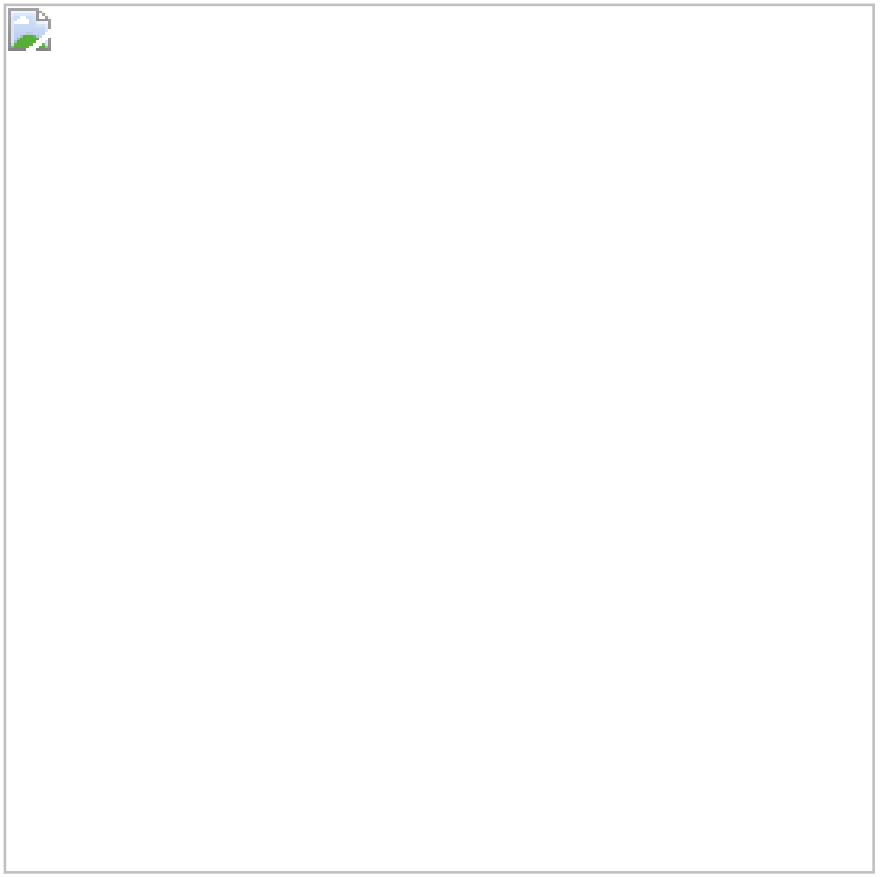

Book Reviews

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Book Reviews

Kunz, T. H., and M. B. Fenton (eds). 2003. Bat ecology. The University of Chicago Press, Chicago, IL, USA, 779 pp. ISBN 0-226-46206-4 (cloth), US$ 55.00

The "Ecology of bats" (Kunz, 1982) was the first technical book that I bought and it became a major influence on how many bat researchers conducted their research. The book has been a primary source of information forming the basis of many publications; just doing a quick search I found 245 articles in which the book is cited! Now, a new generation of scientists is being stewed under the influence of a new "Bat ecology." Similar to the 1982 book, T. Kunz and M. B. Fenton have provided an edited approach with authors charged to summarize the current status of the ecology of bats. Unlike the earlier book, Kunz and Fenton's view is that bat ecology in the last 20 years has developed substantially along a number of prominent areas of research. The chapters are grouped into three parts; I) Life history and social biology, II) Functional ecology, and III) Macroecology. Because of the size and depth of "Bat ecology" and the necessity of limiting the length of this review, I list each chapter and its authors, but only provide detailed comments on selected chapters. Thirty authors, who are globally representative of the discipline, took part in this book and cite literature from significant scientific work up to about 1999.

Because authorship combines a variety of experience that is geographically broad, most chapters follow the format of a succinct summary of past research, highlight the author's most recent findings, and then provide a brief road map telling of emerging or anticipated research pathways from a global perspective. Although "Ecology of bats" covered a wider range of topics, the 15 chapters in "Bat ecology" are more focused and provide more depth to the point of not only forming research questions, but also promoting discussions for advanced graduate seminars.

