

## Next time we hear a frog croak, let's say thank you!

*Raghavendra Gadagkar*

Not many of us would count frogs among the animals we love. Frogs do not figure anywhere near the top of the list even among animal lovers and conservation biologists. The phrase one often hears among conservationists is 'charismatic mega-fauna', and they tell us that these are easy to sell in conservation public relations. It is true that you cannot really hug and cuddle a frog and yet a frog has just put India prominently on the world map. The discovery of a unique frog being variously dubbed as the Jurassic frog, pig-nosed frog and the coelocanth of frogs, from the Western Ghats is justifiably causing ripples across the disciplines of biodiversity, vertebrate phylogeny and biogeography. Writing in a recent issue of *Nature*<sup>1</sup>, S. D. Biju of the Tropical Botanical Garden and Research Institute, Thiruvananthapuram and Franky Bossuyt

of the Vrije Universiteit Brussel, Belgium, describe their discovery and point out why they have not only had to assign this frog to a new species but to a new genus and a new family as well. In a parallel study published in this issue of *Current Science*, Sushil K. Dutta of Utkal University, Bhubaneswar, along with colleagues from the Wildlife Institute of India, Dehradun; Centre for Cellular and Molecular Biology, Hyderabad and Ashoka Trust for Research in Ecology and the Environment, Bangalore has described the same frog using similar morphometric and molecular techniques and arrived at pretty much the same conclusions<sup>2</sup>.

Frogs belong to the vertebrate class Amphibia which evolved from lung fishes during the Devonian period (354–417 million years ago) in geological history. The living amphibians comprise

Anura (frogs and toads), Caudata (salamanders) and Gymnophiona (the caecilians or limbless amphibians), of which frogs and toads are the most diverse and best known to scientists and laymen alike. Among the about 4800 species of Neobatrachia or advanced frogs, the most unusual known so far were some frogs from the archipelago of Seychelles, in the family Sooglossidae. The frog now discovered in the Western Ghats is also most unusual among the advanced frogs and its closest relatives seem to be the sooglossids from Seychelles. And yet, it is sufficiently different from its relatives in Seychelles, that it deserves a new family for itself. This new family has been named Nasikabatrachidae (Nasika, for 'nose', incidentally). The frog itself has been given the fitting binomial name *Nasikabatrachus sahyadrensis*.



Recent reports indicate that there may be a vast number of undescribed species in areas such as the Western Ghats and Sri Lanka. Other unexplored areas such as the eastern Himalaya and the Andaman and Nicobar Islands are also likely to have many undescribed taxa. Of particular interest are high diversity groups such as the Rhacophorids or treefrogs, where taxonomic and phylogenetic issues are yet to be resolved. (Photo Credits: Saravana Kumar, Kartik Shanker)

This discovery is significant at many different levels. It is significant for our understanding of amphibian evolution and phylogeny, as it concerns a frog that appears to have diverged from its closest known relatives (the Sooglossidae) more than 100 million years ago and of course had remained undocumented so far. More generally speaking, the discovery of a new family among vertebrates is a truly rare event.

The fact that the closest relatives of *Nasikabatrachus* are to be found in the Seychelles, is also a matter of great interest. Reconstructing past histories of land masses and their fauna and flora is a tricky business. Not surprisingly, there are more models and theories than hard evidence. The discovery of *Nasikabatrachus* from the Western Ghats demystifies the restriction of Sooglossidae to the Seychelles, because it lends support to the idea that Sooglossidae and Nasikabatrachidae (and many other groups) could have been isolated and could have diversified and evolved, first on the Madagascar–Seychelles–India land mass and later on the Seychelles–India land mass and crossed over to Eurasia after the collision of India with the Eurasian plates. Support for such an ‘out-of-India’ model is now accumulating as more and more endemic fauna, unrelated to African and American lineages, are being discovered in India<sup>3</sup>.

It is now widely known that the Western Ghats are an important hotspot of biodiversity and hold treasures that are vital to understanding the evolution of life on earth, not to mention the treasures they hold with potential for direct eco-

nomic and medicinal value. And yet, these fragile mountain ecosystems are under severe onslaught due to developmental activities. Balancing the needs of our growing population and the imperative to safeguard 100 million-year-old life forms that hold the key to the evolution of life on earth will put us to a severe test indeed.

It is probably fair to ask why the Indian effort described in this issue of *Current Science* (page 211) appears months later than the effort that included a Belgian collaborator? Personally, I am not surprised at all. Instead, I am impressed that the Indian naturalists and field biologists at all managed to collaborate with molecular biologists and managed to get their paper so soon after the *Nature* paper. In India, we have not really woken up to the reality that molecular techniques are becoming increasingly powerful and essential for answering questions in ecology, behaviour and natural history. There is no dearth of expertise and facilities in molecular biology, but there is not a single institution where molecular techniques are routinely applied to problems of ecology and natural history. And yet, it is in these areas that we have a much greater chance of making truly novel and original contributions to global knowledge. Running a molecular biology lab is very demanding and addictive, and there is of course the risk of losing out naturalists to molecular biology permanently! I therefore think that what India needs is a National Facility in molecular biology that stands ready to help ecologists and naturalists to supplement their field work with molecu-

lar techniques so that their work becomes internationally competent. If we do not pay attention to this need, we will find it hard to avoid the criticism that discoveries of global importance are being held up by tropical countries because they neither make the discoveries themselves nor do they freely allow scientists from more developed countries to come and work it out for them. Too much is at stake here for us to remain complacent any longer.

Finally, let us not forget about the frogs that started all this discussion in the first place. Gone are the days when we can focus our conservation efforts only on charismatic maga-fauna that turn on some prince or film-actress. We need to assess the intrinsic conservation values of different groups of organisms and habitats and re-work our balance of development and conservation.

- 
1. Biju, S. D. and Bossuyt, F., *Nature*, 2003, **425**, 711–714.
  2. Dutta, S. K., Vasudevan, K., Chaitra, M. S., Aggarwal, R. K. and Shanker, K., *Curr. Sci.*, 2004, **86**, 211–216.
  3. Bossuyt, F. and Milinkovitch, M. C., *Science*, 2001, **292**, 93–95.
- 

*Raghavendra Gadagkar is in the Centre for Ecological Sciences, Indian Institute of Science, Bangalore 560 012, India and Evolutionary and Organismal Biology Unit, Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bangalore 560 064, India.*  
e-mail: ragh@ces.iisc.ernet.in  
URL: ces.iisc.ernet.in/hpg/ragh