

BOOK REVIEW

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Csorba, G., P. Ujhelyi, and N. Thomas. 2003. HORSESHOE BATS OF THE WORLD. Alana Books, Bishop's Castle, Shropshire, United Kingdom, xxx + 160 pp. ISBN 0-9536049-1-8, price (paper) £50.00 (approximately US\$90).

Sometime during World War I, systematic mammalogy lost a leading figure: Knud Andersen vanished from the face of the planet. Rumors still abound regarding his disappearance; Corbet and Hill (1992:424) merely stated “disappeared mysteriously in 1918.” Guillén and coauthors (chapter in this work, see below) further indicate that Andersen's last (1918) paper actually was presented by Oldfield Thomas, because Andersen “by then had disappeared under mysterious circumstances.” Although best known for his magnum opus on Pteropodidae (Andersen 1912), Andersen is perhaps less well known for a wealth of articles on bats of the family Rhinolophidae and was responsible for 15 of the species names currently recognized in *Rhinolophus* pursuant to Koopman (1993). Hired by the British Museum in 1904, he published 13 papers on Southeast Asian Rhinolophoidea, including his aforementioned last paper in 1918. Perhaps the complexity of addressing evolutionary relationships among a group of animals displaying highly conservative morphology dictated that—barring J. E. Hill's 1963 revision of the Hipposideridae—no one took on the broad issue of rhinolophoid revisionary efforts until the 2 works by Bogdanowicz (1992) and Bogdanowicz and Owen (1992; jointly cited some 24 times), with the possible exception of 2 broader works on African Chiroptera by Aellen in the 1950s (Aellen 1952, 1957), distressingly cited only in 11 articles to present. Andersen's various papers on Rhinolophidae have been cited in at least 56 papers since 1977. This dearth of literature on a globally, ecologically, and numerically important group of animals leads to a chasm of ignorance regarding this—in every sense of the word—absorbing genus of animals. Sixty-five species were listed by Honacki et al. (1982), 64 by Koopman (1993), and 71 in the work under consideration here, with more undoubtedly to come in the future.

It is this remarkable and inexplicable void in the literature that Gábor Csorba and his collaborators have set out to fill. This rationale is not explicitly stated in the work, but at a recent meeting Csorba explained the genesis of the work to me. Being unable to ascertain the taxonomic identity of some rhinolophid material from Southeast Asia, he borrowed some comparative materials from the Harrison Zoological Museum, which in turn turned out to be a novel subspecies (Csorba and Bates 1995). A similar situation occurred with some specimens of *Rhinolophus convexus* (unreliable characters reported in the literature, no detailed drawings, inconsistent measurements, unidentified materials, etc.). Resolving these issues with a grant from the

Hungarian Scientific Research Fund led, after 3 years, to a draft by Csorba of the present work under the title “Taxonomic Atlas of *Rhinolophus*” with keys, short descriptions, and drawings. Shortly after the completion of this draft, a suggestion from P. J. J. Bates and D. L. Harrison led to the incorporation of all available published information on rhinolophids, as well as inclusion of material on ecology, behavior, feeding, and general natural history. The lack of literature resources readily available to Csorba in Hungary was the impetus for the incorporation of Nikki Thomas as an author, with primary responsibility for all areas of the work outside taxonomy (distribution, habits, feeding, breeding, echolocation, and conservation status), as stated on p. xxxi. Peter Ujhelyi, a long-time collaborator of Csorba, produced all the drawings and worked on aspects of the volume relating to morphology. Csorba was responsible for sections on nomenclature, recognized subspecies, external and craniodental characters, bacular morphology, similar species, and taxonomic remarks.

Csorba and colleagues take the approach of Miller (1907) more recently adopted by Hill (1982) and Hill and Smith (1984) in restricting Rhinolophidae to the genus *Rhinolophus*, excising the remaining (sometimes) traditional rhinolophoid genera (*Anthops*, *Asellia*, *Aselliscus*, *Cloeotis*, *Coelops*, *Hipposideros*, *Paracoelops*, *Rhinonictis*, and *Triaenops*) to the family Hipposideridae.

