

Fish Genetic Resources of Bangladesh

- Fish genetic resource simply refers to all fishes found in both freshwater and marine environments and their gene pools.
- Bangladesh has 475 marine fish, sp. 265 freshwater fish sp., 24 prawn and 36 shrimp etc.
- Fisheries research including genetical aspects has made significant contributions to the large growth of aquaculture through
 - generating a number of economically viable,
 - socially acceptable varieties and
 - environmentally compatible technologies being used by different categories of farmers, large and small.

Scope and potential of Genetics

- i) To develop fish breeding technique (i.e. selective breeding) for quality fish seed production.
- ii) To prevent genetical diseases of fish.
- lii) To avoid inbreeding and hybridization problem.
- iv) To develop new strains / varieties of fishes.
- v) To improve qualitative phenotypes of ornamental fishes
- vi) To increase qualitative and quantitative phenotypes (i.e. growth, color, size, taste, scale condition etc) of most aquacultured species.
- Vii) To produce monosex, sterile, supermale or super female populations of a species.
- Viii) To produce genetically modified organisms (GMO) in case of fish.

ix) To study higher molecular biology and different techniques of fish.

x) To recognize pure, inbred or hybrid individuals of a species (by allozyme electrophoresis, DNA or RNA electrophoresis, RAPD, RFLP, microsatellite etc).

xi) To support hatchery management successfully and create a revolution in aquaculture production.

Xii) To develop cryopreservation technique and gene bank.

xiii) To revive our fish biodiversity and save the threatened fish.

xiv) To recognize paternity of individuals of a species or culprits of a case investigation.

Present status of fish genetic diversity in Bangladesh

The fisheries diversity of the country is considered as one of the richest in the world in consideration of its comparatively small total area.

The country has a unique assemblage of 296 fresh and brackish water finfishes and shrimps (Rahman, 1989); the number of marine fin fishes in the county is recorded at 511 species.

However, for various reasons arising out from both manmade and natural causes, the open water habitats have been highly degraded.

The run off insecticides and pesticides from the agricultural fields to the inland waters has significantly degraded the eco-biological qualities of the habitats. Siltation in the rivers, beels, and baors has greatly altered the habitat conditions for fish population. Increase of human population in the country has created various anthropogenic causes leading to serious resource depletion in the open water fisheries.

All these results the reduction of fisheries biodiversity at species, Genetic and ecosystem levels.

The resultant fisheries biodiversity scenario is that many freshwater species have become threatened and or extinct.

List of some Threatened species (iucn 2000)

Bhangon bata-Labeo boga-CE

Nandina- Labeo nandina-CE

Gonia-Labeo goniuss-E

Bata- Labeo bata-E

Kalibaush- Labeo calbasu-E

Ayre-Mystus aor-V

At the backdrop of the above scenario there has been a phenomenal growth of aquaculture of the indigenous Indian major carps species viz., *Labeo rohita*, *Cirrhinus cirrhosus*, *Catla catla*.

Added in the list of cultured species are a few exotics, viz., *Hypophthalmichthys molitrix*, *Ctenopharyngodon idella*, *Aristichthys nobilis*, *Mylopharyngodon piceus*, a few varieties of common carp, *Cyprinus carpio*, *Pangasias sutchi*, *Barbodes gonionotus* and Thai climbing perch, *Anabas testudineus*.

Aquaculture of the species is contributing to the increase of production of fish, however, as obvious; it has negatively impacted to the loss of fisheries conservation of genetic variation and conservation of fisheries biodiversity.

It encourages elimination of the wild species from ponds; the wild species are mainly the small species.

Felts et al (1996) denoted the' species that get 25cm long at their mature state as Small Indigenous Species (SIS) and their number is 143 in the country.

These species breed, feed and sustain automatically in the varied natural aquatic habitats of the country and intrude into the aquaculture ponds and possibly from that vary notion, the species are also termed a Self Recruiting Species (SRS).

At the face of a serious decline of natural seed supply of the endemic Indian major carp species, the country has experienced a recent boom in the growth and development of artificial seed production industry for the cultivable species; numerous hatcheries have been established both in the public and private sectors.

Fish breeding and hatchery activities could not be managed with genetic norms and principles; it brought about genetic erosion of the stocks employed in the hatcheries.

Inbreeding, negative selection for various desirable traits in the Indian major carps and the Chinese carps, introgressive hybridization in the endemic and introduced carps have been common in the country.

Reports on researches for genetic improvement of the cultivable fish species are available on a limited scale. Manpower resource in fish genetics in Bangladesh is not very rich; there are a few people engaged in fish genetics teaching and research in different universities in the country.

Aquaculture Genetics

Ploidy Manipulation (Androgenesis, gynogenesis, triploidization etc.)

Artificial breeding

Hybridization

Sex reversal (Sterile, monosex population, YY supermale of tilapia etc.)

Revive of Fish Genetic Resources

It is said in the foregoing, aquaculture cannot sustain genetically in the long run without a sustained effort for biodiversity protection in the natural waters.

A strong campaign has to be lodged in the local folk on the life cycles of the fish species; they have to be conceived with the simple understanding that there can be no offspring/fish fry without the chance of survival of the brood parents; some fish must be saved/left in the waters for next generation to be possible to come.

The waters have to be declared sanctuaries and managed with the help of the local committee/corporatives assisted by the local fisheries extension agent of the Department of Fisheries.

The fishing in the waters will be allowed but with limitations with regard to seasons and gears involved.

These anthropological impacts on the local waters have practical basis; however, it needs serious reconsideration for, without a concerted effort local fish biodiversity cannot be protected.

The rivers, the big rural ponds, beels, canals/khals, flood plains, haor, baor etc. have to be maintained as perennial water bodies; there has to be serious compromise on the use of water for fishery sustenance and winter crop irrigation.