

ch & Development Notes

How to Establish a small-scale Hatchery for *Penaeus monodon*

A guideline for the design, operations and economics of a small-scale hatchery for the larval rearing of the tiger prawn (*Penaeus monodon* Fabricius), known in the Philippines as *sugpo*, has been prepared by the Aquaculture Department of SEAFDEC.

According to Rolando R. Platon, project leader of the Barangay Hatchery Project of the Aquaculture Department Prawn Program, the guideline essentially scales down the hatchery technology to a level which can be adopted by the private sector, especially in the villages, with a minimum of financial and technical input. Platon, who prepared the guideline, said studies are being done to further reduce the scale of the operation.*

The hatchery guideline presents a comprehensive description of the various factors, resources and activities needed to set

up the project. These are: criteria for selecting hatchery site; physical facilities required; how to culture the prawn's natural feeds, including the needed nutrients for stock culture of *Chaetoceros*, *Tetraselmis*, *Chlorella* and *Brachionus*; disinfection of spawners; spawning and hatching operations; rearing in larval culture tank; harvesting method; and pre-treatment and transportation. A cost and return analysis at different levels of hatchery capacity is presented. The guideline also illustrates the layout of the hatchery system and the designs for a sand filter for concentration of diatoms, 2-ton wooden tanks for the culture of *Brachionus* and algae.

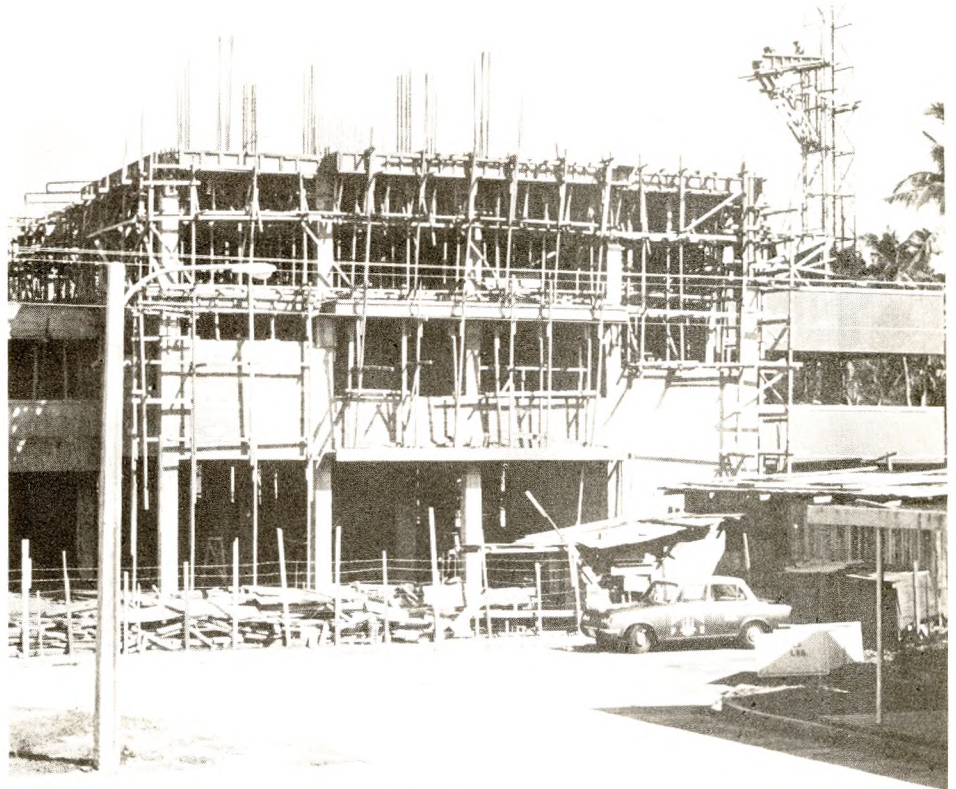
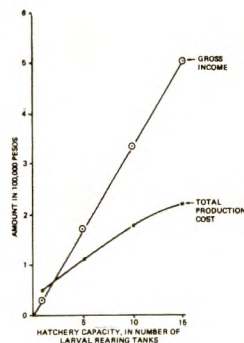
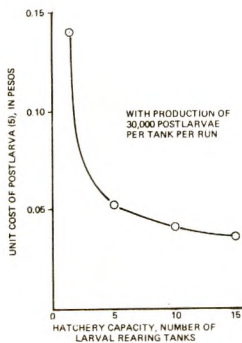
An important economic consideration of the small-scale hatchery is that there are 14 runs per year, each run lasting for 16-18 days. The economics of the project also indicate a stocking rate of 100,000 nauplii per rearing tank, a survival rate of 30 percent or a production of 30,000 postlarvae per tank, and a postlarvae selling price of ₱80.00 per thousand.

Platon said 3 operators have so far established a small-scale hatchery with a fourth one starting to build.

Site Criteria

The principal criteria for hatchery site selection include the following: sea water quality and quantity in which adequate volume of seawater is available and

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*Copies of the guideline may be requested from Mr. Rolando R. Platon, Aquaculture Department, SEAFDEC, P.O. Box 256, Iloilo City, Philippines.

