

Prepare for Invasion

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“Who will deny a poor man a tilapia to eat?”

I raised my hand, stood to reply. “Sir, why would you give that poor man an African fish to eat when he could eat Indian fish?”

Dr Ramakrishna, then Deputy Director of Karnataka State Fisheries Department looked at me, smiled, and acknowledged that I had a valid point. Not that the august body has done anything about my comments in the four years following. Retirement may have robbed them of a person who, quite clearly, understood the issues and was prepared to challenge the orthodoxy when he put a stop to wild release in the final months of his tenure.

In a recent magazine article¹, Gopakumar M., of Nityata River Otter Conservancy also raised the stocking of fish by Karnataka Fisheries Department, and questioned their “release of commercial species of fish - rohu, catla and tilapia... little realising that such releases were actively damaging endemic fish diversity.” And ignoring the effect upon locals who rely on the habitat and fish diversity.

Another active field worker, who asked to remain nameless, has told me that while cataloguing fish diversity in the upper Kabbini and connected tributaries of Kerala, where the Kattunayakan tribals like to fish, he found increasing numbers of species that had been introduced by Karnataka Fisheries Department downstream, across the state border. These included non-native catfish and tilapia.

It may seem unfair to be pointing the finger at Karnataka, but that is the state where I have most experience, and surprising actions just keep cropping up. Like the recent move to build small check dams in some of the beautiful streams of the Western Ghats, and then stock common carp and tilapia, two of the Twelve Worst Invasive Fish on Earth, (according to Karl Fabricius of Skribol Publishing) “as a recreation resource”!

Some have said that “the problem of invasive species makes all other environmental problems pale into insignificance”². Not only that, but MOEFCC have announced that, “according to the Convention for Biological Diversity, invasive alien species are the second largest cause of biodiversity loss in the world. In fact, introduced species are a greater threat to native biodiversity than pollution, harvest, and disease combined.”

Taking a look at the problems is the only way it will be possible to frame any answers and attempt to stop such a drastic threat becoming reality.

While studying the Vaitarna River, in rural Maharashtra with Unmesh Katwate of Bombay Natural History Society, I sat watching the locals of the tribal village where we were staying. It was a joy to see them fishing the river by hand, surely the most sustainable way to feed themselves. By hand, I

mean they dived under the water to pull out fish with only their hands, no gears or tackles of any kind, but they did have a secret weapon - drugs.

Ten minutes before taking the first dive, the lithe young men crushed and sprinkled leaves into the water. This had a mildly narcotic effect on those fish that did not swim away, those that like to hide beneath the black rocks at the bed of the river. Unmesh and I sat in the 45° heat, sheltering beneath an overhang in the unforgiving, volcanic landscape, and watched as the youths dived and then burst through the placid water's surface clutching their prizes, thick eels.

There is no doubt that people who live most closely with nature have preferred food items in what many of us would consider to be a meagre diet. Eels were top of the list in the villages of the Vaitarna plateau. In many parts of the Western Ghats, tiny fish are tops, as my friend Rajeev Raghavan has demonstrated ³.



“Who would deny a poor man a tilapia to eat?” Why would you deliberately deny that poor man his food of choice? In many parts of the world, stocking of commercial, non-native fish would be viewed as state-imposed oppression upon the rights of indigenous people.

The so-called Blue Revolution has been used as a convenient banner to hide imposed fish stocking even in places where there is little need to boost food security. Mahseer fish from Maharashtra were stocked in Karnataka's River Cauvery at regular intervals between 1974 and the present day. At first, this was called a conservation programme, but as the evidence mounted of the impact that releasing a non-native species was having upon the endemic and critically endangered hump-backed mahseer, the Fisheries Department changed its tune. Now, the fish being stocked were part of the normal

remit - making fish available for eating. Which begs the question: why were they released into a strict no-take sanctuary? And why has so much time, effort and expense been spent on a fish with such low fecundity compared to most other Indian cyprinids?

