

Greenberg describes the special communities of the Chicago region with skill. Each new generation of Chicagoans needs to hear about the vulnerability of Lake Michigan. How new species, from the lamprey to the zebra mussel, invade Lake Michigan via canals and ships is a warning that must be sounded over and over. New invasions of the lake are still occurring. The huge marshes of the Calumet and Kankakee rivers once held innumerable birds and remained a wilderness far longer than their nearby location would suggest. The drainage of the Kankakee marsh was completed in 1917. Surprisingly, Greenberg found no records that the people who hunted and fished in these marshes stood up for them as they were being drained. Today there is an attempt to rebuild a small part of the marsh, but although the U.S. Fish and Wildlife service has authority to establish a refuge in the Kankakee basin, local opposition has foiled progress.

After completing the description of the communities, Greenberg marches through taxonomic groups, insects, reptiles and amphibians, birds, and mammals. In the insects we learn that "several insects have suffered major population crashes for reasons not understood." Other insects have been rediscovered after many years of neglect, many through the efforts of Dr. Ron Panzer. In the faunal chapters we learn that populations of reptiles and amphibians have been especially hard hit by changes in the region. None of those species has rebounded the way some birds and mammals have. Canada geese, sandhill cranes, white-tailed deer and coyotes were pushed to the edge of extinction, but have rebounded recently. Greenberg tells all these stories beautifully. As might be expected from an observer focused on birds, the information on mammals is not always accurate. *Peromyscus maniculatus* is described as among three species "that have expanded their ranges and numbers over the years" when the reality is that the prairie deer mouse (*Peromyscus maniculatus bairdii*) has declined from being 85% of the *Peromyscus* to less than 1% (Pergams, O. R. W., and D. Nyberg. 2001. Museum collections of mammals corroborate the exceptional decline of prairie habitat in the Chicago region. *Journal of Mammalogy* **82**: 984–992).

The book includes 94 figures, some of which are maps but most of which are old, interesting photographs. Appendices, notes, bibliography and index occupy 123 pages. With so many species and people in the text, it is not surprising that not all possible entries are in the index. The notes include the results of many interviews and personal communications that add flavor to the book.

The final 12 pages present a view of the future. A trend that I noted is that the "Chicago Region" continues to expand. Early books included most of Cook County and parts of Lake Counties of both Illinois and Indiana. Greenberg and the popular flora by F. Swink and G. Wilhelm (1994. *Plants of the Chicago Region*. Fourth edition. Indiana Academy of Sciences, Indianapolis, Indiana) include counties in Wisconsin and Michigan, as well as Illinois and Indiana. Other trends include people trying to create residential areas hospitable to native plants and animals. There certainly are more glossy photos of local nature now than ever before. Whether that means that "natural history and conservation have moved into the realm of the mainstream" as Greenberg suggests in his preface or rather that people are so isolated from nature that their experiences of nature depend on photographic or some other technological interface is an open question. Many species have prospered recently because game is no longer a substantial part of urban diets. Native species will persist in the Chicago region and even in the city itself, but native communities probably will not unless people are willing to devote resources to that goal.

The natural history of the region is rapidly evolving, but *A natural history of the Chicago Region* is the fittest source of information on the flora and fauna and is likely to remain so for many years.

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PLANT–ANIMAL INTERACTIONS FOR THE CLASSROOM

Herrera, Carlos M., and Olle Pellmyr, editors. 2002. **Plant–animal interactions: an evolutionary approach**. Blackwell Science, Malden, Massachusetts. xii + 313 p. \$69.95, ISBN: 0-632-05267-8.

Since the majority of animals rely on energy fixed by green plants, it's no wonder that the study of plant–animal interactions is a mainstay in ecology. Given the popularity of plant–animal interactions research, it is perhaps surprising that few textbooks have emerged on the topic. We welcomed the volume edited by Herrera and Pellmyr because the last

two texts on the topic were produced over 15 years ago. This attractively packaged paperback is targeted at entry-level graduate students and upper-level undergraduates. Indeed, a successful text in plant–animal interactions would introduce readers to the rich natural history of interactions, modern conceptual issues, and enough methodological detail to seed ideas on how to tackle the important questions. The ideal textbook on plant–animal interactions would also include a wealth of information across levels of biological organization, from a healthy dose of mechanistic (i.e., chemical and molecular) to holistic (i.e., community and ecosystem) studies, spanning the range from ecology and behavior to micro- and

macroevolutionary theory. This admittedly tall order would be quite difficult to synthesize, organize, and present in a single book.

