

Tiny guardians of hill streams: Exploring the ornamental loaches of the Western Ghats

Abhilash C.P., Saikrishnan K.R., Sarath Varghese, Charan Ravi and V.S. Basheer*

ICAR - National Bureau of Fish Genetic Resources, Lucknow, Uttar Pradesh - 226 002, India vsbasheer@gmail.com



Travancoria elongata.

Among the fish of the Western Ghats, loaches (mainly from the families Cobitidae and Nemacheilidae) are a distinctive group of small, bottom-dwelling fish uniquely adapted to fast-flowing hill streams. They have elongated bodies, barbels around the mouth, and cryptic colouring, and play a vital role in stream ecosystems as bottom feeders and indicators of water quality. The region has at least 43 loach species across 12 genera; 39 are endemic, reflecting remarkable evolutionary isolation and habitat specialisation. Species like *Botia striata*, *Bhavana australis*, and *Mesonoemacheilus triangularis* show diverse shapes and behaviours, and some have gained popularity in the global ornamental fish trade. However, these loaches face growing threats from habitat degradation, dam construction, pollution, and unregulated collection. Despite their ecological and commercial value, they receive little conservation attention or legal protection.

Morphological characteristics

Western Ghats loaches are generally small, elongated, bottom-dwelling freshwater fish, highly adapted to life on the streambed. Their body shape ranges from worm-like to spindle-shaped, and they are often scaleless or covered with very small, embedded scales. They have a subterminal mouth fringed with barbels - sensory structures that help them detect food particles in sediment. Many species also have a suborbital spine, a small, retractable spine beneath each eye, used for defence. Their body patterns are often cryptic, with stripes,

spots, and blotches that camouflage them among rocks and gravel. For example, *Acanthocobitis mooreh* has bold vertical bands resembling a zipper. By contrast, *Bhavana australis* and *Travancoria elongata* are flattened from top to bottom and have enlarged pectoral fins, which help them cling to rock surfaces in strong currents.

Major endemic ornamental loach species

Many loaches from the Western Ghats are not only endemic but also visually appealing, making them popular in the ornamental fish trade. *Acanthocobitis mooreh*, the Maharashtra zipper loach, is endemic to the northern Ghats. Its zebra-like patterns and agile behaviour make it attractive for display, although it is poorly represented in international trade. *Bhavana australis* is an ancient hill-stream loach confined to the southern Ghats. It has a flattened profile and a body shape adapted for suction. Though less colourful, it is sometimes traded because of its uniqueness. *Lepidocephalichthys thermalis*, locally known as "Ayira Meen" in Tamil Nadu, is widely distributed and often eaten as food. It is also valued for its hardiness and scavenging behaviour in aquaria, and has been prioritised for captive breeding and aquaculture diversification. *Schistura denisonii*, from the Bhavani River basin, is a small, subtly patterned loach named after Sir William Denison. Related species such as *S. sharavathiensis*



Lepidocephalichthys thermalis.

and *S. nilgiriensis* are endangered due to their narrow ranges and habitat degradation. *Botia striata*, the Zebra loach, is perhaps the best-known ornamental loach from India. Its striking black and yellow stripes have made it widely exported. Unfortunately, its limited range and popularity have made it vulnerable to overexploitation. *Mesonoemacheilus triangularis*, the Zodiac Loach, has intricate dark patterns resembling star constellations. It thrives in well-oxygenated streams in Kerala and Tamil Nadu and is a favourite among aquarium hobbyists. It has also been bred in captivity. Genera such as *Indoreonectes*, *Travancoria*, and *Schistura* together represent the region's rich endemic fauna, with both ecological and commercial importance.