Under the FAO's GIFT programme, genetically selected tilapia have been given to many countries in a bid to ensure better access to protein for the less affluent. While very worthy, and in some cases a much needed food resource, this gift, unless very carefully controlled, has the potential to devastate the accepted and preferred food of many in rural communities at the same time as chomping holes in local biodiversity.



Another regularly farmed fish, the African catfish, *Clarias gariepinus*, has found its way into many rivers across south India, much to the dismay of my friend Dr A.J.T Johnsingh. He believes it is one of the biggest threats facing endemic biodiversity saying; "the thoughtless introduction of a fish that even eats birds and mature fish is a great disaster for India's rivers, which are already being decimated by over fishing, pollution and droughts."

Invasives are very often also termed alien species, if they come from outside the biogeographic region into which they have been released. Without a doubt, tilapia and common carp are alien invaders into India. One question for those who wish to challenge the spread of invasive freshwater species is: can we separate river basins such that their difference is comparable to biogeographic regions? If so, then moving Indian fish species from one river basin to another can reasonably be given the highly emotive term - alien invasion.

Taking conservation messages and ideas between different parts of the country, and, indeed, between countries in the region, is something I feel is needed and brings me immense satisfaction. In Nagaland, the State Fisheries Department cannot carry out stocking without the active agreement of local villages. This may be an obvious route to follow across the whole country. However, in collaboration with the Directorate of Coldwater Fisheries Research, the Nagaland Fisheries Department has recently announced stocking and rearing of trout and mahseer to boost angling opportunities in the state. Local anglers, who lead the river conservation agenda, have agreed that this would be a fantastic chance for them to catch fish denied to them; alien fish. I'm not sure what lessons I can take from Karnataka the next time I visit Nagaland.

What constitutes an invasive fish is not even clearly outlined at present. Six of the top ten invasive fish species in the world, according to Mother Nature Network www.mnn.com are present in India. Yet none of brown and rainbow trout, common carp, walking catfish, mosquito fish or our old friend the tilapia appear on the new Global Register of Introduced and Invasive Species (www.griis.org) for the country.

“The threat of alien invasives taking over freshwater habitats is a reality and the ornamental fish trade is emerging as the most critical threat to aquatic habitats in peninsular India.” So says M. Eric Ramanujam, who studied the small rivers Vappady and Vaniyar, both tributaries of the fragile River Cauvery, in Yercaud, Tamil Nadu. He found, “in addition to native species, we also came upon catla, introduced by the Department of Fisheries. Most alarming was the presence of two alien invasive species: the guppy *Poecilia reticulata* and tilapia. The guppy outnumbered native species in catches almost 10:1.”⁴



For many, the threat of the aquarium trade comes from a sketchy, if not completely lacking, control over collection of wild fish to be sold around the world. There is another, not widely recognised aspect of the aquarium business that also poses great risk for the biodiversity of India’s rivers and lakes. It comes from two unconnected areas, but both, I can only presume, stem from an ignorance about wild habitats.

Saffron-clad monks are a common sight in the communities that sprung up after the Chinese invasion of Tibet in the 1960s. That India welcomed the persecuted Buddhist families, all of whom are essentially peaceful people, and respectful of nature, is an example of positive and unselfish neighbourliness.

One of the largest refugee communities is based at Bylakuppe, near Kushalnagar, Kodagu district of Karnataka. For more than 50 years, the monks have visited town to buy supplies and carry back the 10 km to their adopted home. In recent years, some of the produce has not made it all the way back.

Members of the local Coorg Wildlife Society began telling me, back in 2007, about the monks buying piranha and then ‘liberating’ them in the River Cauvery as they crossed it, on the outskirts of town. I can only guess that it has been by some miraculous fluke that the piranha have not thrived in the sacred waters, and become a menace to all the smaller fish that live there.

