

## Western Ghats' fish fauna in peril: are pseudo conservationist attitudes to be blamed?

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Use of threatened species in research – be it for taxonomy, biology or population studies, has always invoked much debate. As a result, the Species Survival Commission of the International Union for Conservation of Nature (IUCN) developed a set of guidelines entitled 'IUCN Policy Statement on Research Involving Species at Risk of Extinction' with special reference to scientific collecting of threatened species<sup>1</sup>.

A recent IUCN assessment of the conservation status of freshwater taxa of the Western Ghats, involving more than 40 freshwater biodiversity experts, including 15 ichthyologists, listed a number of threats affecting the freshwater taxa of the region and their habitats<sup>2</sup>. Interestingly, none of these ichthyologists considered research on taxonomy and biology as threats to the fish fauna of the Western Ghats, as opined by Daniels<sup>3,4</sup>. It is unfortunate that Daniels, selectively quotes, conveniently overlooks many facts and figures, while criticizing an article published in another journal<sup>5</sup>. This note presents the opinions and views of a group of ichthyologists working in the Western Ghats, including several authors of the article(s) which has been falsely criticized by Daniels<sup>3,4</sup>.

Although listed as 'Endangered', the Denison's Barb, *Puntius denisonii* is one of the most sought-after freshwater aquarium fishes<sup>6</sup>, contributing to as much as 65% of India's ornamental fish exports<sup>7</sup>. Close to 1.5 lakh individual fishes were exported by the Kerala Aquatic Ventures Private Limited in 2010–2011 alone<sup>8</sup>. The conservation importance of *P. denisonii* vis-à-vis the unmanaged aquarium trade was first brought to our attention<sup>9–11</sup>. The same authors were also responsible for providing information (including the findings reported in Solomon *et al.*<sup>5</sup>; as personal observations, since the paper<sup>5</sup> was under preparation at that time) that led to the listing of this species as 'Endangered'<sup>12</sup>.

Solomon *et al.*<sup>5</sup> had explicitly mentioned that they did not collect samples directly from the wild, but purchased them from commercial fish collectors.

They also used only 30 fishes/river/month, which is more or less the minimum number required to determine biological characteristics of a fish species. A perusal of the vast literature on this topic would reveal the importance of this said number (for example, see a recent paper<sup>13</sup> on 'Critically Endangered' *Rasbora tawarensis* using almost the same sample size as used by Solomon *et al.*<sup>5</sup> – that too from a single site compared to three sites in Solomon *et al.*<sup>5</sup>). Although Daniels<sup>4</sup> highlights the number 1080 as fairly big and compares it to 'large-scale killing', this should be calculated as 30 fishes/month × 12 months × 3 rivers, and not a one-time number of 1080. Therefore, this study complies with point 4(b) of the IUCN guidelines<sup>1</sup>, i.e. 'researchers do not collect more than the minimum number of specimens necessary for the accomplishment of their research'.

Similarly, point 5 of the IUCN guidelines<sup>1</sup> mentions that 'in the case of species listed as "Vulnerable" under criterion D1 (< 1000 mature individuals and stable), or "Endangered" under criterion C (< 2500 mature individuals and declining), scientists should provide evidence to permit-issuing agencies that the number of specimens they wish to collect lethally is very unlikely to increase the risk of extinction of the species in question, and that the research proposed is essential for assisting in the conservation of the species'. *P. denisonii* does not fall into any of these categories.

In an unpublished study conducted by the Kerala State Fisheries Department, mature individuals of *P. denisonii* were observed during May, leading them to believe that its breeding season was June–October. This was accepted as a fact/truth by both the scientific community and policy makers leading to the implementation of a ban on fishing during these months. However, by carrying out a comprehensive annual study on various aspects of the reproductive biology of *P. denisonii* from various commercial collection sites, Solomon *et al.*<sup>5</sup> confirmed that the actual breeding season is from October to March, and that the current

conservation plans intended to save this species are wrongly designed.

Close to 5000 *P. denisonii* are being collected and exported from Kerala on a weekly basis. Calculating the average fecundity that the authors observed (~760) and assuming that anywhere between 20% and 35% of the population would be females (based on the sex ratio<sup>5</sup>), one can easily assume that ~1000–1750 females are being exported every week during the breeding season as a result of the wrong enforcement of the regulation. It is therefore obvious that as result of this study<sup>5</sup>, thousands of mature individuals could now be saved, by designing pragmatic conservation plans. We wish to state that a species removed from the wild, either for consumptive or non-consumptive use, results in the loss of biodiversity. If such specimens that have already been removed from the wild can be used for research leading to conservation, this should not be blindly criticized. The thousand-odd fishes that were used in the study<sup>5</sup> would have either died in transit or ended up in home aquariums, resulting in no conservation benefit. We therefore reiterate that it is not unethical to procure fish samples from legal export consignments as well as local fish markets for the sake of research that informs conservation action.

Experts at the IUCN have deliberated upon the issue of balancing research and conservation of a threatened species<sup>1</sup>. They mention that 'governments and research institutions should encourage and facilitate research on globally threatened species by competent scientists to enhance our understanding of the natural history and conservation needs of these species' and further state that 'blanket prohibitions on research and the collection (including lethal collection) of scientific specimens of globally threatened species hinder conservation efforts, and that governments should avoid imposing them'. Daniels<sup>4</sup> avoids mentioning these two important statements from the IUCN guidelines.

