentials and his field experience with alligators assure readers that his knowledge of the biology and behavior of alligators is sufficient for him to tell the story of this remarkable reptile.

The two introductory chapters provide general, often entertaining, historical information about alligators, including their original descriptions by early naturalists, their connection to Native Americans, and their persecution during European colonization and settlement. One section discusses three claims about associations between American alligators and U.S. presidents. A list of popular perceptions about alligators is presented. Each is dismissed as false. Appropriate photographs and illustrations accompany a general overview of alligator anatomy and basic behavior. Subsequent chapters discuss the geographic distribution and behavior of alligators with regard to habitats and climate. Diet and reproduction are suitably covered, again with exceptional photographs, including ones of the water spray phenomenon caused by vibrations of a bellowing alligator's back.

A full chapter is devoted to the two other families (Crocodylidae; Gavialidae) in the order Crocodylia and the other 25 currently recognized species besides the American alligator (Alligatoridae). The information provided about the different modern crocodylians in regard to nesting patterns, fossil records, and skull and teeth morphology offers comparisons of this extraordinary group of reptiles. One interesting chart is a list of officially accepted body size records of alligators from each of the 10 U.S. states where they occur. These sizes were not derived from scientific research. They are based on measurements of harvested alligators taken by wildlife departments. The record for length (snout to tip of tail) in most states is between 4.0 and 4.9 m. The heaviest reported weight was more than 460 kg.

The book benefits greatly from Wayne Lynch's outstanding nature photography, which complements the text in each chapter. Some are spectacular, up-close shots of these iconic reptiles. Others show captivating views of various natural habitats of alligators. One eye-catcher is a snowy egret standing