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Amphibians of the Western Ghats are in the limelight with several discoveries of new species, documentation of novel behaviours, unveiling of evolutionary phylogenetic patterns and records of emerging infectious diseases (e.g., Dahanukar et al.

Mind the map: an atlas of amphibians of the Western Ghats

Neelesh Dahanukar

Indian Institute of Science Education and Research, Dr. Homi Bhabha Road, Pashan, Pune, Maharashtra 411008, India.
n.dahanukar@iiserpune.ac.in

Atlas of Endemic Amphibians of the Western Ghats

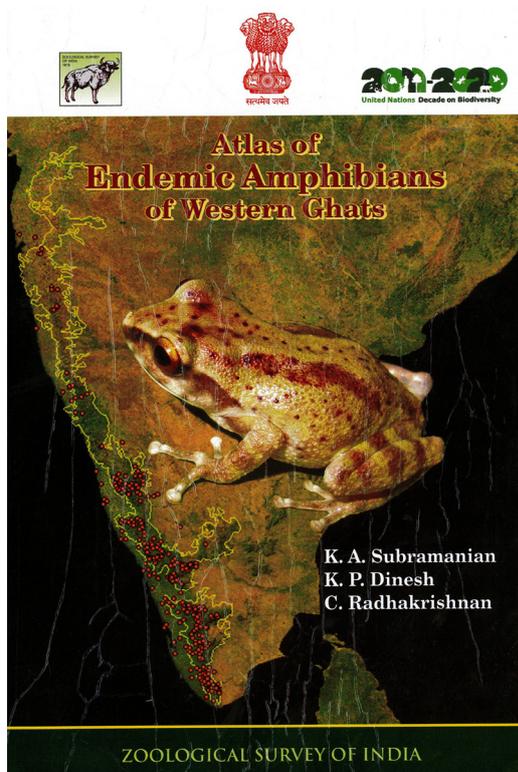
Subramanian, K.A., K.P. Dinesh and C. Radhakrishnan

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2013; Biju et al. 2014; Gururaja et al. 2014). Extensive taxonomic reviews and descriptions of novel taxa have brought the renaissance of amphibian taxonomy in the Western Ghats of India leading to the description of a new family, several new genera and species in the recent years (Biju & Bossuyt 2003; Abraham et al. 2013; Padhye et al. 2013; Biju et al. 2014; Gururaja et al. 2014). While our knowledge on taxonomy, diversity and distribution of amphibians is expanding, it is still scattered in primary

literature. As a result, an attempt to collate the available information so as to bring about a comprehensive account of diversity and distribution of amphibians is always welcome. An 'Atlas' is usually an attempt at doing this and when I heard of "*Atlas of endemic amphibians of the Western Ghats*" by Subramanian, Dinesh and Radhakrishnan, I was ecstatic.

The book is organized as a short introduction to the Western Ghats, amphibian diversity in this region and their conservation status, methodology and a very brief section on results and discussions. This is followed by a checklist of amphibians of the Western Ghats. After defining how the sizes of different amphibians have been categorized and the full forms of the IUCN categories, the book goes on to provide a single page account containing species description, photograph and distribution for each endemic species. At the end there are two tables, one on study localities of endemic amphibians and the other on bioclimatic values for endemic species. The book concludes with a reference section that has exactly five references.

The *Atlas of Endemic Amphibians of the Western Ghats* is, sadly, a far cry from an attempt to understand the distribution and diversity of amphibians. The authors mention their intention to highlight information gaps in the distribution, but hardly make any comment on the same.

Set up as a national institute and self proclaimed as a premier institute on taxonomic studies and exploration of faunal diversity in India, one expects that a publication from Zoological Survey of India (ZSI) to follow standard taxonomic practices and norms. Unfortunately, there are several nomenclatural mistakes in the book in the checklist (pp.14–31) and in species pages, and readers are cautioned not to follow the taxonomic status, especially the way in which the authorities are mentioned, blindly. To illustrate the point, in zoological nomenclature, if the species is valid in the same way it was described by the

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author (i.e., if the original combination is still valid) then the name of the author, mentioned after the binomial, is not in parenthesis. While, if the original combination has changed because of a taxonomic revision that places the focal species under a different genus, then the name of the original author is given in parenthesis. So, *Duttaphrynus beddomii*, originally described as *Bufo beddomii* by Günther (1876) should be mentioned appropriately as *Duttaphrynus beddomii* (Günther, 1876). On the other hand, *Minervarya sahyadris* should be mentioned as *Minervarya sahyadris* Dubois, Ohler, and Biju, 2001, and not in parenthesis as in the species page, because this is the same way it was described under the said genus. Since there are several such examples, it is advised that readers rather use other material, like Dinesh et al. (2013), Amphibian Species of the World (Frost 2014) or AmphibiaWeb (2014). In another instance the book uses the generic name of *Fejervarya* rather than *Zakerana* without providing any rationale, while an earlier publication (Dinesh et al. 2013) on the checklist of amphibians of India by the same organization uses *Zakerana*.

