

Penaeid shrimp and giant prawn seed collection from Rupnarayan River in Purba Medinipur, West Bengal, India

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Operating a net.

River Rupnarayan

The Rupnarayan River has its origin near Ghatal town in Paschim Medinipur District of West Bengal, where the Dwarakeswar River is joined by the Shilabati. The Rupnarayan joins the Hooghly River at Geonkhali in Purba Medinipur District after completing a 78-80 km course. The Rupnarayan is famous for the highly-priced hilsa *Tenualosa ilisha*; adults move upstream for spawning and are caught by fishermen in stationary gill nets at Kolaghat and other places. The Rupnarayan River forms the eastern boundary of Purba Medinipur with Howrah, flows along this region down to Bay of Bengal. Being a part of Hooghly estuary, the lower reaches of this river are affected by semi-diurnal tides from the Bay of Bengal. The tidal range is about 2.8 metres at Kolaghat. At this place, average water velocities of the river in mid-tide and full-tide are 1.75 and 1.63 ms⁻¹ respectively. In most areas of Purba Medinipur District, the impact of the tides is felt in inland low lying areas¹. Kolaghat station in the Rupnarayan

River is located at a distance of 135 km from the sea. Almost every year, the river inundates its two banks during the peak of the rainy season in July-September.

Shrimp seed collection methods from inundated river bank

The practice of collecting penaeid shrimp seed (post-larvae and juvenile) and prawn seed (*Macrobrachium* sp.), the latter to a much lesser extent, from inundated agricultural fields comprising small individual plots located on western bank of the Rupnarayan river at Kharui, Gujarkharui, Gobra and Jamitta villages has become a supplementary source of income for local agricultural communities. From the month of June-July to August-September every year, the river floods during the spring tide supported by monsoon downpour and the extended open tract of unsown paddy plots. This occurs in a zone covering a 2.5-3 km stretch on the Kolaghat-Tamluk



Women catching shrimp postlarvae and juveniles.

roadway, which acts as a river bundh, and 400-700 m across towards the river on its western bank, which is inundated during full moon and new moon.

The water remains stagnant for 3-4 consecutive days twice a month at 45 – 105 cm depth. Innumerable numbers of penaeid shrimp *Metapenaeus monoceros* and *Metapenaeus brevicornis* post-larvae (PL) and juveniles of 1.9-6.3 cm in length and also of riverine prawn (*Macrobrachium* sp.) post-larvae of 5-6.3 cm length enter into these tracts, which offer an opportunity for local farmers and common inhabitants to exploit them.

During the period of June-July till mid of August, 3-4 persons (both elderly males and females of farming households) in each of the plots, which range from 325-1010 m² in area and are demarcated by wild grass-laden embankments 1 metre high, enthusiastically capture these young shrimp and prawns.

Indigenous triangular bamboo-built nets, locally termed “kolee jaal” are used, having a frame of 2-2.50 m on three sides (arm length) fitted with blue nylon mosquito netting cloth (6mm mesh size). Shrimp seed collectors in the aforementioned villages operate it first by pushing the net in front through a water column of water-logged fields a few times and then scooping it from the water to catch the seed, which are stored temporarily. Circular scoop nets (ring nets without handles) 90cm in diameter are also used in the shallow water column.

Shrimp juveniles caught in mughri

As water table recedes, *M. monoceros* and *M. brevicornis* PL and juvenile (locally called ‘honey chingree’, ‘nona chingree’ and ‘thora chingree’) become confined within embankments in each plot. As the water level drops from mid-August till the end of September, these are caught only in stationary triangular V-shaped box traps, which have white nylon mosquito net material called “mughri” placed at specific locations (at water channels) against the water current on submerged to semi-submerged embankments. During this time, paddy seedlings are sown in these plots and the shrimp attain 5-7.5 cm in length. The open end of mughri having the V-shaped inlet faces towards paddy plots. It is 60-75cm in length, cost Rs 80/- each, and have been built locally based on indigenous traditional knowledge. Nylon mosquito netting is tightly wrapped over split bamboo main frame to make the trap. In each of such mughri, 250-500 g of shrimp seeds are typically caught each night.

