

idea is to collect policy relevant statistics for analysing trends in investment, public allocations, availability of manpower and activities of private sector. Since in a globalized world innovation is influenced by several interdependent regional systems, it would be useful to launch this initiative at the Asian level. This should be done in the context of overall socio-economic requirements in the region. The presentations of this meeting are available at [www.ris.org.in](http://www.ris.org.in).

1. Rose Anthony, Paper submitted at the Working Party of National Experts on Science and Technology Indicators, Finland, 13–15 May 2002.
2. Francoz, D., Paper submitted at the Working Party of National Experts on Science and Technology Indicators, Finland, 13–15 May 2002.
3. Beuzekom, Brigitte van, Paper submitted at the Working Party of National Experts on Science and Technology Indicators, Finland, 13–15 May 2002.
4. Byars, D., Paper submitted at the Working Party of National Experts on Science and

Technology Indicators, Finland, 13–15 May 2002.

5. Pilat, D., Paper submitted at the Working Party of National Experts on Science and Technology Indicators, Finland, 13–15 May 2002.

*Sachin Chaturvedi is in the Research and Information System for Developing Countries, Core IV B India Habitat Centre, Lodi Road, New Delhi 110 003, India  
e-mail: sachin@ris.org.in*

## OPINION

### Need for a comprehensive re-assessment of the conservation status of critically endangered (?) freshwater fishes of Kerala

*Rajeev Raghavan, P. H. Anvar Ali and G. Prasad*

As an exceptional hotspot of freshwater biodiversity<sup>1</sup>, showing high degree of endemism<sup>2</sup>, the streams and rivers of Kerala (8°17'30"–12°27'40"N, 74°51'57"–77°24'47"E) have been receiving global attention. The diversity and distribution of freshwater fishes in Kerala have been documented in detail<sup>2–7</sup>. A comprehensive review on the distribution, endemism and threat status of the 175 freshwater fishes from the fourty-four rivers of Kerala was presented at an international large rivers conference<sup>6</sup>. A recent document on the fish diversity of the streams and rivers of Kerala<sup>7</sup> has accounted for 18 critically endangered species (Table 1).

The 'critically endangered' (CR) species of the region have been categorized on the basis of their (i) restricted distribution to a single location and a single river system, (ii) a range distribution of less than 100 sq. km and (iii) an 80% population reduction during the past decade, based on the classification originally proposed by IUCN<sup>8</sup>. Although population is one of the criteria on which various species have been listed as CR, an extensive literature search revealed lack of scientific data pertaining to aspects of population dynamics and/or wild stock analysis, including information on 'population reduction' or 'population estimates' of any of these

species. This therefore suggests that restricted distribution of the species may be the single most important criterion on which these species have been given a CR status. Even if we are led to believe that 'restricted distribution' and 'a limited range of occurrence' are the major factors that have been taken into account to categorize the different species as CR, there still exists a case for much debate and discussion.

The detailed account on the biodiversity status of the freshwater fishes of Kerala<sup>6</sup> reports that among the 18 critically endangered species, seven are confined to only a single locality, while five are found in two locations in the same river, thus supporting the reasoning that restricted distribution of the species is probably the most important criterion, on which the species have been listed as critically endangered. However, our analyses, based on results from detailed literature searches reveal that existing data on several species listed as CR make them unfit to be listed under this threat category. Most species listed as CR are now distributed widely across several river systems located several hundreds or in some cases thousands of miles apart. Here are some examples.

(i) Waynad mahseer, *Barbodes wynaadensis*<sup>9</sup> (Day, 1871) has been listed as CR

in view of its restricted distribution to the Kabini river, Waynad district (11°27'–15°58'N and 75°47'–70°27'E), Kerala<sup>6,7</sup>. However, field surveys have recorded this species from Abby Falls, Madikeri town, Coorg district (14°30'–15°50'N and 75°40'–77°11'E), thereby extending its range distribution to the neighbouring state of Karnataka<sup>10</sup>.

(ii) Malabar catfish, *Pterocryptis wynaadensis*<sup>11</sup> (Day, 1873) also deserves mention here, in the way it has been listed as a CR and endemic fish of Kerala. Even the most recent paper<sup>7</sup> mentions that this catfish is known only from the Kattivat-tom area of Kabini river, Waynad district, Kerala and draws the attention of global scientists due to its endemism to this locality. However, this species has been recorded from neighbouring Tamil Nadu<sup>12</sup> (13.09°N, 80.27°E) and also from regions as far as Maharashtra<sup>12</sup> (18.96°N, 72.82°E), and a number of collections of this catfish have been made from its new geographical areas. Researchers<sup>13</sup> who studied the life history traits of *P. wynaadensis*, had also suggested that the fish no longer merits a CR category.

