Exotic Fish Species Introduced In India And Its Impacts


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An exotic species is any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that habitat. During the period 1870-1947 under the British rule, 9 species of exotic fishes were introduced. They were temperate food carps, *Tinca tinca, Carassius carassius, Cyprinus carpio (European strain), and the tropical osphronemid, Osphronemus goramy*; the salmonid game fishes, the brown trout and the rainbow trout and *larvicidal Gambusia affinis and Lebistes reticulatus*. The post- independence India witnessed introductions of 8 exotic species. They were the *cyprinids*, *Cyprinus carpio*, (*chinese strain), Ctenopharyngodon idella, Hypophthalmicthys molitrix, Puntius javanicus, and the cichlid, Tilapia mossambica*, all of food species and the *salmonids, Salvelinus fontinalis, Onchorhyncus nerka*, and *Salmo salar*. Unauthorized introductions were: *Aristicthys nobilis, Tilapia nilotica* and red tilapia.

Some of the important exotic fish sps introduced in India

Cyprinus carpio (European Carp or Common Carp) : Depending on the texture of the skin and size of scales, the fish has been divided into 3 main varieties. They are:Scale carp (*C. carpio* var. communis) body completely covered with smaller scales. Mirror carp (Var. specularis) with large size shiny scale over the body. *Leather carp* (Var. nudus) body almost without any scales, has a leathery appearance. In India the German strain of Mirror carp was 1st introduced in 1939 from Ceylon. The species was stocked in the Ooty lake and since then has established itself very well in Nilgiri waters. As the German stock of the common carp was not breeding freely in tropical waters in India, a consignment of Chinese stock of the common carp (variety :scale carp) was brought from Bangkok to Cuttack in August 1957. In 1946, the German strain of this fish was introduced in Bhowali hatchery (Uttara Khand) for stocking the Kumaon lakes. Later, it found a home in Kashmir lakes where the Dal was invaded and heavily infested with the species to the exclusion of all other local species, specially the schizothoracids.

It was stocked in Gobindsagar in Himachal Pradesh where is forms a lucrative fishery despite of dominating silver carp. Due to bottom habitat it competes with the indigenous *Cirrhinus mrigala, magur (C. batrachus)* and the scampi (M. rosenbergii) both for the space as well as for space and food.

In the absence of adequate food in ponds, it burrows for food damaging the pond dykes and makes the water turbid thus reducing the natural productivity through suppressing the phytoplankton production. Of late, it has also been recorded from almost all the major rivers as a result of overflowing of ponds and reservoirs. In perennial ponds, the disadvantage lies in its prolific breeding where it upsets the proportion of the different species and at the same time a large number of small mouths compete for food, space and oxygen. They are not easily harvestable in the reservoirs due to their bottom dwelling habit and gill nets are not that much useful for catching them as they move very slow in water. Instances of commoncarp causing the decline of *Cirrhinus* spp. and Krishnarajasagar reservoirs. Detailed accounts of mirror carp affecting the survival of native fish species in Gobindsagar reservoir, upland lakes of Kashmir and Kumaon Himalayas (*Schizothorax* spp.), and Loktak lake in the northeast (*Osteobrama belangiri*).A study on the catch composition of carp availability along the stretches of Ganga revealed that the population of Common carp has been increased where as the availability of Gangetic carps has been declined.

Tilapia mossambica: Tilapia, a native of South Africa was brought to India by CMFRI at 1952. In the same year few fingerlings were brought to Madras. For making detailed investigations a few fingerlings were brought to CIFRI centre cuttack,1953. It was stocked in the reservoirs of Tamil Nadu and Kerala where its performance was initially quite good as large- sized tilapias (1.5-2.5 kg) were caught, but soon the reservoirs, being small in size, were overpopulated and the size of the fish started declining and so was its value in the market. In ponds, it did not do well from the very beginning as stunted population made their appearance rather soon and the impact was found to be quite severe on major carps, pearl spot and milk fish.

Hypophthalmicthys molitrix: The Silver carp was introduced to India in the year 1959 and was confined to ponds till 1969 when 239 fingerlings were introduced into the Kulgarhi reservoir.

Ctenopharyngodon idella: The grass carp was introduced in the year 1959 primarily for controlling submerged vegetation. However, due to its fast growth rate soon it became the integral part of composite fish culture. The Grass carp feed on only selected *macrophytes* such as *Hydrilla verticillata*, but it do not consume any of the floating plants, especially *Eichhornia crassipes*, *Pistia stratiotes* and *Salvinia molesta* -three most menacing weeds- that are abundant in ponds and tanks, lakes and small reservoirs all over the country. Its daily requirement is as much as its body wt, & so it is a problem to provide it large quantity of preferred weeds.

On one hand, by controlling the weeds, it brings in circulation the nutrients locked up by the weeds and produces valuable fish protein, on the other hand, it impacts the survival of those fishes and prawns that hide in the weeds to escape the predators, especially the murrels. The negative impacts on environment by grass carps are: Alteration of water quality including an increase in turbidity, reduced dissolved oxygen, and an increase in plant nutrients. Removal of aquatic vegetation may alter the invertebrate community, thereby influencing species abundance and composition of fishes.

Pangasius sutchi: Another exotic catfish that has been introduced, rather recently in 1994-95 and again

illegally is the Thai catfish, from Bangladesh where it was brought from Thailand and bred in hatcheries.

Other exotic fish species Silver Barb (*Puntius gonionotus*):
The fish has gained popularity in West Bengal on account of its fast growth rate but was never considered a weed-eating fish and a competitor of grass carp. Experiments on its compatibility with the Indian major carps have shown it to be affecting the growth and production of Rohu.

Black carp (*Mylopharyngodon piceus*):
It is stocked in composite carp culture to control mollusks and it is found to grow fast and attain a weight of 4 kg. Due to this the culture of indigenous *Labeo calbasu* & *Pangasius pangasius* is being neglected.

Pangasius sutchi:
Owing to its fast growth about 1 kg in 3 months, the fish is already established as a profitable species for aquaculture in West Bengal and Andhra Pradesh. It is reported that it has also invaded the natural waters. The fish, however, was found to be infected with at least 6 species of myxozoan parasites in Malaysia. Whatsoever may be the reason for its limited area of cultivation particularly coastal belt, the impact of this exotic catfish still requires studies.

Trouts:
Both brown trout (*Salmo trutta fario*) and rainbow trout (*Oncorhynchus mykiss)* are now being regularly stocked in different river stretches in Himachal Pradesh, Jammu and Kashmir as well as Uttaranchal. However, there is no organized study to assess the impact of this kind of unplanned introductions of trouts in open water. Whatsoever may be the impact of such introductions, the recent mass mortality in rainbow trout in Himachal Pradesh during 2002 possibly on account of severe problem has indeed drawn attention of the scientists calling for quarantining need and ecological concern.There are reports that the introduction of Salmo truttafario has eradicated the local cold water spp.

Although the introduction of exotic species can be regarded as a boon to aquaculture production as it has maximum growth potential but we have to judiciously manage our own native ecosystem and biodiversity so that the impact of the introduction of exotic fishes negative impact can be minimized.

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