Shrimp and prawn seeds available in these areas, in the aforesaid time period, contribute considerably to satisfy the food requirements of local people and also generate additional income. Small finfishes like *Glossogobius giuris*, *Pseudapocryptes lanceolatus*, *Xenentodon cancula*, *Chanda* sp., *Chela* sp., *Mystus vittatus* are also caught in mughri, although very less in number. Amongst those caught, mostly shrimp seeds are abundant with much lesser numbers of prawn PL and sub-adult (non-penaeid; *Macrobrachium* sp., locally called ‘bhodrokee chingree’). Shrimp seeds are collected @ 1.5-2.2 kg / hour / person in triangular nets on the



Above: Juvenile *Macrobrachium* sp. caught in mughri. Below: Post larvae and juveniles.



first two days of spring tide when these abundantly occur. The dying and dead shrimp and prawn PL and sub-adults are sold in fresh condition at Kolaghat, Kaktia and Tamluk retail fish markets at Rs 150-200/- per kg.

Extensive culture of *M. monoceros* and *M. brevicornis* in extended tracts

Extensive culture of these marine shrimps in vast agricultural tracts (Bheri) is practiced at Dariara, Saira, Alinan, Mathuri, Siuri and Deemari villages in Sahid Matangini Block in Purba Medinipur; these villages are near to Tamluk town in Tamluk subdivision, which is the district headquarters of Purba Medinipur. Resource-rich persons and professional fishermen take each of such tracts on lease by paying around Rs 1,80,000/- per year for the 107,000-194,000 m² plots and around Rs 4,00,000/- for the 324,000-344,000 m² plots. Fields are ploughed/raked and thereafter paddy seedlings are sown. The earth remains soft, which encourages growth of wild shrimp seeds.

During April and till the end of July, at times of high tide, the Rupnarayan River water is let into these tracts via shallow water channels/canals (having provision of iron sluice gates), 4-6m in width, covering a distance of 1-3 km. Shrimp PL 12-15mm in length enter into these tracts along with tidal water and water remains stagnant at 90-105 cm depth. After 40-45 days, these attain 10-12 cm size. The 1.8-7.5 cm sized shrimp PL, caught from inundated small fields on the river bank, are also bought and stocked in these fields in addition

Rupnaraya River.

to those who had entry via tidal water and these attain marketable size in next 25-28 days. They are caught during July-August until the end of September. From mid of October, fields begin to dry up.

Harvest of grown-up shrimps

The mughri used to catch these grown-up market-sized shrimps are more sturdy, devoid of nylon net material, and cost Rs 200-220/- for a standard size 100 x 50 cm². Three-fourths of its height remains submerged in water. Split bamboo strip screens previously woven are fitted over some transversely fixed bamboo pieces to construct the trap. It is set in water channels/canals flowing towards the vast tracts from Rupnarayan River. Near the sluice gate, a barricade made of knitted split bamboo screens (similar to a part of pen framework) is used to direct the grown-up shrimps towards open end of trap. During high tide, river water is pushed and impounded into paddy fields/tracts through the canals. Water flows back to the river during low tide. Market-sized shrimps moving along with receding water are caught in the mughri. These traps are placed in canals before high tide sets in and are taken up/harvested after the water has receded from the submerged field to reach its lowest level. Adult and marketable sized *M. monoceros* and *M. brevicornis* are sold in retail market at Rs 400-450 / kg.

Shrimp seed caught from river bank in non-stationary triangular nets and small circular nets and kept alive in hundi and in hapa cloth enclosures (constructed at one end of





Mughri trap with nylon net.

