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Prawn and Crab Fisheries in Tapti River – a peninsular river of India

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Highlight points

1. River Tapti is one of the two major west flowing rivers in peninsular India
2. Prawn and crab important crustacean fisheries resources in inland open water which is often neglected by the researchers and policy makers
3. This article provides information on the macro-habitats of freshwater prawn and crab along Tapti River
4. Freshwater crabs are an important and cheap source of protein particularly for tribal communities and lower income group
5. Lesser freshwater prawn could also be used in aquarium industry as it has high ornamental value

Introduction

Freshwater prawn and crabs are important crustacean fisheries resources in inland open water which is often neglected by the researchers and policy makers unlike similar attention given towards marine and estuarine counter parts. It is reported that 118 species of prawns belonging to 14 genera and 2 families are recorded in freshwater bodies of India (Valarmathi, 2017). Freshwater prawns are dominated by genus *Macrobrachium* (Family: Palaemonidae) and *Caridina* (Family: Atyidae). India

is the third largest producer of freshwater prawn in the world, with over 24200 mt in 2001 (FAO, 2001) and ranked 8th among prawn producing nations (FAO, 1999).

Freshwater crabs belong to the infra-order Brachyura of the order Decapoda in the class Malacostraca of phylum Arthropoda. Endemism in inland freshwater crabs is relatively high as a result of their habitat requirement and limited dispersal ability. Crabs of family Gecarcinidae are found in almost all freshwater habitats such as river and streams, shallow and deep pools, floodplain wetlands, inundated crop fields and swamps, etc. Despite its occurrence in different type of habitat their population in wild is vulnerable to many anthropogenic activities such as habitat conversion, deforestation, pollution and unsustainable agricultural practices (Pati and Sharma, 2012). Freshwater crabs are an important and cheap source of protein particularly for tribal communities and lower income group. Besides small crabs are also serving as a food source for turtles, birds and mammals. Currently, there are 121 valid freshwater crab species described from India (Pati and Thackeray, 2018; Mitra et al. 2018) with majority of the species belonging to families Gecarcinidae and Potamidae.

River Tapti is one of the two major west flowing rivers in peninsular India. A rainfed river, it has its origin in Multai Taluka, situated in central highland terrain of Betul district, Madhya Pradesh. The river flows down south westerly through Satpura ranges receiving much of its catchment drains from numerous small streams along its course. These sources serve as a major source of in stream wetted area of main Tapti channel throughout its longitudinal extent in Madhya Pradesh after which it flows as a boundary line between states of Maharashtra and Madhya Pradesh for a length of 54km; altogether covering a distance of



A Pelni seine in operation at Changdev



A tribal child catching crabs in a fragmented pool

724 km from its origin before joining Gulf of Cambay at Dumas near Surat in Gujarat (Jain et al. 2012). The river harbours a rich diversity of fish and shell fish diversity. Although fishes form the major resource being exploited, crustaceans like prawn and crabs are exploited in many stretches of rivers. However, their importance is ill-recognized as far as sustainable fishery development is concerned, despite being a significant contributor to nutritional and livelihood security, particularly of poor fishers dwelling along the riparian areas. These resources are fished by itinerant as well as regular fishers in Tapti throughout its course from origin to sea-mouth. There has not been any comprehensive attempt in the past to document these resources and their fishery, which has driven our focus to survey this aspect of fisheries of river Tapti.

Mainstream macro-habitat distribution

Macrohabitat refers to habitat types with presence of substantial variation in environment, varied ecological niches, and support a large and usually complex flora and fauna (Merriam-Webster dictionary, 2019). The river stretch in Madhya Pradesh and Maharashtra has been characterized by rocky substrate which transforms to different types of macrohabitats viz., pool, riffles, rapids, runs and glides owing to constant changes in instream flow, varying channel slopes, and dominant substrate present in the reach throughout its length. The details of macrohabitat distribution along upper and middle stretches of Tapti River are quantified as shown in table 1. The prawn fishing activity is limited to the marginal areas in case of pools and run. The occurrence has always been associated with the significant instream vegetation cover.