“Ecology of aquatic invasive alien species is rather poorly understood as most attention has been on invertebrates as that which spread through ballast water. Invasive alien species of fish that have taken advantage of the aquarium trade are emerging as the most important threats to fragile aquatic habitats. Regulations to this trade are rather weak and there is a general lack of data on the ecological impact of alien fish species despite the fact that a third of the world’s worst aquatic invasive species are aquarium or ornamental species.” J. D. Marcus Knight ⁵.

Many are the tales of fish grown too large for keeping in the tank at home. What to do with these ‘cuckoos in the nest’? While many a blockbuster movie has used the trope of a pet flushed into the sewer system growing into a mutant monster, it would probably be a safer way to dispose of them than throwing them into a nearby tank, well or lake. Definitely better than throwing them into a river.



As mentioned before, piranha released would create problems for indigenous stocks, but another, related fish has thrived across Asia when released, the pacu. This is a vegetarian piranha, so gives little concern, until you see that it can grow to 40kg and has a set of rabbit-like teeth and extremely powerful jaws that

would sever the fingers of an unwary dhobi wallah. Although many people understand the potential impacts of releasing predators, those fish that eat plants and algae, some of them very small, have been shown to have big impacts on food webs ⁶, being capable of causing devastating collapse across an ecosystem.

Alligator garfish are another common pet, bought without much thought to the fact that they can reach 3m long. It would take quite some home aquarium to house one of those for life. That must be why they have been spotted many times in Mumbai’s Powai Lake.

There exists a whole body of law designed to protect India’s precious biodiversity, much of it, though by no means all, referring to the value of agriculturally useful plants and animals. But most of this law is completely outdated, with the Livestock Importation Act, for instance coming onto statute in 1898.

The National Bureau of Fish Genetic Resources has drafted action plans, and the usual raft of conferences, like the recent Zoological Survey of India’s event in Kolkata (14/15th December 2017) inevitably follow with plenty of agreement, but little positive action. A recent, global, Invasive Species Week should have helped to raise awareness, but concrete action at government level is needed, and fast.

In other parts of the world, there are very strict laws, as well as easily available guidelines about keeping all kinds of pets, but especially fish or other freshwater wildlife. Disposing of them directly into a natural waterbody brings damaging fines, or even jail sentences. This applies whether it is fish that are released, or even the water they are kept in. Micro organisms hosted by the fish can wreak far more havoc, if allowed into the wild.

As Dr Biju Kumar so rightly says, “the presence of, as well as the damages caused by invasive fish are not always directly visible”.

Given that the best way to prevent wild release of alien species currently is the Environmental Protection Act (1986), for which painstaking documentation of the issues has always been the major stumbling block for prosecutors, it seems that whether inadvertent or deliberate, those who stock invasive alien fish species are unlikely to ever be found out, let alone pay the penalty for the damage they cause.



While this article is attempting to address issues of freshwater invasion within India, there remains an unsaid question: what happens if India, Pakistan, Nepal, Bhutan or Myanmar introduce an alien species into a river and the effect is felt most keenly across an international border? How would one sovereign country attempt to find redress following what may well be termed biological terrorism?

“What is required urgently is a national policy to deal with invasives” said Rauf Ali of the Foundation for Ecological Research, Advocacy and Learning, Puducherry.

Drafting a whole raft of new legislation, specifically to address the ease with which invasive species can and are allowed to threaten indigenous or endemic wildlife would take time and political will. Simple awareness campaigns, especially if targeted at particular special interest groups, like anglers or home aquarium fans, should be part of the battle, and may be more effective in the short term.

What to do about the invasive species already on the loose and causing environmental havoc needs to be the subject of a whole other article. One thing is for certain, though; the kind of knee-jerk

reactions that have allowed the release of unwanted species, if applied to the removal of the same, may cause just as much damage to native biodiversity. Any human intervention should only be carried out after a rigorous study of all of the pertinent facts, and with concerted follow-on monitoring. There should be no room in India's valuable and fragile ecosystems for any person or body to offer up the threats posed by wild release of invasive species.

References

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