Biogeography, 2nd Edition
James H. Brown and Mark V. Lomolino
Sinauer Associates, Sunderland, MA, 1998
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A REFLECTION OF how far the field of biogeography has come in the past two decades can be seen by comparing the first and second editions of the popular text *Biogeography*. Fifteen years after publication of the first edition by J. H. Brown and A. C. Gibson, the second edition has been entirely rewritten. Although it still emphasizes ecological as opposed to phylogenetic aspects of biogeography, the text has greatly expanded coverage of topics, reflecting new advances in various subdisciplines of biogeography. The text is extremely well illustrated, which greatly facilitates uptake of the presented concepts. For a relatively comprehensive and fascinating review of developments in biogeography, this new text fills the bill well and strikes a realistic balance between vicariance and dispersalist perspectives.

The book is divided into five units spanning nineteen chapters. The first of the units, "Introducing the Discipline," provides an explanation of what biogeography is and is not, with a nicely written historical treatment of the development of the central ideas. Some readers will find the coverage of recent conceptual advances at this point in the book a bit thin, but after all, the rest of the book is largely devoted to such advances.

The second unit, "The Environmental and Historical Setting," is one of the strengths of the book, in my opinion. The five chapters in this unit cover the earth's physical environment, the factors limiting the distribution of single species, distributions of terrestrial and aquatic communities and biomes, and the changes in earth's climate and land areas over time. The coverage of continental drift and the Pleistocene glacial cycles (the latter have a chapter all to themselves) is likely to serve not only as a good explanation for students, but as a reference source for many professional biologists.

The third unit, "Historical Patterns and Processes," covers a range of related topics affecting species distributions, including speciation and extinction, dispersal, endemism, provincialism and disjunction, history of lineages, and reconstructing biogeographic histories. I found the sections on dispersal and on quantification of degrees of endemism and provincialism especially well fleshed out. On the other hand, there was no coverage of some newer advances in applying phylogenetic methodology to reconstruction of biogeographic patterns, such as component analysis (R.D.M. Page, COMPONENT 2.0., Natural History Museum, London, 1993) and dispersal-vicariance analysis (F. Ronquist, DIVA 1.1, Uppsala University, Sweden, 1996). This is surprising considering the high level of current interest in these methods. If there is a major weakness in this book for use as a text, it is in this area.

"Contemporary Patterns and Processes," the fourth unit, focuses on island biogeography and general patterns of species richness and community assembly and evolution. It is clear that the authors have an especially strong background in the process topics, which are covered in relatively more detail (especially island biogeography, colonization vs. extinction, etc.) than the more taxon-based historical approaches surveyed in the previous unit. Historically, the concepts covered in Unit Four are extremely important in the development of biogeography as a field, so it is perhaps appropriate that they be treated so thoroughly.

The final unit, "Biogeography and Conservation," is an especially welcome inclusion as it covers an area of intensive current research and interest. However, the first chapter in this section, "Continental Patterns and Processes," seems misplaced in the fifth unit, as it features large-scale patterns of faunal assembly and interchange, rather than conservation issues. While it does set up the following chapters on biodiversity in some ways, thematically it seems better placed in Unit 3 or 4, along with other historical or current processes affecting biotic distributions. The next chapter, "The Status of Biodiversity" and the last, "Biogeography for the Twenty-first Century," are where the biogeographic aspects of biodiversity loss are dealt with most directly. Emphasis is placed on extinction rates, hotspots of biodiversity, the role of biogeographic theory in designing nature reserves, and the impact of exotic species invasions. While these issues are well reviewed, I was disappointed to see no mention made of the multidimensional quantitiative mapping tools now being used to prioritize areas for biodiversity conservation (e.g., WORLDMAP, P. H. Williams, Biogeography and Conservation Laboratory, The Natural History Museum, London, 1994). These tools provide excellent practical examples of how biogeographic information can be used in conservation decision-making, and would have been useful to include here. The next-to-last chapter, "Applied Biogeography: Single Species," deals well with the impacts of habitat fragmentation and range collapse on species viability, and includes an interesting section on historical aspects of human biogeography and the lessons we can draw from them.

All in all, as a practicing systematist, I really enjoyed reading the book, and learned much that is new from it. The new edition of Biogeography is a synthetic, up-to-date and relatively comprehensive review of the field. Readers interested in current developments in phylogenetic aspects of biogeography and in the applications of computer technology to solving geographical problems in biodiversity conservation will need to supplement this text with other readings. For a huge array of other aspects of biogeography, however, the authors have done a masterful job of pulling materials together into a highly readable synthesis. I

think it is not too much to say that virtually any student or professional scientist in ecology or systematics would benefit from reading this book, and in keeping it as a reference. Readers wishing to see where the field is several decades after the advent of island biogeography theory are in for a treat.

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The Biopesticide Manual
L. G. Copping, ed.
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FOLLOWING THE TRADITION of *The Pesticide Manual*, the British Crop Protection Council (BCPC) now offers the first edition of *The Biopesticide Manual* that is edited by L. G. Copping. The book presents five sections including natural products (30 entries), pheromones (45), living systems (60), insect predators (40), and genes (13). A surprising aspect of this "biopesticide" book is the inclusion of pheromones, predators, and parasitoids although this must have been a commercial decision to expand the potential audience and market. A very useful feature of the work is the inclusion of addresses of companies involved in the biopesticide area (as defined by the BCPC). Hopefully, future editions will contain e-mail addresses and web site listings that are available for many of the companies listed in the book.