Daniels<sup>3,4</sup> further argues that taxonomic research is a threat to the fresh-

water fishes of the Western Ghats. Daniels may not have read the IUCN species assessments, which explain taxonomic and other issues regarding each species, and why there is a need for increased taxonomic research so as to understand conservation status of the freshwater fishes of the region. The importance of taxonomy in conservation is also explained in Dahanukar *et al.*<sup>14</sup> (see box 4), with these conclusions drawn not only by them, but based on the opinions of 15 eminent taxonomists, ecologists, biologists and conservation biologists working on freshwater fishes of peninsular India (see list of evaluators in the acknowledgements section of Molur *et al.*<sup>2</sup> and for each species separately in the IUCN Redlist). The importance of taxonomy on species conservation is already discussed at length elsewhere<sup>15,16</sup>. In addition, to understand the impact of taxonomic studies using methodological rigour on the conservation status of the Western Ghats fish fauna, we direct the reader to two recent studies<sup>17,18</sup>.

The Convention on Biodiversity (CBD) emphasizes the need for identification and monitoring of the components of biodiversity, besides organizing and sharing the gathered information. The governments of the world recognizing the CBD have affirmed the existence of a taxonomic impediment to the sound management and conservation of biodiversity. Removal of this impediment is a crucial step in the proper implementation of the objectives of CBD and there have been many global attempts to overcome the taxonomic impediment during the past decade<sup>19</sup>. The recent 10th Conference of Parties of CBD has further agreed to cooperate in the capacity-building and development of taxonomy for the support and implementation of the protocol (Nagoya Protocol, article 22)<sup>20</sup>. Unfortunately, Daniels pretends ignorance of these while quoting the preamble of CBD.

The fact that taxonomy of freshwater fishes of the Western Ghats and peninsular India is still in flux can be illustrated from the discussions given for different genera and species in a seminal work by Jayaram<sup>21</sup>. In fact, limitations of current taxonomic knowledge led even a leading taxonomist like Jayaram to list the currently valid species *Hypselobarbus jerdoni* under both *Gonoproktopterus* and *Puntius* in the same book<sup>21</sup>. Therefore,

curtailing fish taxonomy research and blindly following hitherto published guides of fish taxonomy would signal an end to an active research area, and would mean that the biological (fish) diversity of the Western Ghats will continue to remain unexplored and underappreciated. We believe that the current flux in fish taxonomy indicates that the field is in constant progress, and is a signal to healthy research in the subject area.

Part of the confusion in field identification of freshwater fishes is created by books and field guides which have very less to no taxonomic rigour, misleading information on the biology and ecology of species, and keys which do not help in identification. We wish to cite one example. If a field biologist comes across a species of swamp eels *Monopterus* and tries to identify it based on the key given in the book *Freshwater Fishes of Peninsular India*<sup>22</sup> by Daniels himself, the researcher would no doubt end up making mistakes. The key suggests that the snake-like fishes without predorsal spines belong to Anguilliformes, and the ones with spine belong to Synbranchiformes (family Mastacembelidae). The genus *Monopterus* (Synbranchiformes: Synbranchidae) does not have dorsal spines; in fact, it does not even have dorsal, pectoral, ventral or anal fins, and it is not even referred to in the book, as if this genus (represented by five species in peninsular India, two of which are threatened<sup>2</sup>) does not even exist. It is also interesting to note that the book<sup>22</sup> does not give details of *P. denisonii*, a truly endemic species of peninsular India, and resorts to talk about the Himalayan fish *Botia lohachata* rather than the peninsular Indian endemic *Botia striata*. The reason why endemics like *P. denisonii* and *B. striata* are poorly represented in this book<sup>22</sup> is quite clear, and could be attributed to the lack of knowledge on the biology and ecology of these species. In fact, such publications actually explain why there is a need for more taxonomic and ecological studies.

It is rather unfortunate that Daniels<sup>3,4</sup> suggests that studies increasing our understanding of the taxonomy, distribution, biology and ecology of the species are a threat, while other anthropogenic threats like pollution, biological resource use (including large-scale collection of *P. denisonii* for aquarium trade<sup>9-11</sup>), invasive species, residential and com-

mercial developments and natural system modifications, which have been discussed at lengths<sup>2</sup>, are completely disregarded by him. It is also worth mentioning that the IUCN report<sup>2</sup> not only gives the documentation of threats, but also suggests possible ways to overcome them. None of this, unfortunately, is reflected in the concerns raised by Daniels<sup>3,4</sup>, who is rather confronting the very process of research<sup>5</sup>, from which important conclusions in Molur *et al.*<sup>2</sup> were drawn.

We agree with Daniels<sup>3</sup> regarding the fact that there is no legal instrument in India that protects freshwater fishes, and that the livelihood importance of this taxa makes their conservation an ultimate challenge. On the other hand, fishes of the Western Ghats continue to be poorly known as there is virtually no information on population, ecology and biology of ~ 90% of the endemic and threatened species. 'Hard' science based on strong empirical evidence is almost a prerequisite if conservation is to be taken seriously by any government. Policy decisions as well as the implementation and enforcement of regulations are delayed by the justification that scientific information is not available. We therefore believe that understanding aspects of systematics, ecology, biology and demography of endemic and threatened species is vital for informing future conservation actions and pseudo conservationist attitudes like those discussed by Daniels<sup>3,4</sup> will do nothing but promote more unsubstantiated news items<sup>23,24</sup>, and curtail science and research.

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