1992

[Grouper aquaculture] technology tips

Aquaculture Department, Southeast Asian Fisheries Development Center

Southeast Asian Fisheries Development Center, Aquaculture Department (1992). [Grouper aquaculture] technology tips. Aqua Farm News, 10(3), 10-13.

http://hdl.handle.net/10862/2596

Technology Tips

from Bicol University (BU) College of Fisheries in Tabaco, Albay

Pond requirements. Any traditional milkfish or tilapia pond can be utilized in grouper culture. For maximum productivity the following considerations must be met:

1. Good water quality with a salinity of >10 ppt.
2. Water depth of at least 1 m.
3. Pond structure that can be easily flooded or drained.

Pond preparation

1. Drain the pond.
2. Cultivate (upturn or plow) the pond bottom.
3. Prepare the pond bottom and make it slope gradually towards the gate.
4. Repair the dikes and gate.
5. Install screen in the gate.
6. Eradicate pests and competitors. Apply any of the following on the pond bottom.
   a. Tobacco dust or shavings at 500-2000 kg/ha or commercial nicotine at 12-15 kg/ha, depending on density of pests.
   b. Commercial saponin at 10-15 kg/ha or teaseed cake at 150-200 kg/ha.
   c. Derris root at 40 kg/ha. The roots are cut into small pieces and soaked overnight in water. Remove the roots from the water to crush them. Then put back in the water in which they were soaked and squeeze to extract rotenone. This solution is applied directly to the pond.
   d. All the above applications must be done with the water depth kept at 10 cm and the application should be made during sunny days between 9:00 a.m. to 2:00 p.m.
7. Apply lime to pond bottom to raise soil pH to its optimum level (6.0-9.0). This will prevent abrupt change in water pH during heavy rain.
8. Place used tires, PVC pipes, dried tree stumps, etc. in scattered locations throughout the pond to serve as shelters.

Culture methods. Grouper is cultured in two ways: monoculture and polyculture.

In monoculture, grouper is stocked at 5000/ha and fed chopped trash fish or live tilapia fingerlings. In polyculture, the combination is 1000 grouper and 15 000 tilapia per ha. Tilapia is stocked at a sex ratio of 1 male to 5 females.

Tilapia is stocked two months ahead of grouper to give them enough time to spawn and produce young ones that become the live food of grouper. The presence of young tilapia will prevent the original tilapia stock from being devoured by grouper as the young ones become easy prey. To enhance tilapia reproduction, it is fed formulated diets.

Stocking fingerlings. Grouper fingerlings should be at least 8 cm or 20 g. They should be of uniform size to avoid cannibalism, i.e., bigger ones eating smaller fingerlings.

The preferable time for stocking is the cooler parts of the day. Proper handling is necessary to minimize stress on fish.

Feeding stock. The ideal feed for grouper is live tilapia fingerlings. If not available, chopped trash fish is a good substitute. Volume of feed should be at least 10% of fish body weight contained in feeding trays placed near the shelters.

One thing to remember in feeding is to remove and take out excess or unconsumed feed. This will prevent pollution caused by decomposing feeds.

If feed is consumed within an hour after it is given, the amount of feed may be increased.

Water management. Change the pond water as frequently as possible to maintain at least 3 ppm dissolved oxygen.

To maintain salinity at 10 ppt, partially change the water after heavy rains. This can be done by getting the surface water out of the pond and replenishing it with tidal water.

Harvesting. Stocks are harvested in 8-10 months. Fish should normally weigh 500-900 g each.

Water is totally drained in harvesting. The gate is provided with bamboo screens. Grouper can be easily collected since they congregate in the shelters.

After collecting the fish, they are sorted and stocked in *hapa.*

Marketing. For maximum profit, grouper is marketed live, since live grouper commands a price 300% higher than frozen ones.

To keep grouper alive, it is placed in oxygenated plastic bags placed inside styrofoam containers. Each bag contains 3 l water and packed with 3-5 pieces of fish weighing 3 kg total.

To regulate temperature and maintain the proper coolness during transport, ice is placed inside the styrofoam containers where the plastic bags are contained.

With such proper handling, the survival rate should normally be 90-100%.

Source: JV Manzano and VB Manzano. *Pond culture of Lapu-lapu.* **Outreach,** V. 13(1), Mar 1990.

BU on pen/cage culture

Fish culture in pens or cages could bring more income to small-scale rural farmers especially when traditional low-investment materials are used.

Site selection. It is important that the cultured fish in cages or pens are provided with: enough oxygen in the water, plenty of food and favorable environmental conditions (moderate currents and waves and minimum pollution).

