

AQUACULTURE ASIA

Bio-remediation of sewage recycled in aquaculture
Coastal ecosystem management, India

Status of alien fish, India
Extension via ICT



Conservation of fish genetic resources: An introduction to state fishes of India.

Vinay T. N.^{1*}, Kapil S.², Tanmoy G.¹ and Anutosh P.¹

1. ICAR-Indian Institute of Agricultural Biotechnology, Ranchi, India, email vinaytn56@gmail.com;

2. ICAR-Central Marine Fisheries Research Institute, Regional Research Centre, Veraval, India

India is estimated to have around 2,500 fish species, some 11.72% of all fish species known world-wide, out of which 2,358 are indigenous and 291 are exotic¹.

Over exploitation, habitat destruction, introduction of exotic species and pollution has led to the loss of native germplasm. Biodiversity conservation is very important to preserve species and also to safeguard the local interest and the cultural attachment of people to certain species. Several species from India are already extinct and many are endangered, threatened or listed in different categories based on their natural presence. The estimated current extinction rate is very high, ranging between 1000-10000 times the natural rate². Hence, appropriate strategies for biodiversity conservation management are required.



Indian Mackerel (Rastrelliger kanagurta), national fish of India.



Murrel (*Channa striatus*), state fish of Andhra Pradesh.

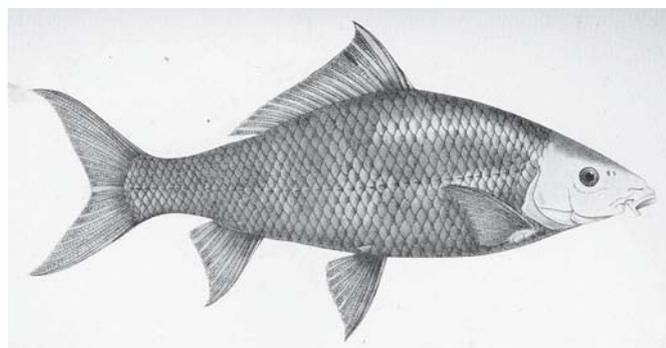
Fish is a very good source of nutrition and has to be preserved for the sake of food security as well. Fisheries has provided food and livelihood to millions of people and in several places livelihoods of local communities are dependent on a particular species, frequently leading to over exploitation. To balance livelihoods and sustainability, it is important to bring awareness among the people to conserve the species. Peacock and the tiger being the national bird and animal respectively, have their own stature in the minds of people and there is always a special interest to preserve these species. Similarly, Indian mackerel is our national fish, found abundantly on the south west coast of India and has a special place in the life of people residing there.

India is a large country with many states and there is considerable cultural variation between them. The varying climatic conditions have led to varied distribution of species among different states of India and the people have different preferences and cultural attachments towards different species. Sensing an opportunity to make use of this, the ICAR-National Bureau of Fish Genetic Resource, Lucknow has conceptualised the "state fish" concept as a method to conserve fish species.

Different states of India have declared their state fish based on the abundance, preference and importance in the day to day life of the people. Out of 30 states, 17 have already declared their state fishes and given importance for their conservation, breeding and culture aspects. This will help in conserving the biodiversity.

Red listing of species

International Union for Conservation of Nature and Natural Resources (IUCN) sets the standard for the conservation effort and species listing based on the threat status on



Kalbasu (*Labeo calbasu*), state fish of Haryana.

particular species. The IUCN red list conveys the urgency and scale of conservation problems to public and policy makers to bring awareness in people to conserve species from extinction¹.

State fishes of India

Out of the 17 states that have declared a state fish, five of them have chosen same species, which indicates the importance of that particular species. It is important that all the states declare their state fish and start contributing towards the conservation of those neglected species, which are in urgent need of conservation. This concept may also be applied elsewhere for biodiversity conservation. This article aims to introduce all the state fishes which are declared at present to the people of the nation to have the awareness on the biodiversity and its conservation.

Channa striatus

Indian state of Andhra Pradesh has adopted *Channa striatus* (Murrel) as its state fish. It belongs to the family *Channidae*. In Hyderabad, India, some people promote the swallowing of live murrel fish and herbs as an asthma treatment, although it is not legally considered as medicine. This species is very common in the plains of India with no known major threats and is currently assessed as least concern, according to IUCN guidelines³. The fish breeds during the rainy season and the female matures at two years, and lays a few hundreds to over a thousand eggs. Young ones are guarded by both parents until they are in fry stage⁴.