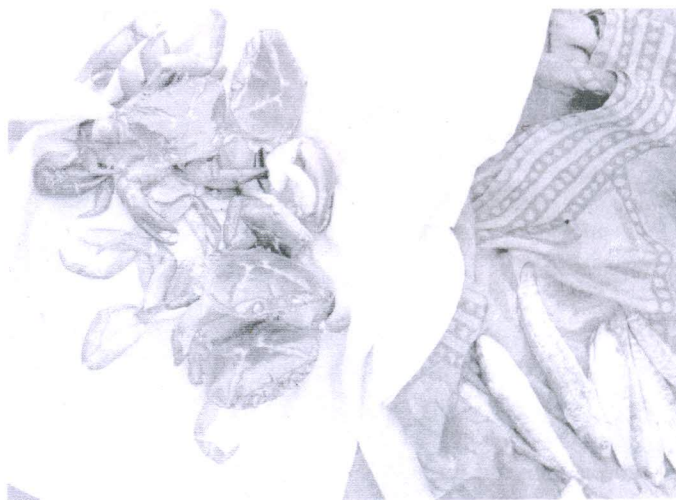
The onset and intensity of monsoon rains serves as supply to seasonal streams and interplays with the seasonal dynamics of macrohabitats. Subsequently, the river turns southwards in

Jalgaon District, Maharashtra where it meets with its first major tributary, Purna. The length of river upstream of this confluence point covering Burhanpur in Madhya Pradesh and downwards till Sarangkhedha is categorized as middle stretch. For a major part, this stretch is characterized by the presence of natural and artificial deep pools (reservoirs) as well as run, with series of fragmented pools and riffles occurring at intervals downstream of anthropogenic structures (dams and barrages) on main channel. The lower stretch of the river is characterized by dominance of perennial sections of deep runs and pools present almost entirely in western border of Maharashtra and whole of Gujarat.

Fisheries

There is limited information available about fish and fisheries of this river; the only comprehensive information available covering the entire stretch is based on a survey conducted by Central Inland Fisheries Research Institute during 1959-60. Based on the survey, Tapti River supported 52 fin fish species. Major contributors to catch were *Tor tor*, *Labeo fimbriatus*, *L. calbasu*, *L. bata*, *L. boggut*, *Sperata aor*, *S. seenghala* and *Wallago attu* (Karamchandani & Pisolkar, 1967). Indian shad hilsa, (*Tenulosa ilisha*) formed a lucrative fishery in lower reaches of Tapti especially during monsoon season in the vicinity of Surat (Karamchandani & Pisolkar, 1967).

Fishing season in the river starts during September and continue till the onset of monsoon season. Fishing ban/closed season as management control during monsoon season starts from 15 June to 31 July and is being complied by the fishers in upper stretch and middle stretch in the Madhya Pradesh stretch of the river. Besides finfishes, prawns and crabs too contribute to fishery, although on a subsistence level. In general, crustacean fishery is the most neglected fishery in inland open waters



Crab catches from river Tapti at Bhusawal



prawn seining using mosquito net in vegetated marginal areas

especially in rivers, streams and wetlands in the sense that it has not been exploited judiciously thus hasn't been able to garner the due attention by managers and stakeholder to develop as an organized fishery in most of the streams across India.

Prawn fisheries

Prawn fishery along Tapti River is mostly subsistence level in nature and occurs as a seasonal activity, mainly during pre-monsoon and in early monsoon season along some stretches; the latter being only associated to stretches receiving delayed and low intensity rains. In pre-monsoon the prawn fishing stretch is characterized by stagnant pools and glides with relatively high water transparency (Transparency >50 cm).

Prawn are distributed along the entire stretch of the river, however they are highly abundant in the middle stretches (Dedtalai to Bhusawal) where pools are abundant and aquatic vegetation contributes to provide as shelter.

