Breeding and seed productionof mussel

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Classification

- Phylum - Mollusca
- Class - Bivalvia
- Order- Mytiloida
- Family Mytiloidae
- ***Perna viridis* (Green mussel)**
- ***Perna indica (Brawn mussel)***
- Very common along the Kerala coast.

Green mussel

Brown mussel

Reproductive biology

- The sexes are separate.
- Testes is creamy white in colour while ovary is pink or reddish.
- **Size and age at first maturity**
- *Perna viridis* is fast growing mussel. It grows faster in open sea.
- It attain maturity at 15.5 – 28.0 mm total length within 2 – 3 months.

- **Spawning season**
- It varies in different geographical regions.
- Kakinada bay – January to May (peak)
- Madras and Goa – Throughout the year
- Kerala : July – November (peak in August – October)
- Ratnagiri (Maharashtra) – Twice in a year June to early September and another from February to March

Larval development

- Fertilisation is external.
- Zygote undergoes cleavage and reaches to morula within 1.5 hrs.
- At 6 -7 hrs reaches to trochophore larvae
- Veliger after 17 to 20 hrs.
- D shaped ciliated velum and start feeding.
- Veliger to umbo stage on day 7. Performing locomotion by means of velum.

- **Eye spot stage** is characterized by the presence of a black rounded spot below the foot mass.
- The eye spot and the rudimentary foot became distinctly visible by days 13–14.
- **Pediveliger stage** The development of the functional foot indicated the pediveliger stage by the 16–19th day.
- Larvae transform from the free swimming pelagic larvae to the creeping, crawling benthic stage ready to attach to the substratum.

- Plantigrade stage: The pediveliger, at the end of the crawling stage settle on the substratum and become plantigrade and begin its sessile life. Spat settlement could be observed from the 21st day onwards.
- Spat: The plantigrade transform into young spat by developing the characteristic adult shell.
- Spatfall or settlement began on the 21st day and continued up to 35th day. The spat measure 510×390µm on 21st day and 910×460 µm on 28th day.

Spat collection from natural spawning ground

- During spawning when there is an onset of heavy spatfall, spat can be collected by giving suitable substrate.
- **Substrates**
- Bamboo poles/wooden stakes
- Coir or synthetic(polypropylene) ropes
- Coir ropes due to their characteristic nature are very successful in spat collection.
- Poorer settlement on smooth ropes.
- Several arrangement was used in rope system.

- **Poly-coco ropes:**
- It consists of main polyethylele ropes of 14 mm in diameter in which coconut coir ropes of 40 mm diameter and 39 cm length are tied.
- These are positioned at the middle of each meter length of main rope.
- It is necessary to season the spat collector material by immersing in sea wter for at least for 2 weeks. During seasoning other organisms like algae and barnacles attach to the substrate making it more natural like.

- **Spat transfer**
- When there is a heavy spatfall, thinning is required.
- It is done by stripping and redistributing the settled spat.
- This has to be done when they are 15 – 20 mm in size.
- The spat is kept on cotton netting and this netting is tied on the culture rope.
- Optimum density for green mussel is 250 – 350 /m.

Hatchery technology

- Developed in India by CMFRI and NIO (Goa).
- **Brood stock rearing**
- Typical mussel culture techniques can be referd.
- Some of the culture methods are listed.
- 1. Stake culture
- 2. Rack and bag culture
- Raft culture
- Longline culture

Spawning and fertilisation

- **Induce spawning**
- Thermal induction; a rise in temperature by 4 °C than ambient temperature.
- Induce spawning by adding hydrogen peroxide at 100-150 ppm for 8 hrs.
- It has to be transferred then in clean water and then it will spawn within 1-4 hrs.

Development and larval rearing

- Soon after spawning, the adult mussels are removed from the spawning tank.
- The water in the tank is kept without disturbance for the fertilization to take place.
- After fertilization, the seawater in the spawning tank containing the fertilized eggs is diluted several times and the eggs were allowed to develop.
- After 24 hours, the D-shaped larvae are transferred to 1000 l FRP tanks at the rate of 2 larvae/ml of seawater.
- Optimum salinity 25 – 35 ppt and temperature 20 - 25 °C.

- **Larval feeding**
- Initially with *Isochrysis* and *Monochrysis in* equal proportion 25000 cells/ml.
- After settlement, the quantity can be reduced to half and *Skeletonema* can be added to 50000 cells/ml. After around 15 days of fertilisation spat will appear and so suitable substrate has to be provided.
- After 20 days it may measure around 2.7 mm.

Thank You