Tor putitora

Indian states of Arunachal Pradesh, Himachal Pradesh, Jammu Kashmir, Madhya Pradesh and Uttarakhand have adopted *Tor putitora* (golden mahseer) as their state fish due to its natural occurrence in the region, the affinity of local population towards the fish and mainly due to the conservation status of the fish. It belongs to the family *Cyprinidae*. It is the most preferred game fish for anglers globally, but unfortunately it is one of the most endangered species of fish in India. The reasons could relate to biological factors, as the fish has a very long hatching period. Further, its migration routes are blocked by construction activities on the rivers. The species is therefore assessed as endangered according to IUCN guidelines and is in need of urgent conservation efforts to save it from becoming locally extinct. Fish lays,



Carnatic Carp (Puntius carnaticus), state fish of Karnataka.

4,000-5,000 eggs/kg body weight. The artificial breeding techniques are standardised but the seed production has to be increased⁵.

Clarias batrachus

The Indian state of Bihar has adopted *Clarias batrachus* (magur) as its state fish. It belongs to the family Clariidae. It is highly threatened by exploitation and threats to breeding grounds. More than 50% of the wild population has declined in the last few years, and the species is assessed as endangered according to IUCN guidelines. Magur spawn for short period from July to August during the rainy season, when water level rises and fish are able to build nests in submerged mud banks and dykes. Significant developments have been made in India in culture techniques for Magur under the All India Coordinated Research Project on Air-breathing Fish Culture. Seed production has to be increased to conserve the species⁶.

Labeo calbasu

Haryana has adopted *Labeo calbasu* (kalbasu) as its state fish. It belongs to the family Cyprinidae. It is mainly present in ponds and in slow moving waters of rivers. Based on wide distribution in India, it is one of the major Indian carps. It is an important food fish and at several places, and is referred as the "black rohu". It is an important game fish in several tanks where it is stocked and is cultured along with other species. Due to its abundance, the species is assessed as least concerned according to IUCN guidelines. The fecundity of this species ranges between 200,000 and 250,000, it does not normally breed in ponds, and hypophysation is required for induced breeding⁷.

Puntius carnaticus

Karnataka has adopted *Puntius carnaticus* (carnatic carp) as its state fish. It belongs to the family Cyprinidae. The species is abundant in the rivers of Karnataka, Kerala and Tamil Nadu. Carnatic carp forms minor fisheries in several reservoirs located in the Cauvery River basin. It is threatened by a wide range of factors including decline in habitat quality due to destructive fishing practices such as poisoning and dynamiting, altered river flow due to construction of dams, competition with exotic and transplanted carps and aquatic pollution. No proper conservation efforts are in place. However, due to its abundance, the species is assessed as least concern category according to IUCN guidelines. The adults migrate upstream for spawning and breed in the flood waters along rivers during the monsoons. Milt cryopreservation and captive breeding protocols have been developed at National Bureau of Fish Genetic Resources and Central

Institute of Freshwater Aquaculture-Regional Research Centre, Bangalore is dedicated to conduct the research, on peninsular carps including carnatic carp⁸.

Etroplus suratensis

Kerala has adopted *Etroplus suratensis* (karimeen) as its state fish. It belongs to the family Cichlidae. Karimeen is a euryhaline species that inhabits mainly brackish water and in river mouths. A major threat is from exotic species like *Oreochromis mossambicus* and *Trichogaster trichopterus*. Though the species has high demand, the wild populations have not been given sufficient conservation attention. However, due to abundance the species is assessed as least concern category according to IUCN guidelines. Karimeen breeds in rainy season and several adults care for a single brood that were probably spawned by only a single pair of the adults⁹.

Osteobrama belangeri

Manipur has adopted *Osteobrama belangeri* (Pengba) as its state fish. It belongs to the family Cyprinidae. Pengba has become extinct from the wild in Manipur and the extinction of the species is due to dam construction and other threats. This indicates that the species is very sensitive to changing environments. Since no threats are known for the species' distribution range, it is assessed as near threatened category according to IUCN guidelines. More research is needed to investigate the possibility of natural population in India. It is commercially used as food from captive breeding in Manipur. Artificial breeding techniques are available and seed production has to be increased for stocking in natural water bodies¹⁰.

Semiplotus modestus

Mizoram has adopted *Semiplotus modestus* (nghavang) as its state fish. It belongs to the family Cyprinidae. This is a very rare species and it inhabits moderate to fast flowing mountain streams and rivers with rocky bed. The hill streams are now threatened by sedimentation due to deforestation and agricultural practices resulting in habitat destruction of the species. Research on distribution, biology, habitat and threats are very necessary. The species is at present assessed as data deficient category according to IUCN guidelines. Further survey work is needed to determine whether or not this species is experiencing a decline, or is undergoing extreme population fluctuations¹¹.



Karimeen (Etroplus suratensis), state fish of Kerala.



Pengba (Osteobrama belangeri), state fish of Manipur.

