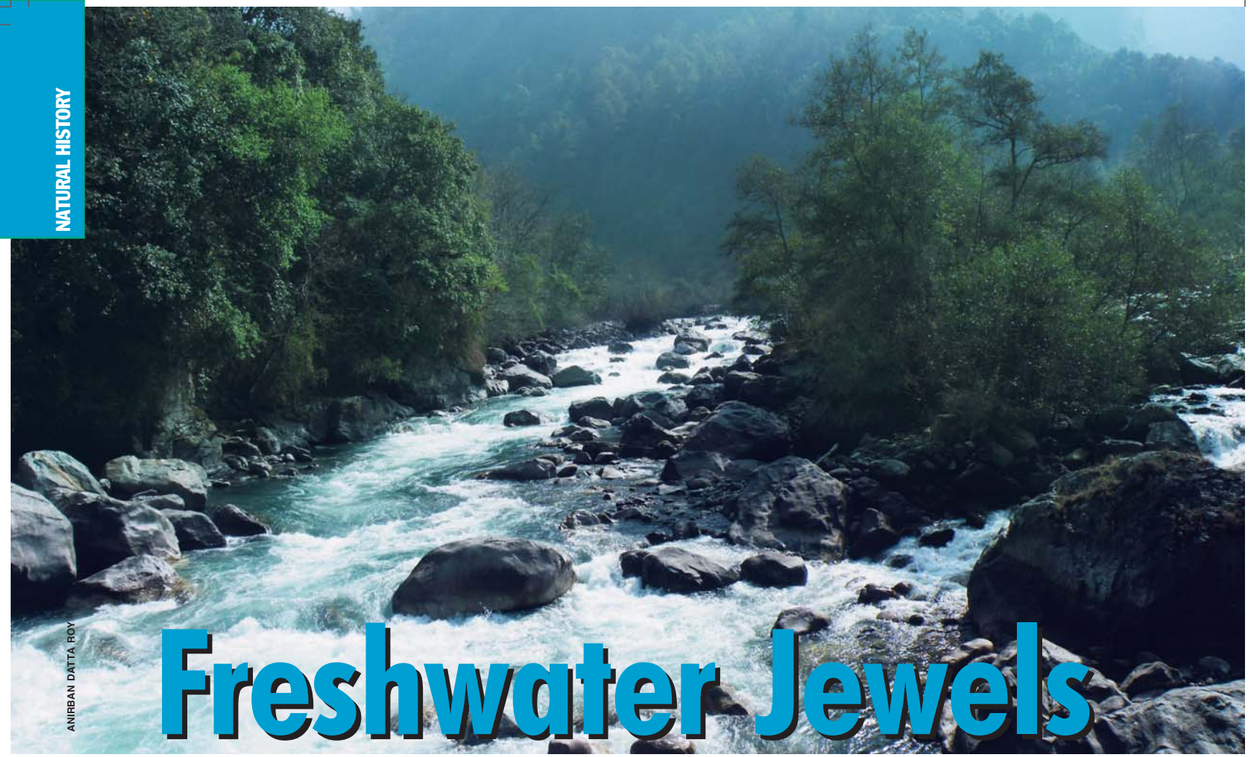

ANIRBAN DATTA ROY

Freshwater Jewels

By Vidyadhar Atkore

After climbing halfway, three Gangetic latia lost control and fell back into the water and I realised the formidable obstacles that Himalayan freshwater fish encountered in their seasonal routine and how they have developed adaptations to overcome these hurdles.

The blue waters of the Ramganga shimmered in the afternoon sun. It was an idyllic day, perfect for lying at the river's edge, looking at the blue sky and the wide sweep of water as a river that had flowed for centuries lapped its white stone-lined banks. But life, as it often does, had other plans for me and I had work to do.

My task that afternoon was simple – cast nets into the river. But being unaccustomed to this activity, I needed guidance. Here Bahadur, my local helper, came to my rescue. It was his job to teach me to cast the net into the water. After some guided attempts that afternoon, we retreated and waited patiently for some time and then pulled it out. As I quickly began systematically recording my catch, I was distracted by a strange, wriggling, slimy, snake-like creature. Bahadur moved forward and carefully removed it from the net for a closer look. It was a spiny eel, common in Indian rivers, but Bahadur took extra care holding it, knowing well that this fish moves backwards when caught – the spines on its back are razor sharp and could cut a fisherman's hand, enabling it to escape.

