

Díaz, L. M. and A. Cádiz. 2008. **Guía taxonómica de los anfibios de Cuba.** vi + 294 pp.; numerous color photographs; *Abc Taxa*, Volume 4. Brussels, Belgium.

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This 2008 book is a major contribution that offers an excellent synthesis of the existing knowledge on Cuban amphibians. Prior to 1980, most of Cuban herpetological research was conducted by foreign researchers. Subsequently however, Cuban amphibian biology began to flourish with the most important taxonomic contributions made by A. R Estrada in the 1990's, and more recently by his student Luis M. Díaz and his colleagues. In the last decade, two Cuban publications updated the extant knowledge of the anuran fauna; Rodríguez-Schettino (2003) included high-quality photographs and brief descriptions of most species, and Alonso *et al.* (2007) produced an audio guide with calls of most species and an illustrative booklet. The Díaz and Cádiz volume builds on precedent work and provides a comprehensive, updated taxonomic treatment of Cuban anurans complemented by excellent photographs and an audio CD. It is part of a series of manuals dedicated to capacity building in taxonomy published by *Abc Taxa*.

The manual contains 12 chapters and two appendices. The first chapter provides a brief summary of the Cuban anuran fauna, with comments on its origin, relevant studies, folkloric impact, and hints on how to use the manual. Chapter 2 is dedicated to the physiographic characteristics of Cuba. Anuran distribution patterns, species richness, and preferred habitats are described in Chapter 3. Chapter 4 introduces beginning herpetologists to way to search for and observation anurans and Chapter 5 provides instructions for preserving specimens for deposition in scientific collections. Chapter 6 comprises the species



accounts, each of which includes (1) a description; (2) distinction from similar species; (3) geographic distribution; and (4) ecological notes. Anuran eggs and larvae are described in Chapter 7, whereas Chapter 8 is dedicated to vocalizations, including an index of sound tracks included in the complementary CD. Conservation priorities are discussed in Chapter 9, and Chapters 10 and 11 contain a useful glossary and literature cited, respectively. Chapter 12 includes biographical information about each author. A taxonomic index and a map with names of localities used in text are included as Appendices 1 and 2, respectively.

The publication of this volume establishes a new standard for accounts of vertebrate biodiversity in Cuba. The guide is exemplary in its profuse use of photographs, drawings, maps, and other illustrations to inform the reader about diagnostic features and associated information concerning the frogs and toads. Another achievement is the identification of the

vocalizations of nearly all species, the mating calls of which are provided in an accompanying CD. Finally, the manual is well written in Spanish, and achieves a good balance between technical and vernacular terms.

The comments I make below are intended to promote more detailed approaches to the subject in the future and not to diminish the value of this work. I had to make Spanish translations for which I assume responsibility.

Chapter 2, dealing with the physiography of Cuba, seems inordinately long and presents detailed descriptions without relevant literature citations. I think the maps of the relief, climate, and vegetation of Cuba contain enough information on their own; thus, limited comments, with relevant literature citations, would have been sufficient to give the reader the necessary information. In Chapter 3, which discusses anuran distributions, the authors failed to specify how they calculated species richness values for the Cuban territory (Fig. 5). Díaz and Cádiz state that this figure is a map derived from the superimposition of point localities. However, the geographic area of a point locality is zero; therefore, it is difficult to understand how the points were turned into shaded areas in the map, which is presented without legend. Additionally, the methodology underlying the classification of species according to their habitat use (Chapter 3.2: Fig. 6) is neither explained, nor applied consistently throughout the text.

It is unfortunate that Díaz and Cádiz did not list the type specimens and provide a synonymy for each of the species accounts in Chapter 6. It also would have been useful to provide a short list of representative specimens available in Cuban collections to facilitate future taxonomic assessments. This information is extraordinarily relevant for a taxonomic guide and would have increased the scientific utility of the manual. Moreover, it would have been more informative to report the maximum body size of males and females, rather than the maximum body size observed for the species.

This can be very important in the field where it is easier to locate vocally active males, which usually are much smaller than females.

The larvae of all aquatic-breeding anurans known to Cuba are described in Chapter 7. However, the sample sizes are not specified, and it is not clear if the drawings and measurements were obtained from larvae collected in the field or raised in captivity. This can be relevant, given that the larval morphology can change depending on the environment, as the authors acknowledge in their Introduction.


The fascinating process of recording, processing, and analyzing frog calls is dealt with in Chapter 8. The introduction explains bioacoustic procedures and terminology with important advices from the authors to beginners. The second part contains the acoustic characterizations of 59 species. The primary flaw rests not in the limited number of individuals recorded (pointed out by the authors), but the absence of any information about the sample size and localities associated with each species. Moreover, given that some acoustic features of anuran calls are strongly influenced by temperature (Gerhardt 1994, Schneider and Sinsch 2007), the temperatures at which the recordings were made should have been reported. Without data on sample size and temperature, the means and ranges of quantitative acoustic features are much less reliable taxonomic indicators. Additionally, Díaz and Cádiz should have reported explicitly the acoustic differences distinguishing species, especially in cases in which these differences are used as diagnostic features in the species accounts.

The plates (pages 130–176) are of superb quality. They include excellent drawings and photographs depicting each of the species in a typical posture; most were prepared by the senior author. However, in many instances figure captions repeat information on the distribution, natural history, and altitudinal range already presented in Chapter 7; this

needlessly lengthens the text and detracts focus from the morphological features portrayed. It is most unfortunate that the figure captions and photographs on facing pages do not correspond with one another. Instead, the correct figure captions for each plate appear on the reverse of the plate. This doubtless will confuse many readers.

In Chapter 9, the authors provide only percentages of species in each IUCN category but do not report the category assigned to each species. Moreover, I am concerned that the IUCN threat categorization used by Díaz and Cádiz is not derived from a consensus of Cuban specialists. Instead it reflects the opinions of a paper by Hedges and Díaz (in press) and overlooks previous workshops held in Cuba (for a compilation see Rodríguez and Alonso 2000). The glossary is good and will surely be of great help to beginners. In Chapter 11, I found that four in-text citations are not compiled in the bibliography and seven references do not appear in the text.

Unfortunately, I could not enjoy the full length of the accompanying CD (86 tracks, 57 min). Mine started to jump at Track 60 and skipped four tracks, after which the sounds, either did not match the voice identifications or did not correspond to the track numbers in Chapter 8.5. I don't know if this was a failure of my particular disk, or a more widespread error in the entire edition. Nonetheless, up to Track 60, the CD was well done and the voice labels of the senior author make it self-explanatory. It would be improved if the authors had given the users an idea of the intensity of the sounds (as is done in Alonso *et al.* 2007), because in nature, some of these frog calls are muted and an unaware listener can be confused in the field.

Overall, the manual is an outstanding legacy for students, forest rangers, researchers, and, of course, Spanish-speaking visitors interested in Cuban herpetology. Additionally the book is an example of what the persistence and commitment can achieve. Surely this volume will encourage many more young Cuban researchers to undertake and persevere in their investigations despite obstacles. The authors deserve every compliment for their work. 

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