

Lessons not learnt even after witnessing ample disasters

S. Sandilyan

Recent reports from the International Union for Conservation of Nature and Natural Resources (IUCN) have clearly established the deleterious role of invasive alien species on global species extinction. Especially the invasion of alien species in the aquatic ecosystem poses a serious threat to global aquatic diversity, in particular the exotic ornamental fishes emerging as a great challenge to the native population. Earlier studies in several parts of India reported the occurrence of 27 exotic ornamental fish species in different inland wetlands. Among them, 15 species have alarmingly established their population in the wild. The National Biodiversity Authority, Chennai, has declared seven exotic ornamental fishes as invasive to Indian inland wetlands. Obviously, the suckermouth catfish (tank cleaner) (Figure 1), reported even in remote village ponds of India, clearly indicates the invasion potential of the exotic ornamental fishes¹⁻³.

Ironically, the Tamil Nadu State Government is willing to promote ornamental fish culture by establishing an exclusive trade centre near Chennai. On 28 August 2021, the minister in charge of Fisheries and Fishermen Welfare announced in the Assembly about the new proposal for ornamental fish trade centre at Kolathur. Further, he explained that the centre would be set up at the cost of Rs 50 crores and that nearly 2000 families who are already involved in breeding and selling ornamental fishes will get more benefits from this project^{4,5}. Apparently floating of this project without the opinion of subject experts will definitely worsen the aquatic diversity of the state.

Earlier reports have highlighted the dangerous sides of illegal stocking of exotic ornamental fishes (150–200 species) in the



Figure 1. Suckermouth catfish in a traditional village ponds near Mayiladuthurai, Tamil Nadu, India (photograph by the author).

Kolathur region. Most of the residents simply use plastic-lined pools, homestead ponds, earthen ponds and the popular small cement cisterns for breeding and stocking of exotic fishes. Besides, they use certain parts of the lake itself for breeding and rearing of these exotic ornamental fishes⁵. Undoubtedly, the seasonal monsoon floods will wash away the exotic breeding stocks and lodge them in nearby wetlands and subsequently, they will emerge as problematic species in due course of time¹. Such kinds of incidents are being systematically studied and reported in Kerala. For example, experts from Department of Fisheries, University of Thiruvananthapuram, and University of Fisheries and Ocean Studies, Kochi, have established the role of unprecedented floods of August 2018 and 2019 in introducing exotic fishes into new wetlands which were free from alien species earlier. They have listed out several exotic fishes, including *Arapaima gigas*, *Atractosteus spatula*, *Cyprinus carpio*, *Clarias gariepinus*, *Pterygoplichthys pardalis*, *Poecilia reticulata*, *Oreochromis mossambicus*, *Oreochromis niloticus*, *Gambusia affinis* and *Osphronemus goramy*, even in 'Alliance for Zero Extinction' sites of the Western Ghats biodiversity hotspots. The reports have also discussed about the serious consequences of such occurrences⁶⁻⁸.

Globally several countries have witnessed the deleterious role of introduced exotic ornamental fishes in their aquatic diversity and have subsequently strengthened their legal framework to avoid such accidental and deliberate introductions in future. For example, in July 2021, the city of Burnsville, USA, asked its residents not release their pet goldfish into ponds and lakes of the city. Authorities have mentioned that a fisherman caught a giant goldfish from the Keller Lake of Burnsville (Figure 2). Further, they educate their residents about how the goldfish pollute the water, disturbing the bottom sediment and uprooting the aquatic plants. People are also informed about the growth potential and survival ability of the exotic species in the wild and how this affects the native species⁹.

Besides, several countries have strong policies and legal frameworks on rearing and possessing a problematic exotic species. For example, in England, UK, without proper procedures and intimations one cannot

take/transport both native and non-native fishes even within its political boundaries¹. Interestingly, the European Union has banned the possession and transport of several problematic exotic species, including the red-eared slider, star tortoise, ruddy ducks and grey squirrels. Interestingly, it periodically updates the list and publishes it in social and print media in order to create awareness¹.

Apparently it is time for us to learn from the developed countries, and change our policies and legal frameworks in this aspect. This is because eradication of an invasive species from an established habitat is almost not possible. For example, in India for the past 100 years we are trying to eradicate water hyacinth *Eichhornia crassipes*, but in vain.

Interestingly, the Indian states, including Tamil Nadu, are blessed with unique native ornamental fishes such as filament barb *Dawkinsia filamentosa*, melon barb *Haludaria fasciata*, Tambraparni barb *Dawkinsia tambraparniei* and long-snouted barb *Puntius dorsalis* and the state governments should encourage and promote native ornamental fish cultivation rather than the exotic under this project.

Further, periodical monitoring of ornamental trades that occur within the states will help halt the aquatic diversity loss. In addition, the state governments should establish a regulatory authority in order to



Figure 2. Goldfish caught at Keller Lake, USA (photo courtesy: Greenville County Parks Recreation and Tourism, USA).

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monitor and manage the status of invasive alien species in the wetlands. The authorities/experts need to formulate guidelines for the stakeholders and hobbyists, and also make them aware of the deleterious role of exotic ornamental fishes on native diversity and regional economy. Since it is a vital issue, it needs to be included in the school and college curriculum. Adherence to the aforesaid will definitely help promote the aquatic diversity of India.

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S. Sandilyan was at the Centre for Biodiversity Policy and Law, National Biodiversity Authority, Taramani, Chennai 600 113, India.

e-mail: ssandilyan@gmail.com

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