In the first chapter, "Ecology of cavity and foliage roosting bats," T. Kunz and L. Lumsden summarize much of what is known about basic roosting ecology and the importance of roosts as a vital resource for bats. This is the longest chapter in the book at 87 pages, and perhaps could have been broken into several chapters. Roost ecology of bats has many aspects that include temporal (maternity or bachelor roosts), spatial, and energetic (hibernaculum) aspects and drawing from many other areas of biology such as genetics (relatedness of members of a hibernaculum), behavior (roosting singly or in groups), and conservation (principally roost loss). With so much to cover, the authors had to miss some things, but still came up with a comprehensive treatment. This chapter is often cited elsewhere in the book.

Chapter 2, authored by J. Altringham and M. B. Fenton, explores, "…the diversity of channels for communication…" where signals can be mixed for a variety of signaling purposes. The authors illustrate a range of conditions by using seven well-documented species (*Epomorphorus wahlbergi*, *Rhinolophus ferrumequinum*, *Artibeus jamaicensis*, *Desmodus rotundus*, *Pipistrellus pipistrellus*, *Antrozous pallidus*, and *Tadarida brasiliensis*) and then work through sensory abilities of bats in general (senses of hearing, vision, olfaction, touch, thermoperception, and multimodal perceptions). A large portion of the second half of the chapter was devoted to sound use in communication, highlighting uses of multimodal and mother-young communication. The "Sensory ecology and communication of the Chiroptera" was one of the more modular chapters that could easily be used in a course.

Aspects of sexual selecton and sperm condition are presented by G. Wilkinson and G. McCracken. Their "Bats and balls" chapter is short (28 pages) but heady with ideas that titillates the reader with a round summary of testis size and mating behavior. Their discussion of sperm competition and sexual selection as driving forces in the evolution of testis size in bats was inspiring. I especially found their perspective refreshing and one of the few chapters that approached bat ecology from "outside the box." Ted Fleming and P. Eby discuss migration and many aspects of the consequences of migration for bats (Chapter 4) while R. Barclay and L. Harder (Chapter

5) discuss life history data for bats and suggest that bats spend their lives "in the slow lane" for a variety of reasons.

Part II, "Functional ecology," has five substantial chapters related to ecomorphology, prey and bat interactions, and energetics. "Ecomorphology of bats: Comparative and experimental approaches relating structural design to ecology" (Chapter 6 by S. Swartz, P. Freeman, and E. Stockwell) is a modernized chapter from Findley and Wilson in Kunz (1982). They provide a fresh approach in application of geometric morphometrics in bat morphology. It is well known that morphology dictates an individual's performance limits and restricts behavioral repertoires — a bat cannot fly faster or eat larger prey than its anatomy will allow (Stockwell, 2001), but chapter 6 goes beyond this with a discussion of evidence from studies where ecology of an animal is also strongly influenced by the local environment in which it regularly operates. Case studies are highlighted involving dietary diversity and craniodental structures. Notwithstanding the important connection is made for interpreting interspecific variation found in studies of morphology in the context of well-defined phylogenies. Moreover, the durability of studies that demonstrate effective integration of morphology, ecology, and phylogeny is considered by the authors an essential dimension contributing to the evolution of bats.

Chapter 7 ("Attack and defense: Interactions between echolocating bats and their insect prey"), by G. Jones and J. Rydell, provides a careful, modernized version of the 1982 chapter on patterns of bat coevolution with their prey. Otto von Helversen and Y. Winter (Chapter 8) discuss bat-plant interactions in "Glossophagine bats and their flowers: Costs and benefits for plants and pollinators." Similar in form to many of the chapters in this book, the authors summarize current information on feeding adaptations and nectarivory in bats. They then outline the pollination syndrome and characteristics of bat-pollinated plants. The comparison of species diversity of glossophagine bats with hummingbirds was striking. Detailed accounts of an acoustic relationship between plants and *Glossophaga commissarisi* and energetics of a nectarivourous lifestyle were especially instructive. All this was background for their own research on interspecific exploitation competition and describing the nectar-feeding community that has evolved as plant pollinators. As with most chapters in the book, the authors conclude with,"loose ends and directions for future research." Chapter 9 addresses the other end of plant reproduction and focuses on bats and fruit and how plants rely on these vertebrates for seed dispersal. Betsy Dumont has done a superb job taking her audience through this fascinating realm of resource use using techniques of ecomorphology. The last chapter (Chapter 10) of this section builds upon what the reader may have learned in the previous chapters of food resources and presents energetics of bats in a very straightforward, understandable fashion. John Speakman and Don Thomas – both renowned in this field – have done a splendid job summarizing a tremendous amount of literature in only 50 pages.