Because the taxonomy of amphibians in the Western Ghats is in a flux, it is understandable that some of the maps provided in the book are subject to genuine change. However, some other maps are erroneous and readers should be careful while using them. For example, in the case of *Indirana leithii* (Boulenger, 1888) the distribution information in the text indicates Maharashtra and Karnataka, but the map shows only two points, one in southern Karnataka and the other on the Kerala-Karnataka border (pp. 109). The type locality of *I. leithii* is in Matheran, Maharashtra, which is missing from the map!

As added information, the book contains IUCN status of each species faithfully obtained from the IUCN Red List of Threatened Species website. Authors have considered all the recent species that have not been assessed by IUCN, under the category Data Deficient (DD). The reason why authors have placed the species in DD could be attributed to lack of understanding of IUCN categories. For the benefit of the authors and readers the concept is explained here. A species qualifies as DD if there is insufficient information to assess its conservation status in one of the threatened categories (Critically Endangered, Endangered or Vulnerable), Near Threatened or Least Concern categories (for the current argument I ignore Extinct and Extinct in the Wild categories) (<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>). The data deficiency could be because of

taxonomic ambiguities and/or insufficient information on the distribution and/or population status of the species. A DD species is assessed explicitly by reviewing the taxonomy, distribution, population status and threats to the species and/or habitat. A DD species has a potential to be categorized under any one of the IUCN categories and therefore highlights the need for further research. Recently described species, like *Raorchestes uthamani*, have not been subjected to IUCN Red Listing and therefore are considered as not assessed until the species is evaluated against the IUCN Red list categories and criteria. Each species assessed in the IUCN Red list is rigorously checked against the five criteria and the assessment is peer reviewed before it is made public. Since the book has the DD category for species that have not been assessed, one is advised against referring to the IUCN status in this book.

Both incorrect citations and not providing credits are forms of scientific misconducts (see Raghavan et al. 2013). It is rather sad to see the book bears both the crimes. For instance, it is mentioned that Western Ghats - Sri Lanka is one of the 34 global biodiversity hotspots citing Myers et al. (2000), when in fact 34 biodiversity hotspots were recognized years later by Mittermeier et al. (2005), while Myers et al. (2000) had only identified 25. For a book that claims to be an Atlas, citations are very frugal—only five references, two of which are conveniently ZSI publications—even though the methodology section indicates distribution records being compiled from published scientific literature. Citing published scientific literature is a courtesy extended towards the efforts taken by the authors of the original literature to provide valuable data for such compilations. Further, it also informs the readers where the data is obtained from and forms a part of reproducibility in scientific studies.

While an Atlas attempts to provide a good overview and fill gaps, this book does not take into cognizance some recent literature. For example, Jobin & Nameer (2012) provide new records for rhacophorid species such as *Polypedatus occidentalis*, *Pseudophilautus kani*, *Raorchestes akroparallagi* and *Raorchestes anili* from Parambikulam Tiger Reserve, Kerala. None of these records are reflected in the maps provided in the book. Not only are the records by Jobin & Nameer (2012) backed up with good photographs and vouchers, most of the records actually fill in the data gaps as the species are distributed both north and south of Parambikulam Tiger Reserve.

The methods section is overall too laconic as it provides no details on how the analysis presented in the book was performed. There is no information in the

section on how the bioclimatic distribution of endemic amphibians was studied with no source for the data used. It is quite likely that WorldClim bioclimatic data (Hijmans et al. 2005) was used without appropriate citation. Further, no details are provided on the statistical analysis performed and the software used.

The species accounts provided for each endemic species is extremely brief. It does not actually portray any salient features of the species and makes one wonder the importance of the one or two liners for diagnosing the species. Fortunately, good photographs have been provided for most of the species. But then the maps are not very informative. It would have been helpful if different color points were used to indicate localities are from literature and those from museum studies. Regarding museum studies, it is surprising that authors have taken no cognizance of the material in the museum collections of the Bombay Natural History Society, which holds several type specimens and good comparative material for amphibians of the Western Ghats.

Apart from these major slips the book has the usual typos, page mismatches and printing/binding faults.

Essentially, the book has very little to offer apart from distribution maps, which also need to be considered with caution. Unfortunately, the cost of the book is exorbitantly high considering that the book is published by a central government institution funded through tax payer's money. For a student this price might just be too expensive and shocking given the book delivers too little in terms of information and content. Worse, the buyer of the book may have to invest their time in relearning facts afterwards.

Authors are encouraged to refer to good atlases available from different countries to improve the next edition. For instance, Minter et al. (2004) provides a wonderful atlas and brief information on frogs of South Africa, Lesotho and Swaziland. Redmond & Scott (1996) have provided an online free atlas of amphibians in Tennessee, while Gasc et al. (1997) provide atlas of amphibians and reptiles in Europe with freely accessible online maps for all the species.

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