

Aquaculture genetics research is gaining importance and with the development of genetically modified organisms (GMOs), the need for protocols for their use in aquaculture research and development is being increasingly felt. This issue of *Aquabyte* contains an announcement on the availability of a computer software package of performance standards for safely conducting research with genetically modified organisms. We are planning to bring out articles on this important subject in future issues of *Aquabyte* and contributions are invited.

This issue contains articles on different aspects of freshwater aquaculture, and NTAS members are encouraged to send articles on thematic issues and country reviews of aquaculture research and development, with potentials and constraints. Wishing all NTAS members a happy and productive 1997.

M. V. Gupta

Role of Women in Indian Shrimp Farming

A. Gopalakrishnan

Although women in India are not conspicuous in the formal industrial sector, their role in traditional coastal shrimp farming is quite significant. In recent years, shrimp farming has expanded fast, particularly in the maritime districts of Tamil Nadu. The rapid development of this industry has provided employment opportunities for women, particularly fisher women, and they are now able to contribute to household income. They are involved in various facets of shrimp farming, including pond construction, seed collection, collection of feed materials and preparation of feeds, pond maintenance and post-harvest handling. This study indicates that about 40% of laborers involved in shrimp farm construction are women. The various roles of rural women in shrimp farming are also described.

Broodstock and Seed Collection

Women collect live brood *Penaeus monodon* and *P. indicus* from the landings of trawl nets for

the broodstock banks maintained by hatcheries. Aside from collection, women are also involved in other activities in broodstock banks such as feeding, water quality maintenance, sex segregation, selection of spawners, and marketing.

Due to the shortage of shrimp seed from hatcheries during the monsoon months (June-September), about 20% of the farmers depend on seed collected on a commercial scale from the Pichavaram mangroves of Tamil Nadu, and the Mulliyar and Vettar rivers of Karikal in the Union territory of Pondicherry, on the east coast of India. Of the people involved in collecting seed, 25 to 30% are women. One person can collect a maximum of 275 seeds of *P. monodon* per day. The gear used for seed collection is a 40 cm x 40 cm square net (No. 40 mesh). The same gear with No. 8 mesh is used to collect young shrimp of 3 g and above. The collected postlarvae and juveniles are transported to nearby farms or to distant grow-out farms by bus or bicycle. When the distance is far, battery-operated aerators are used



Embankment construction in a shrimp farm, Tamil Nadu, India. Men load the clay and the women carry it on their heads.



Manual collection of filamentous algal mats from shrimp ponds, Tamil Nadu, India.

for oxygenation. *P. monodon* and *P. indicus* are the major species required by grow-out farmers. The price of *P. monodon* seed varies from Rs. 0.10 to 1.00 each (US\$1: Rs. 35), depending on the season and place of collection.

Pond Maintenance

Due to improper fertilization, green filamentous algae (predominantly *Cladophora* sp., *Enteromorpha* sp. and *Chaetomorpha* sp.) grow and form thick mats on the pond bottom. The biomass of algae produced can be extremely large - one farmer had to remove 4.5 t of *Cladophora* sp. (wet weight) from his pond. It takes 100-120 women laborers about eight hours to remove 1 t of *Cladophora* sp. Women involved in this activity earn about Rs. 30 per day.

Due to seasonal outbreaks of molluscs in the shrimp ponds, empty clam shells accumulate at the pond bottom, and make the soil pH acidic. A foul odor emanates as a result. Women are often involved in clearing pond bottoms of these mollusc shells.

Collection and Preparation of Feeds

Nereid worms are collected from saline marshy areas of the creeks and are predominantly used in shrimp hatcheries to feed the broodstock to increase the viability of eggs and to achieve higher survival of nauplii. About 35% of the people involved in this activity are women and children from among the local fisherfolk. The sale value of these worms is about Rs. 150-200/kg and a woman can collect 500-700 g per day working from dawn to dusk.

Clams such as *Meretrix meretrix*, *M. casta* and *Catylaysia opima* occur in abundance in the Vellar estuary, from where the women collect them by hand for use as shrimp feed. Women process the clam meat by boiling the live clams. A woman collects 4-5 kg of clam meat per day, the market price of which is about Rs. 10-13/kg. The exploitation rate of these clams from the Vellar estuary is about 50-60 kg of meat per day and the harvest is almost year-round. The use of clam meat is being extended to freshwater prawn culture.



Women and children removing meat from clams and cockles, Tamil Nadu, India.



Collecting oyster meat by breaking the shell, Tamil Nadu, India.

Like the clams, the oyster *Crassostrea maderensis* and the mussel *Perna viridis* are also widely collected for shrimp feed. The market price of these oysters and mussels is high, in the range of Rs. 17-20/kg. The daily harvest is around 20-25 kg of meat from the Vellar estuary and varies with the season. About 7-10 women collect these molluscs to cater to the demand of farmers in the area.

Women also collect freshwater snails from the paddy fields of coastal areas in Tanjavur district, to feed the shrimps. The exploitation is seasonal, being only during rice cultivation.

During disease outbreaks, antibiotics such as oxytetracycline and chloramphenicol are mixed with both the wet feeds and pelletized feeds using egg albumin as the binder. Women are engaged in the preparation of medicated feeds.

Harvesting and Post-harvest

During harvest, the ponds are drained and majority of the shrimp are caught with nets. Those left are collected by hand, mainly by women. Disease outbreaks and any other problems in the shrimp culture ponds also create jobs for women.

Marketing of the cultured shrimps is undertaken by the corporate sector. However, local marketing is done by women, especially during emergency harvests due to threat of disease.

Women are engaged exclusively in the processing plants for grading and deheading of shrimps, and removal of the intestine. Thus, women play a crucial role in shrimp farming, and their participation is on the increase (Fig. 1).

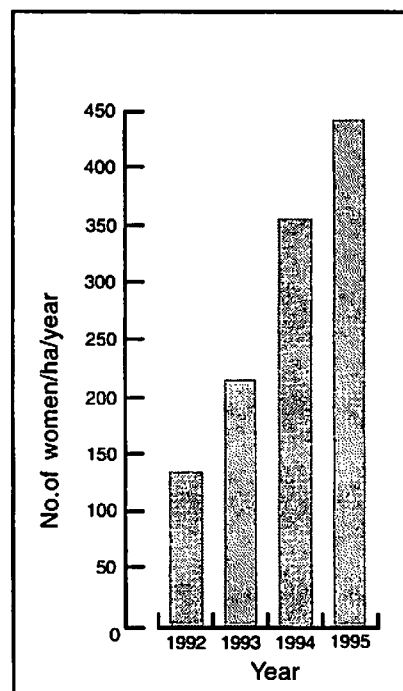


Fig. 1. Number of women involved per hectare of shrimp pond, 1992-95, Tamil Nadu, India.

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Errata

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In the article, "Management of Freshwater Capture Fisheries of Cambodia - Issues and Approaches", by M. Ahmed and T.S. Tana, p. 16-19:

- The map on page 16 "Cambodia and its main districts" should be replaced by the map on page 59.
- The final paragraph on page 19 should read:

"To conclude, forging a partnership with fishing communities will help increase fishers' share of net social benefits from fisheries as well as create among them a sense of ownership of the resources."