IN THE WATERS OF THE RAMGANGA

I was here to study the freshwater fish of Uttarakhand under the guidance of Dr. K. Sivakumar and Dr. A.J.T. Johnsingh of the Wildlife Institute of India (WII), Dehradun. My study had introduced me to many interesting facets of the natural history of freshwater fish of the Himalayan streams. The Ramganga is one of the principal rivers of the Kumaon Himalaya, and is rich in aquatic diversity. It forms the northwest boundary of the Corbett National Park and its pristine, meandering waters are a sight to behold. I chose to study three of her tributaries and was mesmerised by the assemblage of species that these riverine areas harboured. And it was not just the aquatic life that was amazing. I would encounter caddish flies and other stream insect life clinging to boulders, which in turn attracted Pied Kingfishers, White-throated Redstarts and a host of other opportunistic avifauna.

IMAGES BY VIDYADHAR ATKORE

There are few studies on freshwater fish in India, though they have been given their due in most other parts of the world. While we are well-informed about their taxonomy and commercial importance, we know little about their ecology and natural history. During my literature review, I discovered that Himalayan fish have adapted differently to the boulder-strewn river beds, freezing water temperatures and torrential streams. My focus therefore was on understanding the distribution of freshwater fish communities in the torrential tributaries of the Himalayan rivers and how they had adapted to their environment.

A COLD EXPERIENCE

I started my field work at the peak of the north Indian winter. The days were often frosty and the nights were freezing. We camped along the banks of the river Khoh, a tributary of the Ramganga. Our first attempt to catch fish using a mosquito net was quite successful. Using the trusted Talwar & Jhingran's *Freshwater fishes of Indian region* as reference, we took body measurements to confirm identities. Most of them were carps – primarily the barred baril, Hamilton's baril and ticto barb.

Being a novice at handling fish, I made some unfortunate mistakes and regretfully a few died in handling. However, I quickly learned that these fish must be kept in water-filled bins and only once they were sorted out by species, could they be placed into separate large buckets. This also made it easier for me to record and measure them and ensure their survival! After sampling, they would be released unharmed back into the stream. Thus armed with my field kit (two water buckets, nets, plastic jars, spring balance, measuring scale, pen, writing pad, pile of data sheets) and my 'bible' on Indian freshwater fishes, we would begin each day.

One day, I watched snow trout trying to move upstream, jumping over five feet (1.5 m.) high boulders in the manner salmon in North America and *mahseer* in India do to reach their spawning grounds. I also saw other fish crawling slowly, attaching themselves to the wet and slippery surface of the boulder, instead of jumping over it. It was the Gangetic latia *Crossocheilus latius* (less than 12 cm. in length), a small bottom-dwelling stream fish. I had never come across this species anywhere in my study area until then. After climbing halfway, three Gangetic latia lost control and fell back into the water and I realised the formidable obstacles that Himalayan freshwater fish encountered in their seasonal routine and how they have developed adaptations to overcome these hurdles. This kind of local movement of species had hardly been documented earlier, underscoring the importance of natural history observations, even when engaged in hardcore scientific data collection.

FUN AND FEAR

My second study site was the Kolhu river (locally known as Kotdi *nadi*) near Saneh; a small hamlet seven kilometres from Kotdwar town. Unlike the Khoh river, this water course is characterised by a rocky bottom and deep pools with very little sand. Bahadur who is from Nepal and had recently arrived in Kotdwar, proved to be an invaluable help in this terrain. During my stay I also met Dr. V. D. Joshi, Head of the Zoology Department, Government P. G. College Kotdwara, who helped identify the fish I had caught and shared some of his research experiences in the landscape.

The Kolhu river is surrounded by reserve forests and is home to varied wildlife. One morning, we encountered two smooth-coated otters *Lutra perspillata*, opposite the Kolhuchaur Forest Rest House, walking along the banks of the river foraging from one deep pool to another. On another occasion, we saw a huge herd of 32 elephants, including several calves feeding on the leaves of the *Mallotus philippensis* that grow along the river bank. I saw the elephants entering deep pools to cross the river, one cow helping her calf across by extending her trunk, while two elephants pushed it from the rear. The calf made it safely to the opposite bank. That evening, observing the elephants, we lost track of time and decided to take refuge at a *Gujjar's dera* (house) where we were welcomed warmly and offered a delicious meal of rice and *ghee* and a place to sleep. Around 11.30 p.m., when we were asleep, the headman's wife began to yell that a bull elephant was approaching the *dera*. The headman woke, made a terrible din with tins and shouts and this prompted the elephant to retreat. Within a few minutes we were fast asleep. That was a lesson for me on how people living next to forested areas risk their lives everyday.

My third study site was the Mandal river in the northwestern part of the Corbett National Park. At Domunda, where the

The aquatic life of Himalayan rivers (facing page, top) is specially adapted to fast-flowing waters. Algae, moss and aquatic insects abound here and they and their larvae form the prey base for these fish. Disturbing even a single link in this chain can have a cascading and negative effect on the ecosystem of the entire river. A multitude of birds also find sustenance here such as this Crested Kingfisher *Megaceryle lugubris* (below) that has made a successful catch. It will repeatedly strike the fish against the perch to kill it before consuming it.