The third portion of the book, "Macroecology," begins with a discussion on the evolution of ecological diversity in bats in by N. Simmons and T. Conway (Chapter 11). Bruce Patterson, M. Willig, and R. Stevens (Chapter 12, "Trophic strategies, niche partitioning, and patterns of ecological organization") take issue right off with earlier nomenclature and suggest dropping the usage of guild when applying it to just bats in a community and adopting the term ensemble. Their contribution is a clear and informative discussion of a variety of feeding guilds (=assemblages) that include animalivores and herbivores (and more specialized nectar, pollen, leaf, and fruit eaters). From this foundation they then present evidence for latitudinal and elevational gradients of bat species richness stating that the importance of this work is, (page 565), "…to provide deeper insight to the spatial and temporal dynamics of bat assemblages." As a sequel, these authors (Willig, Patterson, and Stevens — Chapter 13, "Patterns of range size, richness, and body size in Chiroptera") then present patterns of range size and patterns of species richness for species of bats by dissecting and examining patterns resembling latitudinal and elevational gradients. The chapter finishes up with a discussion of patterns of body sizes in bats. It seems from these two chapters, that ecologists and scientists in natural history collections must work closely together to help document the world's bat community and to be able to reliably investigate patterns of diversity especially in a temporal and spatial context of the elevational gradient.

Chapter 14 by S. Messenger, C. Rupprecht, and J. Smith is on emerging diseases in bats and recent patterns concerning "bats and disease." The remainder of this chapter details numerous aspects of rabies concerns in association with bats. This chapter is extremely comprehensive and is likely to clarify issues surrounding bat related zoonoses and as a consequence many researchers will take a hard look at their handling and animal care procedures.

Perhaps the most comprehensive chapter that could have been easily developed into a book on its own is the last chapter (Chapter 15) by P. A. Racey and A. Entwistle on the "Conservation ecology of bats." The goals of this chapter were to review areas of ecological research and how those data can be

applied to the conservation biology of bats. Most importantly, conservation assessments are only as reliable as data in which they are based. This is especially true with regard to bat abundance, distribution, and long-term population trends (LaVal, 2004). Providing the necessary information about least known species has been difficult at best. Resource managers even have had to resort to non-peer reviewed literature or to anecdotal observations to base their decisions. True, managers must evaluate the information at hand, but as biologists, it is imperative to plan research to address gaps in knowledge or test assumptions that may otherwise be baseless. One constant difficulty is in defining the population (Burland *et al*., 1999). Often a colony or hibernaculum is presumed to be a population and researchers often assume this without stating it in their study. Another issue that may be overlooked in conservation ecology discussions is that molecular genetic studies are excellent for evaluating numerous questions, but these studies are based on collections and tissues that have been sampled from live bats. The authors of this chapter review sensitive species status and issues surrounding what might lead to a species becoming rare, endangered, or even extinct. Many of the intrinsic and extrinsic factors that cause bats to decline in number are related to human activities and can be reversed through regulation, education, and increased scientific attention. Most important is that conservation planning depends upon the ability to predict the likely responses of a species to changes in their environment. To know this we must have comprehensive studies with a well-planned and executed study design. Overall the chapter was an outstanding summary to answer the question, "What do we know about habitat use in bats?" through summarizing published data into emergent patterns. Further research is clearly needed to examine relationships between morphology and the impacts of habitat fragmentation.

