

Remunerative Vocation of Mud Crab *Scylla olivacea* Fattening in Purba Medinipur, West Bengal

Abstract: Science-based improved brackishwater aquaculture practices has contributed to self-employment, rural socio-economic development and prosperity of villagers in coastal districts of West Bengal. Cultivable brackishwater mud crabs *Scylla serrata* and *Scylla olivacea* are valuable crustacean species in export markets, have high demand as delicious seafood item in restaurants in foreign countries, exported from West Bengal in live condition on regular basis after fattening of adults. Field knowledge gained from expert crab farmers of Purba Medinipur district on salient features of *S. olivacea* fattening is genuinely presented.

Keywords: Mud crab, aquaculture, fattening

Scientific farming of commercially-important fish and shellfish in confined brackishwater & coastal water bodies in controlled conditions in coastal West Bengal have created sustainable livelihood and avenues of income generation of inhabitant fish farmers, rural youths and farming-dependent households in those regions. In the Preface to the Book of Abstracts of World Brackishwater Aquaculture Conference organized in January 2019, Dr K. K. Vijayan, former Director, ICAR-Central Institute of Brackishwater Aquaculture, Chennai had mentioned: 'Future aquaculture development in India is expected to occur mostly in brackishwaters, which is otherwise considered as a zero-economic resource, as it is not used in agriculture, drinking water or construction'. The species(s) *Liza parsia*, *Liza macrolepis*, *Liza tade*, *Mystus gulio*, sex-reversed all-male *Tilapia nilotica*, giant prawn *Macrobrachium rosenbergii*, mud crab *Scylla serrata*, *Scylla olivacea* have considerable economic importance and consumer demand. These are cultured and grown successfully as fishes and shellfishes for food in monoculture and polyculture systems in well-maintained brackishwater ponds by brackishwater fish farmers by profession in West Bengal, as small- to medium-scale enterprise. Species *Scatophagus argus* and *Etroplus suratensis* are cultured as ornamental fishes; brackishwater shrimp *Penaeus monodon* and *Litopenaeus vannamei* farming done by resource-rich brackishwater farmers.

Commercial Importance of Mud Crabs

In coastal states of India particularly West Bengal, Odisha, Karnataka, Kerala, Andhra Pradesh and Tamil Nadu, mud crabs *Scylla serrata* and *S. olivacea* of medium to big size in live condition, with males full of meat and females with fully-developed ovary, either collected from nature or farmed (fattened), have gained importance due to its high export value and good overseas demand. Its export from India has increased markedly over the last fifteen years - the boost occurring after introduction of crab fattening. These are very expensive seafood delicacy all over the world, particularly in China, Singapore, Malaysia, Vietnam, Philippines, Hong Kong, Indonesia, Thailand, Taiwan, United Arab Emirates, Canada, United States and in some countries in European Union. In West Bengal, there are quite a few well-known establishments of mud crab wholesalers in private sector, leading businessmen, traders and mud crab export agencies (companies) in Baghajatin in Kolkata. Baghajatin is a locality in south-eastern part of greater Kolkata city under jurisdiction of Kolkata Municipal Corporation.

Export trade of fattened live mud crabs of the Indian Sundarbans is undertaken by nine exporters located in and around Kolkata¹. Soft-shelled females with under-developed ovary and infirm outer covering, males (somewhat lean) that have to be grown and fed further adequately to fill their new shells with meat (after moulting) – mud crabs in such condition are chosen by crab farmers for fattening. Such adult crabs or 'water crabs' are not suitable for export (not accepted in export trade), thus need fattening². If fat (meat) content is found to be low in adult mud crabs, those are selected and allowed to grow further. These are held in small earthen impoundments for short period of time and fed sufficiently. Crab fattening is definitely remunerative and considered as an emerging aquaculture industry. Profits have been realized in this vocation - better economic returns are obtained in crab fattening (short-term venture) in comparison to its grow-out farming from crablet (25-50gm) stage upto adulthood.

The afore-mentioned shellfish species (mud crab, giant prawn and shrimp) are widely used for brackishwater aquaculture in coastal regions (brackishwater Community Development Blocks) of Purba Medinipur, North 24 Parganas and South 24 Parganas districts in West Bengal.