The 1st surprise I had upon opening this work was to find that the 1st substantive section (pp. xii–xxiv) was a chapter on phylogeny and biogeography of *Rhinolophus* by Toni Guillén Servent, Charles Francis, and Robert Ricklefs. Guillén has been promising such a work for some time now so it is indeed welcome to finally see it in print. It is therefore unfortunate that details, particularly analytical, are lacking. There also were some inexplicable mistakes in typing; inexplicable given the delay between submission and eventual publication by Alana Books (there were numerous other such mistakes throughout the remainder of the work; some examples include, plate opposite p. 80: *pearsoni* capitalized after its abbreviated genus; p. 82: *pearsoni*-group misspelled in heading; p. 115, inconsistency in spelling of *rouxi*; p. 160, *rex* out of alphabetical order in the index; etc). I also was saddened by the short consideration in the chapter of the difficult *R. inops*–*R. subrufus* question. *Rhinolophus subrufus* is located by Guillén and colleagues in the *R. euryotis* species-group of subgenus *Coelophyllus*, and *R. inops* is noted in the text as conspecific with *R. subrufus*. More detail on this thorny issue would have been illuminating, particularly in light of the fact that Csorba and colleagues conservatively choose to retain both *R. inops* and *R. subrufus* as valid species-level taxa in their species accounts. Both sets of authors indicate that they used only the species accepted by Koopman (1994); although published more recently, that work was written and completed before Koopman (1993); one wonders if reliance on the former source has led to some of these questions not being fully addressed (Koopman [1993] retains both species). Also, the chapter appears to have been added almost as an afterthought: the

subgeneric and species-groups of Guillén and colleagues do not altogether jibe with those adopted by Csorba (see below), who seem on the whole instead to have adopted the taxonomic arrangement of Bogdanowicz (1992) and Bogdanowicz and Owen (1992).

Following the chapter by Guillén and colleagues is a section entitled “definition of measurements and technical terms.” This may be the most valuable illustrated compendium there is of facial and craniodental morphology in *Rhinolophus*. One of the main problems in identifying *Rhinolophus* to species (without recourse to type material) is the inconsistency among authors in how exactly particular reported measurements were taken, or to what structures particular authors are alluding when they describe a feature in a treatise. In illustrating, clarifying, and standardizing measurements, Csorba and colleagues have made great strides in the field. I am not necessarily enthused with all their definitions, however; for example, I suspect they have erred in choosing to use crown length (rather than alveolar length) for their upper tooththrow length (CM³L). Ingle and Heaney (1992) instead use the alveolar length method; I believe adherence to this method would lead to greater consistency and less interinvestigator measurement error. A chapter follows on “Evaluation of taxonomic characters.” This section will not necessarily be of critical importance to the majority of readers, but for those who wish to embark on any real taxonomic or evolutionary work on *Rhinolophus*, it could be helpful and save time in terms of choice of characters to employ.

The final substantive sections include keys to species-groups and species accounts. I lacked material to critically evaluate keys in their entirety, but they seemed to work well for the material that I did have at hand. The keys, in combination with the outstanding illustrations (particularly of nose leaves) in species accounts (see below), will make identification of *Rhinolophus* species almost routine. I expect a slew of species descriptions as a result of careful reading and keying based on this and the subsequent section of the book. Perhaps the only criticism I have here is the authors’ disturbingly heterodox consideration of area zoogeographic regions.

The species accounts (pp. 4–133) form the meat of this work. As mentioned above, species accounts are constituted by sections written by 1 of the 3 authors. The species-groups are sometimes listed as per the more evolutionarily based determinations of Guillén and colleagues. However, there are some inconsistencies between Guillén et al.’s conception of subgenera and species-groups and Csorba and colleagues’ view. For example, the *R. megaphyllus* species-group of Guillén et al. includes *R. philippinensis*, *R. hirsutus*, *R. montanus*, and *R. megaphyllus*. In contrast, in Csorba’s view, the *R. megaphyllus* species-group includes *R. affinis* (*affinis* group of Guillén), *stheno* (*coelophyllus* group of Guillén), *malayanus* (*malayanus* group of Guillén), *neréis*, *celebensis*, *borneensis*, and *virgo* (all of the *borneensis* group of Guillén), and of course, *megaphyllus*. Of the constituents of the *megaphyllus* group of Guillén, only the last species remains: *hirsutus* has been sunk into synonymy with *macrotis*

(in Csorba’s *philippinensis* group) and *philippinensis* and *montanus* likewise removed to Csorba’s *philippinensis* group, which is conceived as also including *macrotis*, *marshalli*, *paradoxolophus*, and *rex*, all in the *macrotis*-group of Guillén, but nonexistent as a group in Csorba. The *megaphyllus*-group of Csorba therefore essentially becomes the same as that of Bogdanowicz (1992), sans *simplex* and *keyensis*, which have been reduced into synonymy with *megaphyllus*. Sound confusing? It did to me as well, and it took a while to figure out through use of numerous tables of my making. Philosophical consistency would have been a plus, or at least some rationale for adopting one or another system of classification.

