

CONSERVATION STRATEGIES OF ICHTHYOFAUNA IN NORTHERN PART OF WESTERN GHATS

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INTRODUCTION

The Western Ghats is one of the global hotspots and is of prime importance from biodiversity conservation point of view. It constitutes almost a continuous chain of hills of 200 to 2600 meters altitude, starting from Dangs District of Gujarat in North to Kanyakumari (Tamil Nadu) in south. It gives rise to 3 major peninsular rivers viz. Godavari, Krishna and Cauvery, in addition to numerous west flowing rivrs alongwith their tributaries. The hillstreams, ponds, puddles, rivers and rivulets of northern part of Western Ghats harbour a rich piscine fauna, comprising 135 species under 54 genera of 21 families.

As an impact of modern development and anthropogenic pressure, the ichthyofauna is under threat. Among 135 fish species recorded from northern part of the Western Ghats, 51 are known to be threatened and 40 endemic to this region (Yadav, 1997, unpublished record). Taxonomically important fish species are endangered and few are on the way of extinction. Our valuable fish fauna of Western Ghats must be conserved (Yazdani, 1991).

For conserving the precious ichthyofauna, a holistic approach must be made including In-situ conservation (conserving species within the habitat) and Ex. situ conservation (conserving species outside the habitat). First step of conservation lies in maintaining water clean and free from pollution, water pollution includes many toxic chemicals coming out of sewage, industrial effluent water, garbage, insecticides, pesticides, fertilizers etc. We should try to avoid accumulation of chemicals and metal toxicity in water due to release of Lead, Mg, Cl, Hg, etc., as these chemicals are lethal to fishes, acting directly on gill filaments. Some of them are neurotoxic like Pb. Abnoxious aquatic weeds should also be removed. Water should be kept clean through dilution as well as self purifying system. As per standards laid down by Central Pollution Control Board (CPCB), a class-D water, suitable for fish propagation and wildlife should be maintained. Class-D water is slightly Alkaline (Ph. 6.8 to 8.5) having Dissolved oxygen (DO) 4mg/L, (Anonymous, 1982). Afforestation along the edges of waterbody should be encouraged and further efforts should be made to stop grazing, so that soil quality will be maintained. Salination of waterbody and siltation at the bottom should avoided, as it destruct breeding ground, migration route and it also affects benthic fauna and its natural regeneration (Thomas & Aziz, 1996). In developed countries 'Clean water Act' has been implemented since 1973 (Buddy, 1944), but in India, this aspect has been neglected. It is sad situation in our counrty that, 70% waterbodies are dried up and remaining are polluted. Water pollution is a serious problem which must be faught at all levels.

It is noteworthy that the Tata Electric Company, Lonawala has cultured the Deccan Mahseer, *Tor khudree* (Sykes) alongwith other species which also include air transportation of eggs to various states of country to boost conservation programme (Kulkarni & Ogale, 1979). Similarly in the fish hatchery at Bhubneshwar, artificial breeding experiments on the Rohu, *Labeo rohita* (Ham.-Buch.) have been reported with higher growth rate. Monoculture and polyculture experiments can be conducted, avoiding hybridization with due caution to exotic species e. g. *Oreochromes mossambica* (Peters).

The Dexter National Fish Hatchery Centre, New Mexico, is the first of its kind in the world, which successfully reintroduced and protected fish species of south America by forming 'Fish Refugia', 'Fish Park' etc. (Buddy, 1994).

In the Ex-situe conservation, cryopreservation of sperms of fishes prepared and at suitable period, fertilization can be achieved. Such type of work has been conducted at National Bureau of Fish Genetic Resources, Lucknow. The Scientists are working on endangered, endemic yellow catfishes - Kooral and Kuyil of Kerala (Anonymous, 1998). Recently Japanee's scientists succeeded in reproducing the variety of Zebra danio, *Brachydanio rerio* (Ham.-Buch.) with the aid of cryopreservation techniques and by using liquid Nitrogen (Akoi *et. al.*, 1997).

Ecologically important portion of rivers and certain waterbodies, in the Western Ghats, should be selected for conducting pisciculture experiments to save significant fish species. To achieve this, Non Government Organizations, University and College students' capabilities and interest can be utilized as a study curriculum (Gadgil, 1996a).

Conservation strategies for freshwater fishes of the Western Ghats can include the following significant steps.

1. Survey and species recovery plan.
2. Habitat restoration.
3. Scientific provision.
4. Legal protection.

1. Survey & species recovery plan

For identifying the threatened fish species, a baseline survey of selected waterbodies in Western Ghats should be conducted. After preparing a careful inventory, endangered species can be identified. These species can be given protection. Further, they may be introduced in waterbodies, to enhance fish population. River ranching programmes should be implemented. Unfortunately, there is no Red Data Book on the fishes of India. Instead of teaching the Biology of Shark, Salmon, *Cyprinus* etc., detailed behaviour and Biology of our local fishes should be undertaken. It would help to conserve the ichthyofauna.