Unlike finfishes, which are exploited using a variety of gears both active and passive in operation, prawn resources of river Tapti is exploited mainly using push nets locally known as *Pelni* in this region. The push net is designed in triangular shape with a rigid frame made of bamboo that is pushed along the bottom



The pool habitat representing a fragmented stretch of

in instream macrophyte logged shallow waters and is used for taking prawns and small macrophyte associated finfishes. *Pelni* fishing is one of the fishing activities employed by the tribal population inhabiting along the north and south banks of river Tapti in Madhya Pradesh and northern Maharashtra. The only significant market scale prawn fishery exists along middle stretch of river near *Changdev* in Maharashtra. These prawn fishers are itinerant type as they travel from one village to another village in search to good prawn fishing ground and to market the catches in weekly village markets. The CPUE ranged from 0.5 to 1.25 Kg/hr/fisher. The fishermen regularly camped at Tapti-Purna confluence in groups, each group consisting of 2-3 fishers during pre-monsoon and late post-monsoon seasons. The catches are composed of small sized palaemonid prawns of genus *Macrobrachium* and Caridean prawn under genus *Caridina* along with small quantities of other small sized fin fishes. Among these catches landed by fishers, the larger sized prawns were of 4 to 5 cm total length range. The fishers have high dependence on the local population as more than 90% of the catch is marketed dried in the nearby daily as well as weekly markets at the rate of Rs. 150 to 200 per kg.

Besides some of the tribal fishers in upper stretch near Dedtalai also use stitched nylon or cotton cloth as a seine to catch prawns during early monsoon in the month of July which may due to availability of instream macrophyte vegetation cover. This kind of prawn fishing is mostly done by women through seining with an average CPUE of 0.3 Kg/hr/fisher.

Crab fisheries

Unlike marine blue swimming crab (*Portunus pelagicus*) and mangrove mud crab (*Scylla* spp.), there is no organized fishery and documentation of freshwater crab available in the country. The crab fishing forms a subsistence level fishery, which is mainly focused towards meeting the demand in local markets. However due to its perceived medicinal value (Soundarapandian et al. 2013) year round demand on a smaller scale is constant feature of the local weekly markets. Only one species of crab, *Barytelphusa* sp. belonging to family Gecarcinucidae was recorded so far from all the stretches of the river. There isn't any commercial scale crab fishery in river Tapti, however its demand among local populace for the perceived medicinal value, drives its continuous but low scale exploitation at all the stations throughout river.

Crab is caught mainly by baited line and hand picking. In addition, accidental entangling of crabs in monofilament gill nets of varying mesh sizes in fragmented pool systems situated downstream of check dams, anicuts and reservoir connected with a web of narrow trenches over bed rock also contributed to the

Table 1: Variation in macrohabitat distributional ranges observed between post-monsoon and pre-monsoon season in the selected stations along upper and middle stretches of river Tapti

Macrohabitat area	Multai	Betul	Dedtalai	Nepanagar	Burhanpur	Changdev	Bhusawal	Savkheda
Pool area (%)	50-100	20-25	15-100	20	90	80 - 90	65-85	20-95
Run area/Glide (%)	0-50	50-60	0-85	60-65	10	10-20	10-25	5-80
Rapid/ Riffles area (%)	0	20-25	0	15-20	0	0	5-10	0

daily crab catches around these sites. The popular bait used in fishing crabs are small prawns and small indigenous fishes like *Salmostoma* spp., and *Puntius* spp., etc. The daily catch per day per crab fisher in post monsoon ranges from 1 to 4 kg (December-January) which gradually reduces to 0.5 to 1.5 kg during the pre-monsoon (April-May). The market price of these crabs varies from Rs. 50 to Rs. 100 per pair based on the size where larger crab specimens weighing more than 250 gm fetch higher market price.

Conclusion

Freshwater prawns and crabs are the two important crustacean resources which receive very less attention and often neglected by the researchers and policy makers in the country. However, these resources significantly contribute to nutritional and livelihood security of thousands of fishers in the country and also are integral components of the inland aquatic ecosystem. Similarly, in Tapti River hundreds of fishermen rely their livelihood on fisheries of these two crustacean resources.

It is needed to take up focused research on assessment of these resources including biodiversity and habitat

characterization, extensive or semi-intensive aquaculture practices to improve the stock of freshwater prawns and crabs in order to meet market demand and maintain the depleting wild population.

Lesser freshwater prawn could also be used in aquarium industry as it has high ornamental value. Since these resources contributes to nutritional security to the masses inhabiting interior geographical area under upper and middle stretch of this river, nutrient profiling of these resources may be attempted in order to add value to its fisheries.

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*Best Wishes
to our aqua farmers...*

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