The account of *R. arcuatus* may serve as an exemplar for the layout. The account begins with a synonymy, wherein are detailed species- and subspecies-level taxa considered by Csorba conspecific with *R. arcuatus*. This is followed by a section on recognized subspecies, including a rationale for why certain taxa are considered as subspecies, in this instance a review by Hill and Schlitter (1982). All taxa in the synonymy, with the exception of *R. anderseni*, are included in the section on recognized subspecies. Next is a section on external characters, with a detailed description of external morphology, accompanied by some outstanding illustrations of the nose leaf and associated structures. Both description and illustrations are of the finest quality; in the case of *R. arcuatus*, there actually are 2 nose-leaf structures illustrated: the cotype of *R. arcuatus*, and holotype of *R. anderseni*, the latter in justification for the taxonomic remarks synonymizing the latter with the former. A section on cranial and dental characters is descriptively as good as that on external morphology, but quality of those illustrations, although useful, was not quite as good as that of nose leaves. The next section, “Similar species,” is very good, and works very well with illustrations. In the case of *R. arcuatus*, a high degree of similarity is evinced with *R. euryotis*, but the authors detail differences between them (as well as with other species); a quick glance at figures for *R. euryotis* makes these distinguishing features exquisitely clear. There is an interesting assertion that the closest relative of *R. arcuatus* is *R. inops*, but *R. inops* is regrettably not included in the chapter by Guillén and colleagues.

The most substantive section of the species account is that entitled “Taxonomic remarks.” It is here that Csorba’s extensive knowledge of rhinolophids shines. For this species account, Csorba extensively justifies and documents his inclusion of *R. anderseni* as conspecific with *R. arcuatus*, provides additional taxonomic notes regarding possible evolutionary relationships with other species or species-groups, and—most importantly in my view—suggests stimulating avenues of further research. Remaining sections of the species accounts are fairly routine. The distribution section is good, and supplemented by a substantive list headed “localities include.” The maps accompanying the account are adequate for cursory examination but at times include some errors by excessive inclusion. The specimen localities are more easily located than

in the similar—if taxonomically broader—compendium of Corbet and Hill (1992). There is a geographical gazetteer after the species accounts (pp. 135–147) that is helpful in combination with the list of localities. However it is not complete; for *R. arcuatus*, islands in the Philippines wherein are located individual collecting localities are not listed in the gazetteer, although those selfsame collecting localities are listed (with occasional orthographic inconsistencies). I also found a few other minor errors that appear to be transcriptional errors, that is, likely from the specimen tags whence the authors recorded them.

In general, I found this book to be so good as to perhaps be in a sense insidious. Most readers will merely head for the species-group key, refer to the illustrations, and leave it at that once they have more or less identified a specimen in their possession. Only by means of a vigilant examination will a reader see among the taxonomic remarks (or elsewhere) the wealth of research gems beautifully and carefully planted by Csorba. For example, in the case of *R. arcuatus*, Csorba makes mention of the 2 discrete morphotypes (species) noted by Ingle and Heaney (1992) for the Philippines, and consistent discrete morphological differences among Pleistocene mega-island populations further noted by Heaney et al. (1998). In fact, I strongly suspect there are at least 3 species in “*arcuatus*” from Luzon, and further conjecture that other *islands* throughout the range of *R. arcuatus*—rather than island groups—each likewise contain at least 1 discrete and distinct species or possibly more. Animals of this species are, after all, extremely weak fliers. That would make this a morphologically cryptic species-complex remarkably rich in potential for biogeographic studies. It also strongly suggests that other species of *Rhinolophus* with ranges over numerous islands or disjunct continental populations may likewise be worthy of future scrutiny. Can 2 populations of *R. denti* or *R. simulator* really be considered conspecific given the distance separating them and habitat differences? What about *R. mehelyi*? Or even *R. hipposideros*? These are just a few of the more exciting possibilities that were immediately conjured upon cursory examination of this must-read book. Who can say how many more secrets await to be unlocked upon careful examination of specimens in the company of this invaluable work.—LUIS A. RUEDAS, Department of Biology and Museum of Vertebrate Biology, Portland State University, Science Building 2, 1719 SW 10th Avenue, P.O. Box 751, Portland, OR 97207-0751, USA; e-mail: ruedas@pdx.edu.

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