In summary, chapters are information packed and content driven based on good summaries of papers published in the last 30 years. Each chapter has its own literature cited listing. But the pattern of citations by decade seems typical of what I found for chapter 14: a low in conservation ecology citations with 14 before 1970, then growing to 30 in the 1970s, 65 in the 1980s, and 246 in the 1990's. There are author, species, and subject indexes. Illustrations are all in black and white, and are pertinent and well executed. The writing obviously varies because of the large number of contributors, but the text is informative and readable, although in some places it would be rather difficult for non-biologists. I had assigned several chapters from "Bat ecology" to students in mammalogy class and found them to be mostly an easy read. The book should greatly interest students and professionals working with this large group of mammals, and, to a lesser degree, general ecologists and vertebrate zoologists. Unlike many sensational trilogies in bookstores today, I can hardly wait for a "Bats and their ecology" (or some such titled sequel) due out in 2014.

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ADAMS, R. A. 2003. Bats of the Rocky Mountain West: natural history, ecology, and conservation. University Press of Colorado, Boulder, 289 pp. ISBN 0-87081-736-1 (pbk.), US$ 23.95

The new book, "Bats of the Rocky Mountain West: natural history, ecology, and conservation," by Rick A. Adams attempts to provide a guide for backyard biologist, while functioning as a resource for professionals involved in the research of bats. The book is designed to provide local and regional information about bats while demonstrating the importance and current state of local conservation of bats in the Rocky Mountains. This book aims to fill an overlooked niche in the popular scientific literature, and Adams' emotional devotion to bat conservation is radiated in every aspect of the book.

The most positive aspects of this publication include an attractive cover and dramatic photographs by J. Scott Altenbach and figures by Wendy Smith. This fact was apparently appreciated by Adams, for of the 109 pages of text (species accounts and appendices excluded) 64 include a figure. Twenty one pages of

these are ≥ 80% to full page while the remaining 43 pages include figures of roughly one half page in size. This totals approximately 42 full pages of figures leaving only 67 pages of actual text. Diagrams and photographs immediately capture the eye, and some illuminate points while others merely distract. Additionally, Appendix 2, entitled "Agency Reports by State," appears to be a marginally updated copy of a file of grey literature distributed by the Western Bat Working Group and provides little new information.

Adams includes an interesting cross-disciplinary synopsis of basic bat ecology, geology, and paleontology. This exercise has potential as a worthwhile read for backyard biologists looking for a compact summary of bat natural history. However, professional biologists familiar with the primary literature are left shuddering. The book is full of inconsistencies, oversimplifications, and basic errors. In fact, many topics are handled in such a simplistic way that the discussions are of little use to scientists and the book is most appropriate to those new to bats.

"Bats of the Rocky Mountain West" begins with the necessary basic background information including origins, ecological importance, conservation, and the ever-popular topic of echolocation. Chapter 2 includes a general discussion of the physiography and zoogeography of the Rocky Mountains. Adams zealously delves into an enormous scope of topics, including geology, hydrology, climate, vegetation, life zones, dispersal barriers, and migratory corridors. Chapter 3 focuses on the evolution of bats, including fossils and adaptation. Chapter 4 reviews ecosystems in the Rocky Mountains and associated bat assemblages. Conservation strategies are discussed in chapter 5, and chapter 6 includes species accounts and a regional key. Two appendices contain conservation programs and agency reports.

Adam's enthusiasm and passion for the research and conservation of bats radiates throughout chapter 1, which includes a general discussion of both traditional and contemporary views of bats. As such, this chapter contains the basic pro-bat message included in virtually every popular publication on bats. While Adams' language is unique and interesting to read some scientific terms are left undefined (e.g., page 14 crepuscular foraging), and the list of benefits bats provide is occasionally exaggerated to provide a simple positive message.