Neolissocheilus hexagonolepis

Nagaland has adopted *Neolissocheilus hexagonolepis* (chocolate mahseer) as its state fish. It belongs to the family cyprinidae. It is endemic to northeastern states of India, particularly to the Brahmaputra River basin. It is a very popular fish for both food and sport and also a rich protein source for remote villagers of Arunachal Pradesh, Assam and Meghalaya. But it is reported to be declining in the wild and presently assessed as near threatened species category according to IUCN guidelines. Its propagation by artificial breeding is being attempted as a measure of conservation by several research and educational Institutions¹².

Tor mahanadicus

Indian state of Orissa has adopted *Tor mahanadicus* (mahanadi mahseer) as its state fish. It belongs to the family Cyprinidae. It is commonly known as the tor mahseer or tor barb. It is found in fast flowing rivers and streams with rocky bottoms and is a commercially important food and game fish. Its population is rapidly declining in its native range due to overfishing. It is a large fish, reaching 36 cm at maturity. In conservation terms it is assessed as near threatened category according to IUCN guidelines¹³.

Ompak bimaculatus

Tripura has adopted *Ompak bimaculatus* (pabda) as its state fish. It belongs to the family Siluridae. Pabda is also known as butter catfish, it is a species of sheat fishes native to India, Bangladesh, Pakistan, and Sri Lanka, but recently identified in Myanmar. In conservation terms it is in near threatened

category according to IUCN guidelines. Breeding techniques for this species are standardised in the state of Tripura and seed production needs to be given more importance¹⁴.

Chitala chitala

Indian state of Uttar Pradesh has adopted *Chitala chitala* (chitala) as its state fish. It belongs to the family Notopteridae. Chitala is mostly restricted to the Indian subcontinent and the stock has declined considerably. However, limited data is available on the population status and it has been difficult to estimate the period over which the suspected decline has occurred. The species congregates, making it very easy to catch where it is present. The catches of this species are fast declining in India. In conservation terms it is assessed as near threatened category according to IUCN guidelines.



Nghavang (Semiplotus modestus), state fish of Mizoram.



Chocolate Mahaseer (Neolissocheilus hexagonolepis), state fish of Nagaland.

Breeding has been successfully demonstrated and captive breeding of the species is being undertaken in parts of India to provide food fish¹⁵.

Tenualosa ilisha

Indian state of West Bengal has adopted *Tenualosa ilisha* (hilsa) as its state fish. It belongs to the family Clupeidae. There is not a single Bengali that doesn't like hilsa. It has become an integral part of everyday life and diet of Bengali culture. The species is widespread, but there have been serious declines in some major populations of the species due to over-exploration by commercial fisheries. There are no known, species-specific conservation measures in place. In conservation terms it is assessed as least concern category according to IUCN guidelines. This species has the ability to spawn multiple times during its spawning season from May to August. Its absolute fecundity ranges from 450,000 to 1,600,000 eggs per female, but may reach 2,000,000 depending on the size of the fish¹⁶.

Conclusion

Out of the 13 species adopted by 17 states, 2 are endangered and 5 are near threatened and if proper care is not taken, there is every chance of losing these species. The conservation of aquatic organisms has to be taken very seriously as more and more organisms are approaching a threat of extinction. The state fish concept is an innovative step to make people understand and take care of species that are related to the everyday life of the people. It leads to the conservation of the local germplasm and helps to maintain sustainability in fisheries activities. It is the responsibility of every person to contribute to conservation of biodiversity, and not just the states who have declared their state fishes. It is "easy to lose a species but impossible to create one". This concept of encouraging region specific conservation method will bring more awareness in people for biodiversity conservation and sustainable livelihoods.



Pabda (Ompak bimaculatus), state fish of Tripura.



Chitala (Chitala chitala), state fish of Uttar Pradesh.

References

1. Lakra, W.S., U.K. Sarkar, A. Gopalkrishnan, A. Kathirvelpandian. 2010. Threatened fresh water fishes of India. NBFGR Publication. ISBN: 978-81-905540-5-3.
2. Kumar, A and V. Khanna. 2006. Globally threatened Indian Fauna Status, Issues and Prospects: Zoological Survey of India, Kolkata. ISBN: 81-8171-122-X.
3. IUCN, 2014. IUCN Redlist of threatened fishes. www.iucnredlist.org.
4. Chaudhry, S. 2010. *Channa striata*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.
5. Jha, B.R. & A. Rayamajhi, 2010. *Tor putitora*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.
6. Vishwanath, W. 2010. *Clarias magur*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.
7. Dahanukar, N. 2010. *Labeo calbasu*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.
8. Ali, A & R. Raghavan. 2013. *Barbodes carnaticus*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.
9. Abraham, R. 2013. *Etroplus suratensis*. IUCN Red List of Threatened Species. Version 3.1. International Union for Conservation of Nature. Retrieved 02 May 2016.