inundated fields) are transported and sold to prawn farmers and resource-rich farmers in nearby and distant villages at Rs 700-800/- per kg during May to June-July and Rs 250-300/- per kg (400-450 pieces / kg) during July-August and August-September (Rs 0.75 – Rs 1.00 per piece) for stocking in medium-sized to large ponds in this district and in the afore-mentioned inland low-lying vast agricultural tracts around 106,000-334,000 m² in area. Post-larvae of the shrimps *M. monoceros* and *M. brevicornis* obtained from Rupnarayan River grow well in large freshwater ponds along with *M. rosenbergii* and in tidal water-fed vast tracts, where exclusively shrimps are allowed to grow. During March-April, many freshwater prawn farmers in Purba Medinipur procure seeds of *Macrobrachium rosenbergii* (5-8 mm; paddy grain size) and *Penaeus monodon* (PL-15; 14-15mm size) from riverine prawn/shrimp seed collectors; these are available in Rupnarayan during March to July. Each seed of *M. rosenbergii* and *P. monodon* costs Rs. 2.00-2.50 and 40-50 paisa respectively. Riverine *P. monodon* seeds are raised to marketable size in association with *M. rosenbergii* in freshwater ponds².

Occurrence of shrimp seeds in riverine freshwaters

Innumerable numbers of penaeid shrimp *M. monoceros* and *M. brevicornis* PL and juvenile 1.8-5cm size occur in river Rupnarayan during monsoon months. In support to this fact, these two species have been reported to utilise the Feni River estuary as nursery grounds. Feni River is a

major river of Bangladesh that flows to the Bay of Bengal. These two are the monsoon season species; juveniles were fairly abundant or nearly so in the estuary when it became freshwater. In April, the juveniles suddenly occurred in abundance in the freshwater zone. During the peak of the monsoon season, they occupied the entire estuary. Juveniles of *M. monoceros* and *M. brevicornis* about 30 mm apparently require freshwater for nursing³. In West Bengal conditions, *M. monoceros* and *M. brevicornis* seeds attain marketable size of 100-130mm and 80-100mm respectively in five months in brackishwater ponds⁴.

Giant prawn seed collection from the Rupnarayan River

Seeds of the giant prawn *Macrobrachium rosenbergii* (7-10mm; paddy grain size) are collected during beginning of April until the end of August every year from Rupnarayan River on its Purba Medinipur side, mainly by women in Gujarkharui village of Sahid Matangini Block, a distance of 5 km from Kolaghat proper on Kolaghat-Tamluk Road. Seed are collected from shallow riverine water along muddy bank at waist height to chest height depth during night hours 10.00pm-2.00am at ebb tide. Indigenous triangular bamboo-built nets (described earlier), locally termed "kolee jaal" and having fine mesh, are used to capture the tender stages of giant prawn. In one night, in April, a woman will be able to capture 12-20 pieces after pushing the net through water column in every 50 m distance single time. From June-July,

she will capture at least 50 pieces from every 50 m distance and will be able to earn Rs 75/- by selling these to giant prawn grow-out farmers in Purba Medinipur (@ Rs 1.50/- per piece). In one hour, every woman captures 250-300 pieces of *M. rosenbergii* seed from every 50 m distance moving to and fro many times. About three women work in every 200 m zone in the night hours.

During the peak period of seed availability (until mid-August), a woman can capture 1,300 pieces by operating the net for two hours continually every night along the river bank; a few women may individually capture even 2,500 pieces in a three hour period. But when availability is greater the price of seeds falls to Re 0.40-0.50/- per piece. Elderly males, though lesser in number, also participate in giant prawn seed collection. During April-June (i.e., at the beginning of the season), these are sold @ Rs 2.00/- per piece. In June-July, *M. rosenbergii* seeds are stocked in freshwater ponds and in monoculture system (with provision of commercial formulated pelleted feed), these attain 200-250 g body weight in next 6-7 months and are harvested in January-February of the following year.

Women collect giant prawn seeds from nets and safely keep them in aluminium hundi. After returning back home (with the Hundi on head for 20-30 mins), during midnight hours, these are transferred to a white porcelain dish, counted with help of a table spoon and sold to prawn seed traders during dawn hours. Before carrying, traders sprinkle salt in the container of *M. rosenbergii* seeds. In a 2-3 month period every year,

woman working as giant prawn seed collectors in this village earn Rs 7000-10,000/-. A woman in one night can earn a maximum of Rs 600/- by selling *M. rosenbergii* seeds. After high tide had set in, river water becomes calm, *M. rosenbergii* seeds aggregate in shallow region along banks. This income-generating activity helps local women to supplement and contribute to their family income to a considerable extent.

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Operating a triangular net.