Chapter 2 discusses physiogeography, and a large scope of subjects, including details about the Rocky Mountain West, such as climate, hydrology, and life zones (page 31 defines the Rocky Mountains as discussed in the book). This chapter exemplifies one of the most worrisome aspects of the book. Many marginally accepted tidbits are offered in a happenstance manner as fact. For example swarming is decreed mating behavior by Adams, a hypothesis that is not yet strongly supported, in the scientific literature. While semi-informative pictures portray described habitat types and life zones, no map of the distribution of these habitat types is provided. This greatly reduces the value of the chapter to readers as they are forced to either seek other sources of information to cross-reference, or rely on the included photographs for comparison. Simple mistakes abound, for example on page 47 Adams incorrectly states that "because of their increased solar exposure, south-facing slopes exhibit zonation that is higher in elevation than that of north-facing slopes" when in fact, the opposite is true. In addition, Adams' attempt to associate species of bats with vegetation and life zones is too simplistic to be of value. The author infers habitat association without any discussion or appreciation of spatial and temporal variation in the use of habitat by bats. For example, he identifies the long-eared bat (*Myotis evotis*) as a "forest specialist" that is absent from Semidesert scrublands and Pinyon-Juniper woodlands, an inference that is not supported in the literature. In a second example Adams describes Townsend's big-eared bat (*Corynorhinus townsendii*) as a bat of the "montane forests," an association that is simply incorrect throughout much of this species range. In fact, none of the described specific habitat associations can be consistently applied across the "Rocky Mountain West" as defined by the author. Additional problems in this chapter include the use of vague and undefined terms. He fails to define what is meant by habitat associations or species "use" of an area. Adams describes species as "dominant" in a given habitat, with no qualifier or discussion of potential variation in community structure (example page 42 *Myotis yumanensis* dominating Chapparel habitats). In addition, Adams incorrectly identifies the Mexican long-tongued bat (*Choeronycteris mexicana*) as Federally Endangered (U.S.) and fails to include the greater long-nosed bat (*Leptonycteris nivalis*) as a resident of the area, despite its known occurrence in the "Rocky Mountain West" as defined by the author.

The evolutionary origins of bats are discussed in chapter 3. This includes migration patterns and other vaguely related subjects (supposedly included to satisfy the "adaptations" portion of the title). If the jumbled organization of topics is not enough to lose the reader, apparent contradictions in the text will. Adams consistently infers that bats first appeared in the Rocky Mountain region despite the fact that fossils from Europe predate the discovery of *Icaronycteris index* in Wyoming. He suggests patterns of hibernation that are simply not maintained across the Rocky

Mountain Region. He also describes hibernating colonies as being composed of multiple clusters of bats "…, consisting usually of several dozen individuals …" This information is presented as a general pattern supposedly of all hibernating species within the Rocky Mountain Region. However, this simplistic pattern is more the exception than the rule as presence and patterns of clustering vary within and between species across the region. This complexity of hibernation patterns makes the speculation of competition and competitive exclusion that follows meaningless. On page 61 Adams attempts to describe "typical" conditions required for hibernation. His descriptions of what constitutes a usable hibernation site are too simplistic to be of much value. For example, he states that air flow is an important feature of hibernation roosts because it replenishes air supply. This statement is simply not supported in the literature and appears to be speculation rather than a data-based statement.

Additional problems include (page 65) a description of bats navigating during migration using the stars, that is contradicted a few paragraphs later when he declares that it is unknown how bats navigate. Figure 3.7 is shown as representing migration patterns of the hoary bat (*Lasiurus cinereus*), with no explanation of what the lines represent (supposedly these are migratory routes) across the Rocky Mountains. Apparently "patterns" (not defined) follow the lines during both spring and summer migration. These routes would be much more strongly represented by capture locations and dates rather than lines as presented.

In chapter 4 (entitled "Bats in the Rocky Mountain Ecosystems") the author discusses distribution, foraging strategies, and competition. The chapter begins by stating that "Populations of organisms respond to changing conditions through a mindless agent called natural selection, which favors certain adaptations." This simple statement represents the naiveté that pervades much of this book, as a basic tenet of evolutionary theory is that natural selection functions on the individual not population level. Adams goes into some detail about morphological variability in bats and describes these various traits as adaptations associated directly with competition from other species of bats. In fact, Adams seems to assume that all morphology is a direct result of intraspecific competition. On page 83 he states that most nectar feeding bat populations are in danger of extinction, a reactionary and simplistic statement that is not currently supported.

It is in chapter 4 when the occasions of Adams citing his own unpublished data/observations become apparent. In many cases Adams references personal observations from Colorado to infer region-wide patterns. In fact, there are over 15 independent occurrences of Adams citing such observations in chapters 4, 5, and 6.