This 4-storey research building will house the expanded reproductive physiology and nutrition laboratories of the SEAFDEC Aquaculture Department. With a total floor area of 7,067 sq m, it is expected to be finished by September, 1978 at an estimated cost of ₱14.8 M.

1. The location should be calm and protected from strong wind and current.

2. Tidal range should not be too large; best range should be around 1-2 meters allowing sufficient exchange of water through the cages

3. The dissolved oxygen content of the water of the site for cages should not be less than 3 cc/l.

4. Clear water is an advantage for cages as the nets will not be clogged by fouling organisms and silt particles.

5. For coastal aquaculture, water salinity should not be less than 15‰ for groupers, 25‰ for rabbitfishes, snappers and threadfins but a wider fluctuation of the salinity from 10‰ to 30‰ is suitable for the rearing of sea bass, *Lates calacifer*.

6. Site should be easily accessible for the transportation of feeds as well as for bringing the fish out to market.

7. Site should be as much as possible free from otters which are rather common around mining pools, rivers or coastal waters. Otters are known to tear nets with their strong teeth.

Suitable Fish for Culture

For floating fishpens, one should consider such factors as the hardiness of the fish, availability of fry in sufficient quantity, disease resistance, larval history, environmental requirements as well as other factors such as the acceptability of the cultured fish to the consumers and its market price.

Feeds

Carnivorous fishes take sliced trash fish readily when they are more than 10 cm in length. Smaller fishes or fry about 2-8 cm in length should be fed with small shrimps such as *Acetes* or mysids. For freshwater fishes such as the bighead and silver carp, no feeding is needed if the reservoir is rich in plankton. But for intensive stocking, supplementary feed such as rice bran is given. Experiments have so far revealed better conversion and growth rate when the estuary groupers are fed once in two days with sliced trash fish rather than intensive feedings. Results also indicated that good conversion rate, less mortality rate and even growth are ensured.

Feeds should be free from parasites. When trash fish is used as the main feed, ensure that they are fresh and properly cleaned. Pellet feed is considered to be

the best as parasites and germs are destroyed in the process of preparation.

Economic Aspects

For profitability, it is important to produce fishes which fetch higher market value and have ready market. Choice of site is important because a wise selection and efficient utilization of the environmental factors such as temperature, salinity, dissolved oxygen content and plankton productivity, contribute to the success and profitability of the venture.

Capital investment includes equipment for the preparation of feeds, deep freezer, building for storage and disease treatment, and boat. Operating costs generally include items such as cost of seeds, feeds, disease treatment, electricity, fuel, labor and rent.

Family Unit Floating Fishpens

With the decline of inshore catch, the floating fishpen system of culturing fish may help alleviate the situation by absorbing some of the fishermen into culture fishery.

A family of two can easily handle and operate four floating net-cages of size 28 x 18 x 5 feet, which can contain around 1000 fishes each. With grouper, the ratio of net income over capital cost is calculated to be 51.2 percent excluding labor cost. The net income of each fisherman per month is about M\$294.

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unaffected by inland discharges containing agricultural runoff or industrial wastes; proximity to the source of spawners; road accessibility; and availability of power source, fresh water, and technical personnel needed for hatchery management.

The best method to determine the suitability of seawater for larval rearing is to conduct preliminary tests using pails or small tanks on the probable site. The production of postlarvae with reasonable survival rate from eggs in a series of at least 3 runs would indicate likelihood of success in actual operation.

Facilities

Some of the facilities needed are a sand filter to rid the seawater or organ-

isms like fish and jellyfish, including silt and mud during heavy run-off, an air supply system with a compressor or blower that can deliver air at an effective pressure of 1.5 meters column of water, a 2-ton larval rearing tank which may be made of marine plywood, 1-ton shallow wooden tanks for algal culture, 1-ton cubic wooden tanks for *Brachionus* culture, and a roofed structure with walls to house the larval rearing tanks, the algal starters, and as a monitoring area.

Larval Rearing of Milkfish... from p. 4

trochophore larvae of oysters and six different types of artificial feeds.

More Trials

The milkfish research program is a continuing one and additional experiments are being done with the postlarvae such as salinity level, food preference and other parameters that could shed light on the development of the technology for successful mass rearing of fry which in turn would considerably help in the establishment of seed banks.

Economic Impact

This latest development is significant in terms of solving the problem of ensuring a steady and reliable supply of fry, a big drawback of the milkfish industry. Fishpond operators still rely on the seasonal supply of fry and thus cannot operate at an optimum level. This however does not mean the displacement of people who depend on the collection of fry for livelihood. The SEAFDEC milkfish experts assure that the extensive present and potential requirements of the milkfish industry can readily absorb all the fry that can be collected from coastal waters and those that may eventually be raised in seedbanks.

SEAFDEC's milkfish program — an integrated and continuing research thrust — has so far hurdled the following problems: domestication of spawners; inducing spawners while in captivity to ovulate through hormonal injection; artificial fertilization and hatching of eggs; and, with this latest advancement, possibly mass rearing of fry until these are ready for release and distribution.