Table-1: Features and particulars of management practices of *Scylla olivacea* fattening at the three mud crab fattening farms in Purba Medinipur District, West Bengal

Sl. No.	Particulars	Crab fattener (1)	Crab fattener (2)	Crab fattener (3)
1.	Name	Sri Monoj Bera	Sri Bapi Mondal	Sri Sambhu Maity and Smt. Atashi Maity
2.	Date of author's visit to crab farm	18/10/2024	18/10/2024	27/10/2024
3.	Profession and means of income	Mud crab fattening; owner of mud crab wholesale shop ('Kankra Arat')	Mud crab fattening; owner of mud crab wholesale shop ('Kankra Arat')	Mud crab fattening; <i>L. rohita</i> , <i>C. catla</i> (stocked at 200-250gm size) and <i>Lates calcarifer</i> (stocked at much smaller size) farming in same ponds
4.	Location of farm	Vill. Mundumari, P.O. Chouddochuli, Holudbari Gram Panchayat, Khejuri-2 CD Block, PS Khejuri, Dist. Purba Medinipur	Vill. Dakshin Boga, P.O. Boga, Nijkasba Gram Panchayat, Khejuri-2 CD Block, PS Khejuri, Dist. Purba Medinipur	Vill. Char Kendiyamari, P.O. Kendiyamari, Kendumari-Jalpai Gram Panchayat, Nandigram-1 CD Block, PS Nandigram, Dist. Purba Medinipur
5.	Crab fattening practiced since (Year)	2019	2015	2017
6.	Age of farmer	35 years	45 years	45 years and 36 years
7.	Effective water area of crab fattening water body	3 ponds, 8.5-9.0 decimal each	5 ponds, 6.0-6.5 decimal each	2 ponds, 25 decimal and 18 decimal
8.	Water depth	3.5-4.5 feet	4.0-5.0 feet	6.0-8.0 feet
9.	Nature of water	Brackish or slightly saline	Brackish or slightly saline	Brackish or slightly saline
10.	Source of water (during high tide)	Rosulpur canal	Rosulpur canal and Petuaghat canal	Kendiyamari canal
11.	Technology of crab fattening	Advanced culture in floating boxes in pond	Open pond (earthen chamber) culture	Advanced culture in floating boxes in pond
12.	Number of box and mud crab stocked	140-150nos in each pond, one mud crab in each box	120kg adult mud crabs suitable for fattening in each pond	1500nos and 1000nos in two ponds, one mud crab in each box
13.	Source of stocking material	Mud crab wholesalers & traders at Baghajatin; wild-collected ones, from local crab collectors by profession and small-scale fishermen	Mud crab wholesalers & traders at Baghajatin; wild-collected ones, from local crab collectors by profession and small-scale fishermen	Mud crab wholesalers & traders at Baghajatin; wild-collected ones, from local crab collectors by profession and small-scale fishermen
14.	Size of crab at stocking	175gm and above, mostly females	250-450gm females, 400-500gm males, mostly females	500-600gm females, 200-350gm males, mostly females
15.	Price of crab box when purchased	Rs 150/- and Rs 200/- /piece, small and big size; purchased from Messrs. Bengal Mud Crab Aquaculture, Namkhana, Dist. South 24 Parganas	—	Rs 120/- and Rs 150/- / piece, small and big size; purchased from a private manufacturer at Hyderabad, Telangana
16.	Feed to mud crabs	Sun-dried naturally-occurring brackishwater fishes <i>Coilia dussumieri</i> , small-sized <i>Johnius</i> sp, <i>Gudusia chapra</i> , <i>Escualosa thoracata</i> ; 10-15gm / mud crab/ day; sometimes fresh raw fishes given as feed	Naturally-occurring brackish-water fish <i>Coilia dussumieri</i> in fresh and raw state; 14-16kg / 200kg mud crab stocked / day	Sun-dried naturally-occurring brackishwater fishes <i>Coilia dussumieri</i> , small-sized <i>Johnius</i> sp, <i>Escualosa thoracata</i> ; each fish 10gm in weight, 2 fishes / mud crab / day
17.	Price of feed when bought	Sun-dried fishes Rs 65-70/-/kg, medium quality raw fish Rs 40-55/-/kg (which is less available)	Superior quality raw fish Rs 150-180/-/kg	Sun-dried fishes Rs 70-75/-/kg, bought in the form of 50-70kg sacks

Table-1: contd..