DR. CAESAR SENGUPTA

Mandal meets the Ramganga, I observed a healthy population of golden *mahseer*. The *mahseer* is a popular sport fish that can grow to 2.75 m. and weigh in excess of 50 kg. Being migratory, it prefers to spawn in shallow riverine habitats (June to September), which makes the Mandal an ideal habitat. After spawning, the fish usually move downstream to feeding sites in large rivers. Locals informed us that before the monsoons, schools of *mahseer* swim upstream to shallow rivers like the Mandal from the Ramganga reservoir.

Once while marking a location on my GPS, I had to cross a small stretch of the river. The water was extremely cold and the pebbles masked by algal growth. Halfway, I realised that the current was much stronger than I had anticipated, but it was more risky retreating than forging ahead. Only a few hundred metres downstream was a deep waterfall. I slipped often and even lost one of my slippers, but with Bahadur's encouragement I safely reached the other bank. As I turned around, my brave assistant was nowhere to be seen. I was aware that he could swim, yet my stomach churned, imagining the worst. My heart in my mouth, I walked along the riverbank across difficult, undulating terrain, holding on to shrubs and vegetation, scanning the river for any sign of Bahadur. An hour later much to my relief, I found him, sitting on a rock – holding my errant slipper. He had chased it down the river!

On our way back to the forest rest house, we saw fresh tiger scat and pugmarks that led to a small cave surrounded by bushes. Earlier, I had seen a tiger across the Mandal river at close range, but this time, it was late and we did not want to take chances on a day when we had already had some narrow escapes.


ADITYA SINGH

The clear waters of the Ramganga are home to an astonishing diversity of freshwater fish. More than 30 species are found here including the golden mahseer *Tor putitora* (above), an endangered and highly-prized sport fish.

WAKE UP CALL

Studying river ecology is exciting and adventurous but also tremendously challenging – possibly why many have not embarked on it. However, it is extremely important that we bridge the gap of our understanding on river ecology. Freshwater ecosystems are under tremendous pressure, not just in the Himalaya but across the country. My study gave me some insights into how traditional, sustainable methods of fishing are not harmful, whereas modern destructive methods such as dynamiting and fish poisoning (mixing bleaching powder in running water) could wreak havoc on aquatic species and food chains, thus degrading the river system and wiping out the stock of fingerlings. Pollution and mining of river sand beds adds to the pressure. If we really care about our aquatic habitats, we need to initiate concrete steps towards their restoration. One possible way could be to make use of the Government of India's *NREGA Scheme & Act* under which local people could be employed for restoring rivers and associated aquatic habitats.

It speaks volumes for our priorities and our understanding of fresh aquatic systems that not one fish is listed in any schedule of protected species under the *Wildlife (Protection) Act,* 1972! We know, of course, that species with low abundance that are endemic to specific regions are desperately in need of extra protection. There is also a need to create awareness for the conservation of freshwater fish in these troubled waters. I fully believe that the concept of fish sanctuaries is not far-fetched. But it is equally important that we get decision makers and locals to understand the ecology of freshwater habitats and the species that depend on and maintain such crucial ecosystems.


MISTY DILLON

FISH FOR THOUGHT

I recorded 43 fish species from the three tributaries of the Ramganga river. Family Cyprinidae was dominant with 23 species. Species richness and diversity was higher in the PA than non-PAs. Thus, the Mandal had the maximum number of species (31 species) than the Khoh (26 species) and Kolhu rivers (28 species). The *Barilius barila* of family Cyprinidae was the most abundant species followed by *Tor putitora*. Other common species were *Schizothorax richardsonii*, *Garra lamta*, *Barilius barna*, *Crossocheilus latius*, *Puntius ticto*, *Barilius vagra* and *Labeo dyocheilus*.

Of the total, 28 species were threatened following IUCN based CAMP classification. Similarity in species composition varied from 60 to 70 per cent across the tributaries. I found that these streams were dominated by <15 cm. fish sizes. Apart from species assemblages in the Mandal, the Kolhu with deeper pools had large size golden *mahseer*. Morphometrical analysis on golden *mahseer* suggests that 6-10 cm. size class was dominant. The golden *mahseer*, an endangered and highly prized sport fish, is abundantly thriving in these waters. There is scope to develop these areas as eco-friendly angling hotspots but much care must be taken to secure the conservation of the species and habitat. It is imperative that we identify crucial breeding habitats as fish sanctuaries and create mass awareness to save the threatened fish fauna of this region.