

## 'Boom and bust fishery' in a biodiversity hotspot – Is the Western Ghats losing its most celebrated native ornamental fish, *Puntius denisonii* Day?

Rajeev Raghavan, G. Prasad, P. H. Anvar Ali and Lavanchawee Sujarittanonta

Streams and rivers in the Kerala part of the Western Ghats are an exceptional hotspot of freshwater fish diversity<sup>1</sup>, having an immensely rich and diverse ichthyofauna of around 207 species<sup>2</sup>, including food, ornamental and sport fishes<sup>3</sup>. Among these, the native ornamental fishes form the most important component of the regional biodiversity from an eco-biological and socio-economic perspective.

The ornamental fish fauna of Kerala is contributed by 106 species<sup>4</sup>. Among these, no single species has received attention as much as the red-lined torpedo fish, *Puntius denisonii* Day, an endemic and endangered cyprinid<sup>5</sup>. Locally known as 'chorakanni', literally meaning bleeding eyes, and more popular as 'Miss Kerala', this native barb has become one of India's biggest exports in recent times<sup>6</sup>. Market studies have confirmed that *P. denisonii* is the most preferred ornamental fish in the international trade and is being exported from India in consistent numbers<sup>7</sup>. The species was collected for the first time in 1996 and sent to Germany, and has been a regular among the native ornamental fishes exported from Kerala since then. The opening up of the Cochin International Airport in 1999 probably stimulated an increased trade, as the region became connected to Singapore (the single largest market for native ornamental fishes from Kerala) by daily flights.

An alarming yet predictable increase in the export of *P. denisonii*, and an associated decline in its wild population have been witnessed in recent years. Reports<sup>8</sup> have suggested that the wild stock of the species has dwindled at a rate of 70% during the period 2000–04. The catch per hour for *P. denisonii* in the various rivers of Kerala was found to be low, ranging from 0.002 to 0.042, probably indicative of the extreme fishing pressure that the species is being subjected to<sup>9</sup>, resulting in its low abundance. Although there are no direct measures of the population status of the Denison's barb till date, there exists a general consensus among scientists and researchers

in the region that the fish has become rare<sup>2,4,9</sup> and its population has declined precipitously.

The fact that wild stocks have declined and the species has become scarce in the trade can also be confirmed by the sharp increase in its market price over the last few years. Saturation in market supply due to decline in catches has probably resulted in an increase in retail prices for this species from US\$ 8 per piece at the start of the decade<sup>10</sup> to the current value<sup>6,11</sup> of US\$ 20–30. This gradual increase in price witnessed over the last few years, has certainly driven the flow of more catches from the wild, turning the stock position into a downward spiral.

Given the nature of marketing involving various stakeholders like collectors (locals belonging to tribes and forest communities who survive on subsistence level), intermediaries, wholesalers and exporters, engaged in what can be described as a clandestine and surreptitious trade, it has been extremely difficult to track and precisely quantify the trade in *P. denisonii*. A large share of the exports is also channelled through non-conventional routes and is seldom documented and recorded.

Although *P. denisonii* is known to be found in as many as nine rivers in Kerala, its distribution is restricted to certain specific locales of these rivers and most stocks are known to be highly fragmented. Pooyamkutty (Periyar River), Vettilapara (Chalakydy River) and Iritty (Valapatanam River) are the epicentres of mass-scale collection of this species in view of the comparatively large populations that these locales sustain. However, as wild stocks in these sites are declining, supply sources are changing and collectors are moving onto new locales for exploitation.

Despite being the most celebrated and perhaps the most threatened native fish species, *P. denisonii* has not been well documented in the literature. Lack of any data on this species is also evident from Fishbase – the world's largest encyclopaedia on fishes. Our current knowledge

of the biology of the species is principally in the form of grey literature, indicating that the species is herbivore and that its spawning season corresponds with the regional monsoon<sup>12</sup>. To the best of our knowledge, the only available peer-reviewed publication is on the length-weight relationship of this species from the Bharatapuzha River<sup>13</sup>.

Even though captive breeding technology has been standardized for thirteen native ornamental species of Kerala<sup>14</sup>, no breakthrough has yet been achieved with *P. denisonii*. High rates of female mortality and a skewed sex ratio favouring males are the major factors that have hampered the closing of its life cycle in captivity<sup>8</sup>.