To tackle plant–animal interactions in a somewhat more manageable approach, Herrera and Pellmyr chose an evolutionary approach, while focusing on terrestrial and macroscopic organisms. This text covers the major areas of plant–animals interactions thoroughly, nicely balancing both ecological and evolutionary approaches, and plant vs. animal perspectives. An emphasis on multi-species plant–animal interactions was also pervasive throughout much of the book. We found this perspective to be a refreshingly modern approach since these interactions have historically been viewed as a pairwise process between two species. Ample space is devoted to understanding the net outcome of simultaneous natural selection by mutualists and antagonists. The balanced approach is reflected in the book's structure; two chapters each are devoted to sections titled "mostly antagonisms" and "mostly mutualisms." These titles appropriately recognize the context dependence of most species interactions.

In general, the chapters of Herrera and Pellmyr's edited volume provide consistently thorough coverage of the major topics and conceptual issues in plant–animal interactions and we appreciated the integration of evolutionary and ecological approaches. We found chapters 3–9 to be particularly synthetic and broad in their scope. Our favorite chapters were those by Strauss and Zangerl (plant–insect herbivore interactions), Pellmyr (pollination), and Thompson (the future) because they seemed balanced in their treatment, covering ecology to macroevolution, and targeted the right audience. Equally interesting, although less evolutionary in their approach, were the chapters by Danell and Bergström (mammalian herbivory), Herrera (seed dispersal), and Beattie and Hughes (ant–plant interactions). If the lack of strong evolutionary approaches truly represents a gap in those subdisciplines, it would have been nice to highlight those missing links and provide a road map for how to proceed in unraveling the evolution of those interactions. Perhaps the only major terrestrial interaction that we would have liked to see covered in a separate chapter would have been plant–parasitoid interactions. A large literature now indicates that plants release cues that directly attract parasitoids and there are numerous studies on how parasitoids use this information to find hosts, and on the ultimate trophic consequences of the interaction. The chapter by Beattie and Hughes covering ant–plant interactions highlights some of the same conceptual issues, but is also distinct.

Although the book has the usual advantages and disadvantages of an edited volume, the big advantage is that chapters are written by experts in each field. Having said that, we found the first two chapters of *Plant–animal interactions* difficult to digest. Price's introductory chapter presents an attempt at broad synthesis. Although his approach leads to a plethora of useful information, it is often dwarfed by too many

details, too much terminology, and overly complex figures. Labandeira's chapter on the history of plant–animal associations is a stimulating addition to the traditional topics covered in plant–animal interactions. Still, at nearly twice the length of all other chapters, the fossil perspective is overly descriptive and borders on encyclopedic.

Our other criticisms are few and relate primarily to the treatment of coevolution, which is perhaps the most recurring theme in this text. Although several chapters use coevolution as a driving conceptual framework, it is defined and redefined in different chapters without parallel structure (i.e., micro- vs. macroevolutionary definitions). Given coevolution as a theme and the explicit recognition of context dependence in community-wide interactions as the norm, it perhaps surprising that very little attention was given to the diffuse coevolution concept—that is, community members may alter the patterns of reciprocal selection in a binary species interaction. Although Labandeira briefly introduces diffuse coevolution, he does so strictly in a phylogenetic perspective and dismisses it as too difficult a process to evaluate because of the multitude of mechanisms that can result in diffuse coevolution. John Thompson has recently advocated the abandonment of the diffuse coevolution concept, and perhaps the authors of this book have followed his logic. However, several authors present examples of community members altering the patterns of reciprocal selection, and we feel that development of the diffuse coevolution concept would have strengthened the conceptual backbone of the book.

Overall there is much to recommend this book and we both plan to use it as background material for future upper-level undergraduate classes in plant–animal interactions. Despite some quirks in a few chapters, we hope to see wide usage of the book as the primary source for a class due to its thorough coverage, balanced approach emphasizing multispecies interactions, and well-conceived future directions. This book is likely to guide the development of research projects by students who will be the next generation to study plant–animal interactions.

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