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How about [snapper] hatchery production?

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How about hatchery production?

Hatchery production of John's snapper has been tried in Singapore. Larval rearing is conducted in 5-m^3 circular fiberglass tanks (1.4 m dia. x 0.8 m high). The eggs are stocked in the late embryo stage at densities of 20 000 - 25 000/m^3.

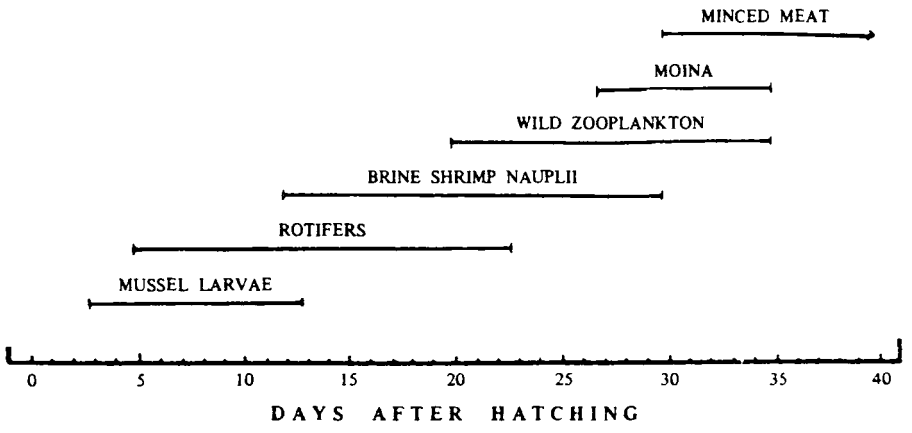
The larvae hatch within 1-2 h after egg transfer. Newly hatched larvae (day 0) have uniform size of 1.6-1.7 mm TL (total length). Each larva carries an elongated yolk sac with a single oil globule. On day 1, the yolk is partially absorbed and only the posterior half is left. On day 2, the yolk sac is greatly reduced, and by day 3, only a small oil globule is present. Pigmentation of eyes starts on day 1 and both eyes are fully pigmented by day 3. The mouth of the larvae is open by day 3 (2.87 mm TL) and at this time, the larvae are ready to begin feeding.

The feeding regime is shown below. The larvae are fed green mussel larvae, rotifers, brine shrimp nauplii, wild zooplankton, moina, minced mussel, trashfish, and *Acetes* over the 40-day rearing period.

The water quality in the rearing tanks is maintained through partial exchange of fresh seawater from day 1-8 and continuous flow of seawater from day 9 onwards till metamorphosis. The flow rate is 4 l/min (or 1.4 changes/day) on day 9 and it is gradually stepped up to 30 l/min (10.8 changes/day) on day 30. Seawater used for rearing is first sandfiltered. Water is discharged through a 0.30 mm mesh bag (24 cm dia. x 1.2 m long). Uneaten food, dead larvae, and debris on the tank bottom are siphoned out daily.

Chlorella (green water) is added every morning to maintain a cell density of 2.5-5.0 x 10^5 cells/ml. Water temperature of the rearing water ranges 27-29°C, salinity 28-30 ppt, dissolved oxygen 6.6-8 mg/l, pH 7.85-8.17, and ammonia-nitrogen < 0.10 mg/l.

The mean larval survival of John's snapper from hatching to the stage of metamorphosis is 1%, with best result at 5%. There are two critical periods during the 35-day larval rearing cycle. The first critical period occurs at day 4-7. Total mortality at this stage is common among larvae from artificial spawning, probably due to the difficulty of synchronizing oocyte development with stripping. Although larval survival is improved in spontaneous spawning, mortality at day 4-7 is still high, usually more than 80%. About 60-70% of the snapper larvae can feed on mussel larvae during this period but still appear starved. Mussel larvae alone may be nutritionally inadequate for the growth and survival of the larvae during this period. The second critical period occurs at day 18-28. During this period, many larvae die after dashing about. They float lopsided at the water surface, swim erratically in semi-circles, and then sink slowly with heads down. Some of the dead larvae have deflated swimbladders, a phenomenon usually associated with deficiency of essential fatty acids in the food for marine fish larvae. Other larvae may be unable to cope



Feeding regime of John's snapper larvae.

with morphological and physiological changes before metamorphosis. Cannibalism also occurs among different-sized larvae and this contributes to the larval mortality after day 25.

The trials reported here demonstrates that the John's snapper can be reared in the hatchery. The limited success in larval rearing indicates that further research is required before mass production of fry can be realized.

Recommendations

Major research efforts in the hatchery of John's snapper will be directed at the improvement of egg quality through broodstock diets, and the provision of more suitable food for the early larvae, including the improvement of the nutritional quality of the various live food used at different stages of larval rearing.

Source: L.C. Lim, L. Cheong, H.B. Lee, and H.H. Heng. 1985. *Induced breeding studies of the John's snapper, Lutjanus johni (Bloch), in Singapore.* **Singapore J. Pri. Ind.** 13 (2): 70-83.

Postscript

The research done on snappers attest to their cultivability. To summarize (with reference to p. 1):

economic importance: positive (+)
growth rate: +
breeding in captivity: +
hatchery and growout: +
feeding: +

However, a great deal of research still needs to be done to verify and fine-tune the techniques so far reported.

At SEAFDEC Aquaculture Department, the snappers are one of the priority species for research for 1992-1994. Studies will be on inventory and taxonomy; identification of suitable species for culture; development of rearing techniques for hatchery, nursery, and growout; broodstock development; feed development; and fish health control. The Department has already made progress in inventory and taxonomy as well as in breeding techniques (see p. 4 and 9, this issue).

Notes on snappers

Declining catch

The development of the Caribbean red snapper (*Lutjanus purpureus*) fishery during 1967-1987 was studied. Results showed that this fishery has three phases of population change: the first is of increasing catch averaging 3,178 t (1967-1973), the second is a stabilization period with catch averaging 5,964 t (1974-1981), and the third is declining catch averaging 4,601 t (1982-1987). The optimum fishing effort which produced the maximum sustainable yield of 5,937 t was estimated in 2,074 x 10^3 hook day. Some regulatory measures for this fishery, such as reducing the fishing effort by 27.6% down to its optimum value and increase of the hook size for protecting the juveniles, are recommended. (Source: Correa Ivo CT and MJ Batista de Sousa. 1988. Synopsis of data on the Caribbean red snapper, *Lutjanus purpureus* Poey, off north and northeastern Brazil. Arq. Cienc. Mar. 27:57-67.)

Red snapper fishing limited

The federal authority that oversees fishing in the Gulf of Mexico lowered the number of red snapper *(Lutjanus campechanus)* that commercial and sport fishermen may catch in 1991, reports the *San Antonio Light;* however, there were no efforts made to regulate the shrimpers. What red snapper sport fishermen may take was lowered from seven to six per person, per day. The commercial quota was dropped to 2.5 million pounds. (Source: *Tropical Fish Hobbyist* 39 (4), Dec. 1990.)