We believe that *P. denisonii* presents the most complex challenge to conservation biologists of the Western Ghats in recent times. First, because the entire volume of exports for the last ten years (and also in the foreseeable future) has been based on collections from the streams of Kerala and subsequently by the fact that no scientific data are available on aspects of its population, fishery or life history.

The organized fishery for *P. denisonii* in the streams of the Kerala part of the Western Ghats is a 'boom and bust fishery'<sup>15</sup>, where a newly discovered population is being rapidly exploited for trade, resulting in its eventual collapse. In an open-access fishery devoid of any quotas or access restrictions, the race to exploit and market the product has no doubt led to a rapid collapse of the wild stock. In spite of being the focus of a flourishing trade, it is highly disappointing that the species has received rather poor attention from the concerned government authorities and conservationists. Additional worry is due to the fact that the government agencies are actively promoting the marketing and export of this fish without focusing on their resource characteristics. An urgent consideration is therefore needed from scientists, policy makers and relevant government agencies to take up the cause of this species, conduct baseline studies

## OPINION

---

on resource characters and life history, and promulgate the importance of conservation and sustainable utilization among the concerned stakeholders. Immediate enforcement of strict conservation strategies would probably be the only key to save this endemic species from further endangerment and possible extinction.

1. Kottelat, M. and Whitten, T., World Bank Technical Paper, 1996, 343.
2. Gopi, K. C., *Endemic Fish Diversity of Western Ghats*, National Bureau of Fish Genetic Resources, Lucknow, 2000.
3. Gopalakrishnan, A. and Ponniah, A. G., *Endemic Fish Diversity of Western Ghats*, National Bureau of Fish Genetic Resources, Lucknow, 2000, pp. 13–32.
4. Kurup, B. M. and Radhakrishnan, K. V., *Fish. Chimes*, 2006, **25**, 111–122.
5. Dahanukar, N., Raut, R. and Bhat, A., *J. Biogeog.*, 2004, **31**, 123–136.
6. Anon., 21 April 2006; [www.practicalfishkeeping.co.uk/pfk/pages/show\\_article.php?article\\_id=137](http://www.practicalfishkeeping.co.uk/pfk/pages/show_article.php?article_id=137)
7. Sekharan, M. N. and Ramachandran, A., *OFI J.*, 2006, **52**, 20–21.
8. Sudhi, K. S., *The Hindu*, Internet edition, 18 February 2004; [www.thehindu.com/2004/12/25/stories/2004122504930500.htm](http://www.thehindu.com/2004/12/25/stories/2004122504930500.htm)
9. Kurup, B. M. and Radhakrishnan, K. V., *Souvenir – Ornamentals Kerala*, 2006, pp. 37–57.
10. Ramachandran, A., *Riverine and Reservoir Fisheries of India*, Central Institute of Fisheries Technology and Society of Fisheries Technologists, Kochi, 2002, pp. 109–135.
11. Anon., 11 April 2006; [http://www.aquahobby.com/gallery/e\\_Puntius\\_denisonii.php](http://www.aquahobby.com/gallery/e_Puntius_denisonii.php)
12. Radhakrishnan, K. V. and Kurup, B. M., Abstr., *Sustain Fish* 2005, Kochi, 16–18 March 2005.
13. Mercy, T. V. A., Thomas, K. R. and Jacob, E., *Indian J. Fish.*, 2002, **49**, 209–210.
14. Mercy, T. V. A., *Souvenir – Ornamentals Kerala*, 2006, pp. 71–75.
15. Panes, H., Giles, B., Morgan, S., McCorry, D. and Vincent, A. C. J., Abstr., 7th Asian Fisheries Forum, Penang, Malaysia, 30 November–4 December 2004.

ACKNOWLEDGEMENTS. We thank Robin Welcomme for useful comments on the draft manuscript; Mini Sekharan, School of Industrial Fisheries, CUSAT, Kochi, and Benno Pereira, Department of Aquaculture, St. Albert's College, Kochi, for sharing valuable information on trade in native ornamental fishes from Kerala.

---

*Rajeev Raghavan\* is in the Department of Aquaculture, St. Albert's College, Kochi 682 018, India and currently at the Institute of Hydrobiology of the Chinese Academy of Sciences, Wuhan, China; G. Prasad and P. H. Anvar Ali are in the Department of Zoology, University of Kerala, Thiruvananthapuram 695 581, India; Lavanchawee Sujarittanonta is in the Institute for Sufficiency Economy Research and Promotion, Chiang Mai University, Chiang Mai, Thailand.*  
*\*e-mail: rajeevraq@hotmail.com*