Habitat and distribution

Western Ghats loaches are mainly found in fast-flowing, oxygen-rich hill streams. They occur across a range of altitudes, from high mountain torrents to mid- and low-elevation forest streams. They prefer rocky or gravelly streambeds with clear water and moderate to strong current. Species like *Bhavana australis* and *Balitorid* spp. are typical of cold, clear streams, while *Lepidocephalichthys thermalis* is more adaptable, occurring even in lowland and sluggish waters. Many species are micro-endemic, restricted to one or two river basins. For example, *Botia striata* is known only from a few rivers in the Maharashtra-Karnataka region, and *Travancoria elongata* is limited to southern Tamil Nadu and Kerala. Endemism is highest in the southern Western Ghats,



Mesonoemacheilus petrubarrescui.

where rainfall, altitudinal variation, and stream connectivity have produced high species diversity. This makes these loaches especially vulnerable to habitat fragmentation from dams, deforestation, and urban expansion.

Food and feeding

Loaches are bottom feeders, foraging mainly on algae, biofilm, small invertebrates, and detritus. Their barbels help them detect food buried in sand or lodged between rocks. Gut content studies show a diet of diatoms, filamentous algae, insect larvae, and small crustaceans. Species like *M. triangularis* and *S. denisonii* feed mainly on bottom-dwelling algae and organic matter, while *B. striata* has a broader diet, accepting insect larvae, snails, and even commercial pellets in captivity. This opportunistic feeding strategy helps loaches adapt to seasonal changes in food availability, especially during the dry season when insect larvae are scarce.

Behaviour and ecology

Western Ghats loaches show a range of ecological adaptations. Many species, like *B. australis*, are strongly adapted to fast currents. They use their flat undersides and enlarged pectoral fins to cling to rocks. When disturbed, they dive into the substrate or wedge into rock crevices to escape predators. Some species, such as *B. striata*, form shoals and may produce audible clicks during feeding or social interaction. Others, like *Schistura* spp., are territorial - especially males, who defend a specific rock or shelter. Spawning is poorly documented, but rising water levels during the monsoon likely trigger breeding. Juveniles are often seen in late monsoon

months, suggesting seasonal reproduction. Loaches play a vital role in nutrient cycling and periphyton control and are important indicators of stream health. Their decline is often one of the first signs of stream degradation.

Aquarium trade demand

Several loach species from the Western Ghats are popular in the global ornamental fish market. *B. striata* is the most commercially exploited, with over 265,000 individuals exported over five years. High demand has raised concerns about over-harvesting during peak breeding seasons. Other species like *M. triangularis* and *L. thermalis* are also collected in smaller numbers. These loaches are valued for their patterns and substrate-cleaning behaviour. Government bodies like the Marine Products Export Development Authority (MPEDA) have tried to promote sustainable wild collection through green certification, though implementation has been patchy. The aquarium trade provides income for local communities, but it must be tightly regulated to ensure species survival. Captive breeding - particularly for *B. striata* - is being explored to reduce pressure on wild populations.

Conservation status

Western Ghats loaches face a range of threats, including habitat loss, pollution, dam construction, and unsustainable harvesting. Species like *B. striata* and *T. elongata* are listed as Endangered by the IUCN. Habitat degradation from deforestation and agricultural runoff reduces oxygen availability and increases sedimentation, destroying spawning and feeding grounds. Dams fragment habitats and disrupt the



Bhavania australis.

flow regimes that loaches need to breed. Conservation efforts include taxonomic research, habitat mapping, and captive breeding initiatives by institutions such as ICAR-NBFGR (2024). The organisation's Peninsular Aquatic Genetic Resource Centre (PAGR) in Kochi has played a vital role in loach documentation and public awareness.

Legal frameworks have not kept pace. Most loaches are not covered under India's Wildlife Protection Act, and there are ongoing efforts to include them under Schedule I or the CITES Appendix to regulate exports. Community engage-

ment, river habitat restoration, and captive propagation are key strategies for the future. With coordinated efforts, Western Ghats loaches can be conserved as integral parts of India's freshwater biodiversity.



Acanthocobitis moorei.



Mesonoemacheilus triangularis.