2. Habitat Restoration

As a result of irrigation projects and human interference, many important habitats of fishes are lost. Rivers dry up or spoil due to pollution. Mula-Mutha and Pawana rivers in Pune dist.,

Ulhas river in Thane dist., Banganga river in Raigad dist., Panchganga river in Kolhapur dist., Krishna river in Satara dist. of Maharashtra state. Pamba and Periyar in Kerala state are few examples. Type localities of *Rasbora labiosa* Mukerji and *Puntius fraseri* Hora & Misra (Darna river, a tributary of Godavari river Nasik dist., Maharashtra state) and *Silonai childreni* (Sykes) (Mula Mutha river, Pune) have almost vanished and fish specimens can not be obtained. Similarly, the Mahseer, (Masundi), *Tor mussullah* (Sykes) & *Osteobrama* spp. could not be collected from its type locality i. e. Ghod river, Sirur & Pune dist., due to degradation of natural habitats (Jayaram, 1997).

Endangered fish species must be conserved by formation of sacred groves like one in Indryani river near Dehu, Pune dist., for *Schismatorhynchus (Nukta) nukta* (Sykes) and at holy region of Trimbakeshwar, near the origin of Godavari river, Nasik dist., Maharashtra.

Sacred groves have important influence on masses to save valuable fish species, Maintenance of sacred groves can be allotted to Non Government Organizations. Like the fish sanctuaries, their number should be increased in every district of Western Ghats.

3. Scientific Provision

The construction of dams have affected the fish migration, as many of the fishes undergo short term local migrations for feeding and breeding purpose. e.g. *Tor khudree* (Sykes) which requires rocky bottom, goes upstream for breeding, while *Bagarius bagarius* (Ham.-Buch.) goes down - stream and eels, catfishes undergo local migrations. Hence provision of a fish ladder (an easy zig-zag way/steps for fishes to cross over the dam) should be made (Tilak & Sharma, 1982), Nautiyal (1994). The idea of fish ladder has emerged in Western countries in 1973, to enable migration of Salmon. On the similar lines we should try to from some way for fishes to cross over the dam. Prior to construction of dam, a provision for fish ladder should be made. As per suggestions of Jhingran (1982), a fish sanctuary or fish farm with buffer zone must be formed nearby every dam, as a means of compensation to propagate ichthyofauna therein.

A close period should be strictly observed in the breeding season of fishes, (June to September). Eggs, fry, fingerlings and brooding adults must be protected. Aquaculture business should be encouraged with some recreation charges so as to percolate the knowledge about local fishes. Similarly training on fishery management and conservation programmes must be conducted for public awareness. In U. S. A. in 1960, citizens raised voice against killing of fishes (Johnson & Rinne, 1982). Thus in addition to Government's efforts, tribals and local residents should be involved in the fish conservation programme in India.

4. Legal Protection

Excessive killing of fishes should be abided by law. On the line of U. S. fish-wild life service, a new fishery law should be formed in our country in which protection to endangered fish species as well as to the identified localities of great significance should be given and degraded ones should restored. Recently Australian Government accorded protection to seahorses and other sea-fishes under wild life act from 1st January 1998 (Anonymous, 1997).

Every major fish market in the Western Ghats belt should have a licence and check over the sale of threatened fish species. For this purpose, Eco-restoration Fund should be raised from owners of fish farm under Aquaculture Act, which has been practised in Tamil Nadu (Anonymous, 1995). Further, Fishery Inspector should be appointed in every major fish market of the districts of Western Ghats. Eco-friendly attitude with sustainable use of natural resources should be formulated in the legal frame-work.

Fisherman should be instructed with guidelines to save particular fish with the use of nets of suitable mesh size & their practical knowledge can be utilized in conservation work. Attempts should be made to prepare an updated document on the ichthyofauna of the Western Ghats, similar to the idea of People's Biodiversity Register by Gadgil (1996b) including suggestions of Species Survival Commission and Convention on Trade in Endangered Species (CITES).

Thus by vigilant survey, collection, identification of fishes, protection and restoration of waterbodies, with the aid of scientific provision, legal protection and through public awareness precious ichthyofauna of the Western Ghats must be conserved.

ACKNOWLEDGEMENTS

I am grateful to the Director, Zoological Survey of India, Calcutta and to Dr. M. S. Pradhan, Sci-SE, Officer-in-charge, Western Regional Station, Pune, for the facilities. I am deeply indebted to my guide Dr. G. M. Yazdani, Ex-Sci-SF, for his valuable suggestions and also to various survey parties of WRS/ZSI for precious fish collection.

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