18.	Duration of crab fattening (one crop)	21-28 days	28-30 days	30 days, sometimes extended for 45 days
19.	Price of fattened mud crab when sold	Rs 850-1500/-/kg (females); reaches to 1800-2100/-/kg during winter months	Rs 850-1500/-/kg (females); reaches to 1800-2100/-/kg during winter months	Rs 850-1500/-/kg (females); reaches to 1800-2100/-/kg during winter months
20.	Number of crops per year	9-10nos	9-10nos	8-10nos
21.	Important features in management practice	Commercial aquaculture products of reputed company applied routinely in ponds in proper dosage to maintain ideal water conditions; water exchange done when felt necessary; wooden planks' and raw bamboo built 1mt wide foot over-bridge (platform) constructed across ponds for walking and handling floating boxes (holding mud crabs) positioned on rafts, made of parallelly-placed long PVC pipes on water surface; fattened crabs harvested after opening boxes one after another	Strong and proper net fencing done with split bamboo driven into bottom and attached nylon net screen upto 4 feet height on all four sides of each chamber; Calcium carbonate, Zeolite, lime stone powder and Potassium permanganate applied routine wise in proper dosage; water exchange done when felt necessary; mud crabs fed sufficiently to prevent cannibalism amongst them; fattened crabs harvested individually from bottom of earthen chambers after dewatering using hand net/scoop net	Calcium carbonate, Zeolite, lime stone powder and Potassium permanganate applied routine wise in proper dosage; water exchange done when felt necessary; wooden planks' and raw bamboo built 1mt wide foot over-bridge (platform) constructed across ponds for walking and handling floating boxes (holding mud crabs) positioned on rafts, made of parallelly-placed long PVC pipes on water surface; paddle wheel aerators operated in ponds; fattened crabs harvested after opening boxes one after another

Purba Medinipur district holds a prominent position in the inland aquaculture map of West Bengal. It holds the first position out of 23 districts in this state in production amount of marketable-size Indian major carps (*Labeo rohita*, *Catla catla* and *Cirrhinus mrigala*) and penaeid prawn i.e., shrimp *P. monodon* and *L. vannamei* production every year, grown in confined aquatic system under controlled conditions. Fattening of the orange-clawed and partially orange-bodied mud crab *S. olivacea* is done in Purba Medinipur. Indian Sundarbans region comprise of six and fourteen brackishwater CD Blocks in North 24 Parganas and South 24 Parganas districts respectively. Mud crab fattening predominates farming practices in Sundarbans as opposed to grow-out mud crab culture³. The same scenario is appropriate for Purba Medinipur district also in its coastal region. Among the thirteen brackishwater Blocks in this district, Nandigram-1, Khejuri-2 and Haldia CD Blocks are known for the presence of brackishwater aquaculturists by profession (though few in number), who are actively engaged in mud crab fattening in improved method and commercial terms.

Field Study

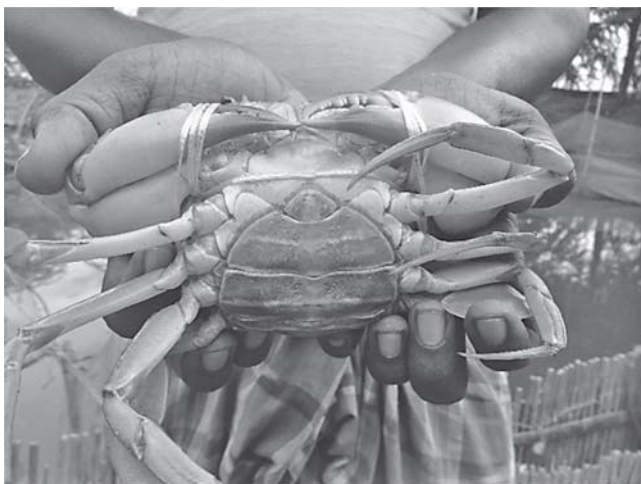
In November 2024, as an extension worker, author was self-motivated to learn from farmers, had field visits and exposure on the ongoing practices and activities of mud crab fattening in Purba Medinipur district at three well-known mud crab farms owned by progressive farmers.