The basic principles in selecting sites for floating cage culture are good water quality, adequate water exchange, and freedom from predators and natural hazards.

Bays, lagoons, straits and open coasts protected from strong monsoonal winds and rough seas are good sites for cages. These locations are usually affected by tidal flushing. Except in lagoons, salinity change in these sites is low and the environmental conditions are stable.

It is also important to examine the degree of nutrient enrichment of the water since too much enrichment may encourage the growth of destructive organisms.

Cage design. For pelagic species such as threadfin bream (Polynemidae) and the jack (*Carangoides*) which swim continuously near the surface, bigger nets in circular or hexagonal cages may be more suitable.

For demersal fish such as grouper (Serrankfae) and marble goby (Gobidae) which are less active and stable in habits and which prefer to hide under any structure, square or rectangular cages are advisable.

The practical size of the cage for estuary grouper is 3-11 m^2 where the stocking can range from 360-1320 fish at a stocking rate of 60 fish/m^3 for size less than 1 kg.

The parts of a floating net cage are: the floating unit, the framework, the net cages, and the anchorage facilities. (For details of such construction, the interested party may inquire from BU College of Fisheries in Tabaco, Albay).

Once a site has been selected, the physical facilities established and the cage stocked, the farm manager has to ensure that: (a) the fish grow at expected rate, (b) loss of fish due to disease and damage to nets from predators or foulers are minimized, (c) nets are regularly maintained and cleaned, (d) feeding is optimized through provision of suitable feeds for different sizes of fish at the right time of the day and at the right amount and frequency, and (e) regular grading of the stocked fish and routine checking of the water quality throughout the operating periods are carried out.

Cage maintenance. The nets are changed once a week for smaller mesh size of 0.635 cm, once every two weeks for mesh size between 1.27 cm and 2.54 cm, and once a month for those above 3.81 cm.

Regular checking of the conditions of the nets for wear and tear is most important since the netting might be torn by predators like the puffer fish or by the sharp edges of barnacles.

Stocking and grading. The highest stocking density per cage for each species in mono- or polyculture should be carefully determined. In order to reduce the effect of the dominant fish in the culture population, grading by size is necessary. This would not only contribute to rapid growth but also ensure uniform sizes. Grading is usually done by hand every two weeks.

Predators and poaching. The hairy-nosed otter is the most common predator that may attack the cultured fish in cages. They have sharp teeth and strong claws which can easily tear the polyethylene netting and can kill the cultured fish in a short time. Fencing the cultured site with galvanized wire mesh prevents the otter from entering. Watch dogs can also drive away otters. Trapping otters is also a solution.

Source: VB Manzano and JV Manzano. *You can raise fish in pens or cages.* **Outreach** V. 12 (1). March 1989.

from Cagayan State University

Given the fishery resources of the region, Cagayan State University researchers conducted a study of grouper culture in Buguey Lagoon, Cagayan, and a survey of grouper fry grounds in selected rivers of Cagayan.

The grouper cage culture was done in a lagoon along the coastal barangays of Buguey, Cagayan, covering a total area of 120 m^2. The growth of three species of grouper, *Epinephelus bleekeri, E. tauvina,* and *E. sexfasciatus* was evaluated at stocking densities of 45 and 60 fish/cage. The fish were reared for 5 months in 1 m x 1 m x 1 m net cage (3-mm mesh size).

Grouper was fed chopped trashfish twice a day at 15% of fish biomass and sampled at 30-day intervals. While there was no significant difference in weight and length among the three species, weight gains were significantly higher at 45 than at 60 fish/cage. The highest average weight gain of 101.53 g/month was achieved by *E. tauvina.* Average final weights of 609.2 and 529.4 g at 45 and 60 fish/cage, respectively, were attained.

On the other hand, a 9-month survey of fry gatherers and buyers was undertaken by CSU researchers headed by R.C. Culasing to determine the production and seasonality of grouper fry, and the catch per unit effort of fry gatherers in the rivers of Buguey, Gonzaga, Baua, Abulug, Pamplona, Pata, Cabicungan, and Cagayan.

Grouper fry were found in Buguey River and Gonzaga River in January to September, with the peak catch in February and August. Buguey River had the highest number of grouper fry collected, followed by Gonzaga River and Baua River. Fry catch was estimated at 894 200 in Buguey River and 578 500 in Gonzaga River from January to September 1989.