"Rocky Mountain Bat Conservation Strategies" is the title of chapter 5. The chapter begins by identifying (page 87) the "habitats of greatest value to bats …" as "desert, semidesert, pinon juniper woodlands and riparian systems." This appears to be self-contradictory as the author stated on page 68 that the highest bat diversity in the region is to be found in foothills montane forests (defined on page 43 as "an ecosystem that occurs from 1,706 to 2,743 m and is represented by ponderosa pine …, Douglas fir…, quaking aspen …, and white fir …".

On page 93 Adams suggests that protection of abandoned mines with gates may be problematic and references "recent studies" that indicate that bat gates represent obstacles to bats and infers that these problems are of sufficient concern to warrant the use of fencing rather than gates. The recent study referenced by Adams appears to be that of Ludlow and Gore (2000) who studied *Myotis austroriparius* and *M. grisescens* (neither of which occur in the Rocky Mountain Region) roosting in a cave (not a mine) in Florida. If this is the study in question, it is irresponsible to extrapolate these observations across regional and taxonomic boundaries. Adams references other studies that have compared gated and non-gated mine shafts and found "higher use of the latter, suggesting that gates themselves can adversely impact bat usage patterns." We are unaware of any peer reviewed studies conducted in the Rocky Mountain Region that support this statement. Adams should be clearer in the sources being cited before making recommendations that dramatically effect management programs in the region. General sloppiness continues as Adams falsely labels all mines as shafts (which are by definition vertical). For example, the figure caption of figure 5.5 identifies this adit opening as a shaft. Again, this may seem like a trivial matter, but correct use of terms is a key component of good scholarship. The author discusses the closure of rocks on page 94. He references a survey in Colorado where passes of bats are cited as informing scholars about presence and absence of species, apparently failing to understand that failure to detect does not simply translate to absence.

Reading chapter 6 induces an odd sense of déjà-vu. The wording for nearly every species description bears an uncanny similarity to that of Harvey *et al*. (1999) in the nonprofit book, "Bats of the United States." To fully appreciate the level of similarity, we recommend setting the books side by side and reading the accounts for each species together.

No account is included of *Leptonycteris nivalis* (a species known to occur in the Rocky Mountain West as defined in this book). Considering the regional scale of the book and the limited distribution of most of the species within the range, it is troubling that Adams chose to include outlines of distributions rather than providing capture localities. The author did not update the information for this region by analyzing new specimens, but simply summarizes the work of others for descriptions and standard measurements. As such, the book adds nothing new to our understanding of either specific distributions or morphological variation throughout the Rocky Mountain West. Adams has generously inserted personal observations from Colorado to enhance the natural history accounts of many species. The combination of no new specimens examined, no inclusion of locality and capture records, and infusion of natural history accounts with anecdotal information reduces the value of this book to researchers.

Citations are a problem throughout the book with references given in a random and inconsistent style. Many key arguments are supported by referencing "studies" with no indication given for the source of these references. If this book is designed for a scientific audience (as suggested by Adams), it would be valuable to assign citations in the text with those included at the end of each chapter. As written, it is impossible to distinguish information gleaned from the peer-reviewed literature from anecdotal information and observations made by the author. In our opinion this book provides an outlet for Adams' anecdotal observations in Colorado that he has chosen to extrapolate across the region. As such, the book includes far too many simplifications and overstatements that are not supported. This book does little to advance our understanding of bats in Rocky Mountain West as defined by Adams and we recommend that professional biologists will find better sources of information in the primary literature and books such as "Bats: a natural history" (Hill and Smith, 1984), "Bats: a community perspective" (Findley, 1993), and "Bats of Texas" (Schmidly, 1991).

While the writing style is a nice change from the sterile prose of the scientific literature, it often becomes tedious and somewhat forced. However, the overall effect of the information presented in "Bats of the Rocky Mountain West" is that Adams' intent to debunk stigmas associated with bats has been pushed to an extreme that hinders the coherent conveyance of basic information in a non-biased manner. The book leaves the reader with what can only be described as exposure to pure pedantic dogma. However, it is possible that his simplistic representation of evolution and conservation is acceptable and even of value to non-scientific readers. The author must be commended for his avid push for bat conservation and against the cultural dogma associated with bats. He succeeds in demonstrating the importance of bats (perhaps to extreme) and provides readers with a useful listing of agencies and websites to satisfy their interests.