Unfortunately, there are a number of mistakes and typographical errors in the book. The listing of parasitoids under the heading "insect predators" and the unfortunate use of the term "parasites" when referring to parasitoids are distinctions that were not, but should have been made. A common statement throughout the book, under the heading "Environmental impact and non-target toxicity," is that the subject being discussed ". . . occurs widely in nature, and is not expected to have any adverse effect on non-target organisms or on the environment." Needless to say, the fact that something occurs widely in nature does not say anything about it being safe or unsafe. However, even with these problems, this book should be a useful tool to practitioners of biological control and those seeking more environmentally friendly methods of pest management.

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Insect Viruses and Pest Management
F. R. Hunter-Fujita, P. F. Entwistle, H. F. Evans, N. E. Crook, and contributors
John Wiley & Sons, Somerset, NJ, 1998
620 pp., $199.95
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WITH IMPLEMENTATION OF the 1996 Food Quality and Protection Act looming on the horizon, our need to investigate and develop alternatives to chemical pesticides is greater than ever. Microbial control agents, such as the entomopathogenic viruses in the Baculoviridae, will enable selective and effective control of pest insects, with minimal impact on nontarget organisms.

One of the most comprehensive texts on entomopathogenic viruses to be published recently is that by F. R. Hunter-Fujita et al. (authors and editors). This opus magnum is divided into four sections: basic principles; world survey, practical techniques; and environmental factors influencing viral survival.

The section on basic principles is subdivided into 10 chapters on the rationale for using microbial pesticides, virus characteristics, assessment of biological activity, baculovirus ecology in insects, control strategies, virus production, formulation, spray application, conducting and recording field trials and future developments. Although this section duplicates much of what has been presented in earlier texts, it brings together information that has not been integrated into one text before, updates earlier information, and broadens the utility of the book. The "rationale" chapter is a concise and convincing justification for the use of microbial control agents of insect pests. A fairly short chapter describing characteristics of entomopathogenic viruses provides a synopsis of each of the families of viruses found in insects with the majority of the information devoted to the Baculoviruses. The chapter also includes the latest nomenclatural information. The next chapter is a short introduction to the principles of assessment of biological activity that is supplemented with detailed "hands on" procedures in part three of the book ("Practical Techniques"). The chapter on ecology of baculoviruses in insect hosts presents a detailed overview of this subject and supplies the reader with a multitude of references. In addition to pathology and the dynamics of virus transmission, biotic and abiotic factors that influence viral activity in insects, persistence of virus in the environment and epidemiology, there is a section on the use of models in understanding and using baculoviruses in pest management. The chapter on control strategies includes the use of viruses in classical and semi-classical biological control, inundative applications, methods to enhance effectiveness and integration of viruses with other pathogens and conventional chemical insecticides. Chapters on virus production, formulation and spray application present a mix of theory and practical information. The most comprehensive of these is the chapter on formulation which includes a broad range of formulation components and their functions. The chapter on "Conduct and Record-

ing of Field Control Trials" delivers a concise overview on a variety of topics related to conducting field trials, including parameters related to the condition of the virus inoculum, virus coverage, susceptibility of the target insect, field design and statistical treatment, and recording data.

Part two of the book, "World Survey" is a review of the usage of entomopathogenic viruses against specific pests from a global perspective. Twelve chapters cover 11 geographical regions in terms of current research and control practices. The introductory chapter by P. F. Entwistle presents an overview in the form of tables for each of the geographic areas covered in subsequent chapters. In addition to the viruses that are addressed in each zone, the tables present an overview of work being conducted on: strain search, characterization, infectivity testing, ecology, safety testing, environmental impact studies, formulation research, field trials, extension trials, production and development, registration, commercialization and sales. The following 11 chapters are contributed by 15 authors, most of which are from the geographic areas being covered. The length and content of the chapters varies, but the reader will be furnished with a summary of fairly up to date information literally from the four corners of the globe. The general format of each chapter includes a regional perspective, information on virus production, formulation, safety tests and registration, and field experimentation. Most of the information regarding field experimentation and efficacy is organized under specific target pest insects.

Part three is an extensive "how to do" section of the book that concentrates on techniques used to work with entomopathogenic viruses and their production in host insects and cell lines. It also includes biochemical and molecular methods (e.g., Western blots, protein assay, polymerase chain reaction) and a variety of useful information from general laboratory practice to spray application. The chapter on mass production, product formulation and quality control actually contains very little regarding mass production, but procedures for production are covered in several other chapters. Procedures for formulating virus supplement the detailed chapter on formulation in part one of the book. The final chapter of the section on registration requirements is a bit out of place in that it does not include practical techniques per se. Chapters in this section will be useful to the novice as well as the experienced insect pathologist and include step by step procedures, materials that are required, and didactic figures and diagrams to assist the user.

Part four on environmental factors influencing viral survival contains two short chapters focusing on solar radiation and the effect plant surfaces can have on viral activity. The solar radiation chapter generally covers the physical properties and biological impact of ultraviolet radiation in terms of damage to DNA, RNA, and proteins. The chapter on plant surfaces addresses the effects of leaf surface macro- and micro-structure, and chemical and micro-meteorological conditions and their measurement.

The book will make an excellent addition to the library of anyone working on entomopathogenic viruses. Its thorough coverage of the subject will provide the reader with a single source of information without the need to cross reference another two or more books. The dedication of the book to the late Norman Crook is a sad reminder that we have lost one of our best in the field of entomopathogenic viruses.

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