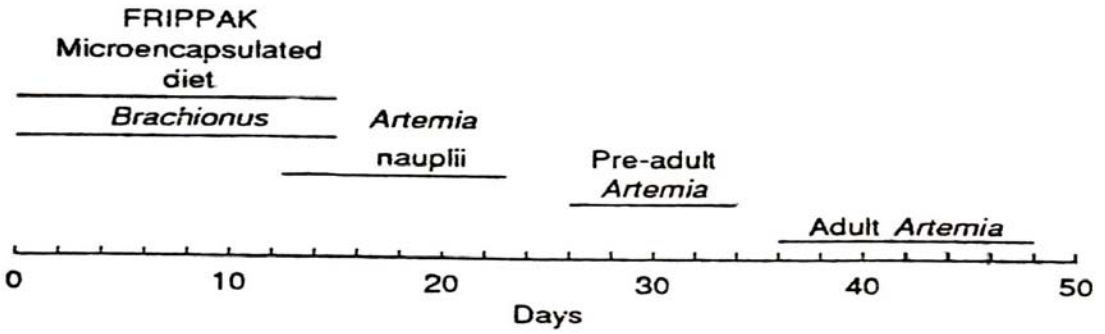
With the area's fishery resources and the R&D efforts of CSU, Cagayan's grouper industry - one of the country's leading edges in fisheries - may be on its way towards full development to boost the local economy.

Source: **Currents,** PCAMRD, 6 Aug 90; **The PCAMRD Waves,** V.3(3), July-Sept 1990; **Philippines Journal**, 31 Oct. 1990.

from a private hatchery

Attempts to spawn grouper have also been conducted by the private sector. A mature male (15 kg) and female (6.5 kg) *E. malabaricus* injected with 100 μg LHRHa/fish twice at 24-h interval spawned naturally in a canvas tank. Approximately 120 000 spawned eggs were collected of which 44 800 hatched.

This private hatchery had also successfully used FRIPPAK microencapsulated diet in combination with *Brachionus as feed* for early larval stages (Day 1-10) of *E. malabaricus. Brachionus* was solely used from Day 11-15, *Brachionus* + *Artemia* nauplii from Pay 12-24, pre -adult *Artemia* from Day 25-34, and adult *Artemia* from Day 35-50 (figure on p. 13). A sur-



Feeding scheme for larval rearing of Epinephelus malabaricus followed by a private hatchery.

vival rate of about 14% was obtained on Day 50 using this feeding protocol.

Feeding scheme for larval rearing of *E. suillus* followed by the SEAFDEC Aquaculture Department is noted on p.6.

Source: GF Quinitio and JD Toledo. 1990. *Mariculture Techniques for Epinephelus sp. in the Philippines. In:* RD Guerrero III and MP Garcia Jr (eds). 1991. **Advances in Finfish and Shellfish Mariculture; Proceedings of the 1st Phil.-French Technical Workshop on Advances in Finfish and Shellfish Mariculture:** 24-26 Oct. 1990: Los Baños. Laguna.

SEAFDEC/ AQD's *1991 Report* is available

The 1991 Report of SEAFDEC Aquaculture Department, *Better life through aquaculture,* is available in July. The Report notes achievement in research, training, and information; it also contains AQD's program for the next three years (1992-1994).

Write to: Sales/Circulation, Training and Information Division, SEAFDEC/AQD, Tigbauan, Iloilo 5021.

GROUPER STUDIES AT SEAFDEC... FROM P.6

(8) fish health control, and
(9) international market.

The AQD research team for sea bass - grouper - snapper that will closely follow the above priorities are:

Marietta Duray, team leader, with team members: Arnil Emata, Josefa Fermin, Luis Ma. Garcia, Joebert Toledo, Gerald Quinitio, Ruby Bombeo, Demetrio Estenor, Armando Fermin, Fe Estepa, Junji Imayoshi, Antonio Castillo, Mae Catacutan, Relicardo Coloso, Renato Agbayani, Eduard Rodriguez, Noel Solis, Norio Yasunaga, Soichiro Shirahata.

It is hoped that within the decade, grouper technology will be developed.

Sources: (1) GF Quinitio and JD Toledo. 1990. *Mariculture Technique for Epinephelus sp. in the Philippines.* In: RD Guerrero III and MP Garcia Jr (eds). 1991. **Advances in Finfish and Shellfish Mariculture; Proceedings of the 1st Phil.-French Technical Workshop on Advances in Finfish and Shellfish Mariculture;** 24-26 Oct. 1990; Los Baños, Laguna. (2) **1987-1991 SEAFDEC/AQD Annual Reports.** (3) Brackishwater Aquaculture Information System. 1987. **Grouper Abstracts**. SEAFDEC/AQD, Tigbauan, Iloilo.