(iii) *Dayella malabarica* (Day, 1873) listed as CR<sup>6,7</sup> has been collected from as many as 25 river systems of Kerala<sup>14</sup>. It is highly surprising that a fish species,

**Table 1.** Critically endangered fish species of Kerala (after Kurup and Radhakrishnan<sup>7</sup>) and their updated ranges of distribution

Species	Distribution
<i>Amblypharyngodon melettinus</i> <sup>20</sup>	Veli Lake, Achencoil
<i>Balitora mysorensis</i>	Kabini, Bhavani, Bharatapuzha, Periyar, Achencoil, North Karnataka
<i>Channa micropeltes</i>	Pamba, Kallada
<i>Dayella malabarica</i>	Twenty-five rivers of Kerala
<i>Glyptothorax anamalaiensis</i>	Anamalai Hills (Noolpuzha), Chaliyar
<i>Homaloptera montana</i>	Anamalai Hills (Puthuthottam Estate), Silent Valley
<i>Horabagrus nigricollaris</i>	Chalakyud
<i>Horaglanis krishnai</i>	Subterranean wells of Kottayam
<i>Horabiosia joshuai</i>	Pambar, Bharatapuzha, Kalakkad
<i>Labeo ariza</i>	Periyar, North Karnataka, Maharashtra, Kabini
<i>Lepidopygopsis typus</i>	Periyar (Thanikuddy)
<i>Barbodes wynaadensis</i> <sup>10</sup>	Kabini, Cauvery
<i>Ompok malabaricus</i>	Bharatapuzha, Chalakyud, Karuvannur, Moyar, Kabini, Goa
<i>Osteochilus longidorsalis</i>	Chalakyud
<i>Pangasius pangasius</i>	Pampa, Kuttanad
<i>Puntius ophiocephalus</i>	Periyar, Pampa, Manimala
<i>Pterocryptis wynaadensis</i> <sup>12</sup>	Kabini, Tungabhadra, Tamaraparini, Bhavani, Moyar
<i>Tor mussullah</i>	Chalakyud, Chaliyar, Bhavani, Krishna, Godavari, Cauvery

distributed in as many as two-dozen river systems of a region, lying hundreds of kilometres apart has been placed in the CR category. Another point of interest here is that a recent paper on the distribution, endemism and threat status of freshwater fishes of the Western Ghats<sup>15</sup>, published in an international peer-reviewed journal, has listed this species under the Low Risk (LR) category! Such anomalies, where a single species has been categorized in two different threat status, by two different workers also support our argument to conduct a comprehensive assessment of threat status of the freshwater fishes of Kerala.

Here a detailed mention has been made only on three species. There are other examples of species being treated as CR, when they have been collected from many locations spread across different geographical areas. Table 1 gives a detailed overview on the species mentioned as CR by various workers and our results (based on published sources) on their present status with regard to distribution and endemism.

What could be termed as a classical example of mis-documentation with regard to the threat status of fishes of this region is the case of the blind catfish, *Horaglanis krishnai* Menon 1950, which is restricted to the subterranean wells of Kottayam district (9°36'N and 76°17'E), Kerala. This species, which all along has been listed as CR in view of its strict endemism to the area, has been categorized as a

'Vulnerable' (Vu) in the latest IUCN Red List assessment<sup>16</sup>. If a species, which is restricted to a single location and one which is very rarely available in the collections, has been listed only as 'Vu', then there is little or no doubt that the other species which all along have been listed in the CR category would end up in the LR category if subjected to detailed assessments.

The most important point is that the conservation categories used for listing the species from the Western Ghats and Kerala, are from the original formulation of the IUCN threat categories<sup>8</sup>. Work for the 1996 Red List, and consultation led to the redefining<sup>17,18</sup> of these categories in 2001. Henceforth these should be the criteria for redefining the threat status of the native fish fauna. A critical comment on this aspect, with regard to the fishes of the Western Ghats, has already been published<sup>19</sup>. In addition, another point that we would like to raise is that the Conservation Assessment and Management Plan workshop conducted in 2001 assigned various threat categories to the freshwater fishes of the region<sup>8</sup> using the IUCN criteria of 1994. However, this exercise was primarily based on the perceptions of the expert participants with regard to changes in population decline and not based on credible scientific studies.

It is more or less clear that there is no proper documentation regarding the threat status of freshwater fishes of this global biodiversity hotspot and urgent attention

is therefore required to reassess the endangered status of freshwater fishes of the region. A detailed document on the current status of freshwater fishes of Kerala with reference to distribution, abundance, endemism and threat status should be prepared by involving experts from agencies such as IUCN, using their latest tools and categories.

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*Rajeev Raghavan is in the Department of Aquaculture, St. Albert's College, Kochi 682 018, India and P. H. Anvar Ali and G. Prasad\* are at the Department of Zoology, University of Kerala, Kariavattom, Thiruvananthapuram 695 581, India.*  
\*e-mail: probios1@hotmail.com

## MEETINGS/SYMPOSIA/SEMINARS

### Molecular and Clinical Aspects of Gonadal and Nongonadal Actions of Gonadotropins

Date: 7–9 February 2008  
Place: New Delhi

Contact: Dr Pradeep K. Chaturvedi  
Organising Secretary  
Department of Reproductive Biology  
All India Institute of Medical Sciences  
New Delhi 110 029  
E-mail: gonadotropins2008@gmail.com  
Website: [www.aiims.edu/gonadotropins2008.htm](http://www.aiims.edu/gonadotropins2008.htm)

### Workshop on Electrophoresis Techniques

Date: 16–25 May 2007  
Place: Yercaud

Topics include: Fundamentals and practical aspects of various electrophoresis techniques routinely employed today. Agarose gel, immunoelectrophoresis techniques, submarine gel, PCR, RAPD, RFLP analysis, isoelectric focusing, 2D PAGE, electroelution, silver staining, gel documentation and analysis, etc.

Contact: Dr K. Anbalagan  
The Electrophoresis Institute (Biotech)  
Yercaud 636 601  
Tel: 04281 222626  
Fax: 04281 222256  
Mobile: 9443222480  
E-mail: phoresis@hotmail.com