Historical Background of Shellfish Breeding and status in India

Crustaceans- Tiger prawn; fresh water prawn; mud crab

Other than crustacean- Molluscan and holothurians

Historical Background of Shellfish Breeding and status in India

Shrimp

- **Controlled spawning and larval rearing of shrimps was initiated by Hudinaga (1942)** with wild **spawners of *P. japonicus* caught from fishing grounds.**
- He successfully bred and reared under controlled conditions in the laboratory
- In course of time, series of developments have taken place in different parts of the world which helped in the commercial production of shrimp seed for farming.

hatchery systems for shrimps - primarily of two types:

A. **Japanese system / community culture or fertilized system**. (Green water culture system) - originally developed and followed by Hudinaga

B. **Galveston system – or clear water system** –

- developed in Europe for the shrimps,
- in which the green water culture system was modified to overcome the troubles in the green water culture. Since it was developed and followed in Galveston laboratory it is named as Galveston system.
- Following the successful seed production with *P. japonicus*, seed production **was standardized for *P. monodon* in Taiwan and later on this technology was transferred to many parts of the world during early 70s.**

Japanese System of shrimp seed production

- first developed system for the seed production of shrimps.
- Hudinaga adopted this system for the seed production of *Penaeus japonicus*.
- This system involved **spawning, hatching and larval rearing in the same pond or tank with same conditions.**
- initial attempt to produce the seed of Penaeid shrimp
- first designed system for the larval rearing and hence regarded as the first developed technology for closing the larval cycle in captivity.
- In this system, **the larval rearing was done along with the culture of live feed (i.e., microalgae).** Therefore the water in the rearing tank will always remain **green due to the enrichment of algae**. Due to uncontrolled aquatic conditions, the **survival in this system was low compared to clear water culture system**.

Galveston system for seed production shrimp

- This system was developed in the Galveston laboratory, USA (Cook and Murphy, 1966).
- this system, rearing of brood stock, spawning hatching, larval rearing and live feed culture are done separately in separate tanks.
- **Since live feeds were not cultured in the larval rearing tank (LRT), the water in the LRTs remained clear. Therefore this system is also referred as clear water rearing system.**
- In this clear water system further developments took place leading to the development **of larval feeds and advanced larval rearing conditions**.
- Thus resulting in **higher survival rate, better economical seed production,** etc. Hence, this system is widely followed in many countries for the shrimp seed production and has been successful for many other species of crustaceans.

Breeding of freshwater prawns

- The first successful attempt of captive breeding of freshwater prawn was done by **S.W. Ling in a Malaysian Laboratory** for *Macrobrachium rosenbergii* in the year 1969.
- Later the larval rearing under laboratory conditions was perfected **by Fujimura in the year 1970 in Hawaii.**
- This was further picked up by countries like France, Thailand, Taiwan and India for controlled seed production of *M. rosenbergii*. Further research was done on **different aspects of rearing such as feeds and feeding, health management**, etc in Taiwan, Hawaii, French Guyana , and India for *M. rosenbergii* and *M. malcolmsonii* simultaneously.
- Similar to *M. rosenbergii,* controlled breeding and seed production was developed for many native *Macrobrchium spp* in other countries like China *for M. nipponense*. This has led to the expanded farming of *Macrobrchium spp* in the world.

Mussel

- Mussel hatchery technology has been developed in countries like China and Thailand.
- In India, CMFRI at Madras and N.I.O. Goa have developed technology for the production of spat of green mussel (*Perna viridis*) and Vizhingam centre of CMFRI has developed the spat production for brown mussel (*Perna indica)*.

Status of shellfish seed production in India

- Indian shellfish seed production dates back to 1960s as earlier works indicate that the seed collection had been a serious occupation for the coastal folk in many states.
- Presently, India has about **400 registered hatcheries in which about 120 were for freshwater prawn seed production.** The major emphasis is on Tiger shrimp (*Penaeus monodon*) while a few have concentrated on Indian white shrimp (*P. indicus*) too. After 2005, the thrust is slowly shifting towards *P. vannamei* while in the freshwater prawn sector, it was only for *Macrobrachium rosenbergii*.
- **Due to biological complexity, lobster hatcheries are not operated by entrepreneurs in India. A few experimental hatcheries are present.**

- A private entrepreneur has his **crab hatchery in Chennai** that has been supplying juvenile crabs for farming.
- Molluscan hatcheries do not have much appeal for commercial start-up and therefore, **only government run oyster, clam and holothurian hatcheries are present in India.**
- many hatcheries in coastal Tamil Nadu and Andhra Pradesh working on shrimp, prawn and fishes all in one facility. This type of **multi functional hatcheries are known for their year round operation and business**.

Shrimp and prawn seed production

- Among the **shrimp species available in India, Tiger shrimp and White shrimp are the species of preference due to their international market.**
- Tiger shrimp is the **most preferred among the two shrimp species. Quality brooders for the hatcheries is remaining as a major problem for the production of quality seeds.**
- Captive brood stock development has not become a popular reality for *P. monodon* while, some attempts on *P. indicus* yielded good results. But in general all the shrimp hatcheries can work on both the species for captive seed production.