They are Sri Monoj Bera, Sri Bapi Mondal and Sri Sambhu Maity and Smt. Atashi Maity. These four reputed, progressive, well-established crab fatteners of Purba Medinipur district are courteous, possess considerable experience, expertise and skill, and have adopted improved and scientific version of mud crab fattening practice on a commercial scale. Author provided photocopies of packages of practice of mud crab fattening and *Lates calcarifer* monoculture published in Bengali version as Information pamphlet to each of them and helped them to some extent. Features and particulars of the management practices of *S. olivacea* fattening at the three sites as studied are described in tabular form in Table-1.

Some Important Aspects

Before going for fattening, *S. olivacea* are checked for fat content (meat), male and female mud crabs separately. Battery-powered torch light is used, and mud crabs hold individually in front of this light source in dark room or in semi-dark condition. After harvest of fattened *S. olivacea* from open pond and boxes, their claws are tied, fixed beside and under body using jute thread or plastic twine thread in proper manner. Those are properly arranged in rectangular-shaped perforated plastic crates/ baskets and prepared for transportation. After properly and securely tying the pair of claws of individual crabs (live, medium to big-sized, shell hardened, healthy, intact and injury-free) and packing in bulk (in pile) in stress-free state,

those are transported and sold to exporters at Baghajatin. Price of fattened *S. olivacea* depends on its size, weight, whether alive or dead, if it has both claws and legs intact. Mud crab traders and exporters at Baghajatin sort the fattened crabs supplied to them into specific grades and accordingly fatteners (farmers) are paid.



A female mud crab *Scylla olivacea*

Current market price (rate) of fattened live mud crabs at Baghajatin is informed by company representatives to crab fatteners over mobile telephone from time to time once or twice a week in all three coastal districts in West Bengal. Accordingly the latter decide and fix up date of harvest and transport. On roadways, these three mud crab fatteners (farmers) transport and supply their product to Baghajatin when they find price at their highest and is on an upward trend – obviously they aim for the maximum profit margin. Harvest done in early morning, direct sunlight is avoided upon live fattened mud crabs after bringing out from water.

End Note

Survival capacity of mud crabs in saline water has influenced coastal residents to adopt this technology as an adaptation strategy for salinity intrusion in freshwater and brackishwater ponds⁴. Recently on 7/11/2024, author heard a Presentation titled ‘Community aquafarming among coastal and tribal women and their success stories’ in International Conference organized at ICAR-Central Institute for Women in Agriculture, Bhubaneswar where Dr B. Shanthi, Principal Scientist, ICAR-CIBA, Chennai highlighted on successful case studies on mud crab *S. serrata* fattening in small open tide-fed ponds in five coastal districts of Tamil Nadu. During conversation, Sri Bera, Sri Mondal and Smt. Maity mentioned to author that gravid female *S. olivacea* with orange-red egg mass after



A mud crab fattening unit at Purba Medinipur

fattening are in much demand in sea-food restaurants overseas, fetches high price.

Indeed rightly, ICAR-CIBA preaches the phrase ‘Brackishwater aquaculture for food, employment and prosperity’. These professional persons are ideal for horizontal transfer (dissemination) of knowledge to rural youths, agriculture-dependent people and small-scale coastal fishermen in respective villages and nearby regions who are interested in mud crab fattening. They are the ‘role model’, their success and achievements will encourage others to take up mud crab fattening as means of self-employment and income generation sustainably, to adopt better farm management practices with particular reference to mud crab fattening. Slowly and steadily these three persons got good reputation in entire West Bengal in brackishwater aquaculture sector by dint of their hard work, patience and endurance. □

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References

1. S. K. Pramanik and N. C. Nandi. *J. Environ. and Sociobiol.*, **9**. 78 (2012).
2. S. Ghosh. *Aquaculture Asia*. **23** (1). 11-19 (2019).
3. C. Lalramchhani, C. P. Balasubramanian, P. S. Shyne Anand, T. K. Ghoshal, Prem Kumar and K. K. Vijayan. *Aquaculture Asia*, **23** (3). 20-29 (2019).
4. M. H. Khan Sujana, M. M. H. Kazal, M. S. Ali and M. S. Rahman. *Aquaculture Reports (Elsevier)*, **19** (2021).