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CSORBA, G., P. UJHELYI, and N. THOMAS. 2003. Horseshoe bats of the World (Chiroptera: Rhinolophidae). Alana Books, Bishop's Castle, Shropshire, xxxii + 160 pp. ISBN 0-9536049-1-8 (pbk.), GB£ 50.00

In the last few years, mammalian systematic relationships have been addressed with numerous contributions resulting in several substantial modifications of our views on phylogeny of many taxa, including bats. Although changes in bat taxonomy are based on molecular genetics and focus on either vespertilionids or higher levels within Chiroptera, some papers, as well exemplified in "Acta Chiropterologica", offers new views on other bat families, such as pteropodids, hipposiderids or rhinolophids.

For any systematic evaluation, as well as for posing important taxonomic questions, it is necessary to understand in detail the present state of taxonomic conception of relevant group. Such reviews not only result from compilation of extensive bibliography but also from examination of types and other materials in

museum collections around the world, and through intensive field work. Such an approach is a very strenuous and time-consuming procedure, therefore only rarely we meet a new publication that brings a comprehensive view on some higher taxonomic unit like a family of bats. In such situation, we may feel quite fortunate that a long-time announced and wishfully prospective book has just emerged. This publication, created under leadership of Gabor Csorba – a curator of the mammal collection of the Hungarian Natural History Museum – brings up-to-date information on one of the most widely distributed Old World bat families – Rhinolophidae (horseshoe bats). The book offers a detailed overview of the species composition and systematics within rhinolophids. The authors discern 71 species of the only genus of the family, *Rhinolophus* Lacépède, 1799, and provide detailed delineation of their morphology, biology and/or taxonomic affinities.

The book is composed of four unequal parts. It begins with an introductory chapter written by Antonio Guillén, Charles Francis and Robert Ricklefs briefly delineating the molecular phylogeny and historical biogeography of the family. This part has a character of independent chapter and provides a new glance on systematic relationships within the rhinolophid family and its probable taxonomic expression, including the subgeneric division of the genus *Rhinolophus*. The second portion of the book contains several explanatory chapters dealing with the definition of selected morphologic characters and mensural features, and describes different taxonomic levels and biogeographic units. An identification key to species groups and individual species within the family is also provided. The largest part (130 pp.) comprises species accounts, presenting the complete list of currently accepted species of horseshoe bats, aligned in traditional species groups (unfortunately, definitions of mutual characters of species in the groups are not presented). The species accounts consist of synonymies, detailed descriptions, taxonomy (incl. taxonomic alternatives), detailed distribution, and – when available – also notes on biology, ecology and echolocation, as well as the conservatory status. This chapter contains several tables of measurements for each species. Chiefly, most species accounts are well illustrated by accomplished drawings of nose-leaf (both from lateral and frontal views) or of upper tooth-row and outline of rostral part of skull and/or baculum as well as a distribution map of the respective taxon. On separate tables, colour photographs of several species of horseshoe bat are presented. The last part of the book is composed of the very useful geographical gazetteer containing over 2600 sites quoted throughout the text, followed by the list of almost 500 references cited and concluding with a taxon index.

I feel strong necessity to appreciate such extensive work of authors that accumulated almost all available information on individual species and moreover, that evaluated and/or compiled practically all gathered data, including a good number of new ones. On the other hand, I found some minor faults but these do not pertain the taxonomic content of the review. In several cases, distribution maps do not correspond exactly to the species distribution described in text, or the distribution is based on rather old writings and current publications are ignored; for example, the description of species ranges of European taxa is based on publications almost 40 year old although new ones, such as comprehensive book by Mitchell-Jones *et al*. (1999), are available. Also, the distribution of taxa from Mediterranean Africa or Middle East are incorrectly described and shown on the maps. Nevertheless, these imperfections, which usually accompany any compilatory work of such scale, do not reduce the value and importance of "Horseshoe bats of the World".

In conclusion, Csorba's *et al*.'s book is the best monograph concerning horseshoe bats that has ever appeared and I fully agree with the statement by David L. Harrison, who finished the foreword of the book with "This book will be an essential tool for every serious student on bats at the start of the new millennium; it is strongly recommended to all who study bats and indeed to all who have a sense of the wonder and intrinsic value of nature."

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