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Siganid culture in floating cages

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Why not try this?

Siganid culture in floating cages

(As a preliminary guide for fish farmers on the culture of siganids in sea cages the following techniques were lifted from the Manual for Culturing Siganids in Floating Cages prepared by E. Carumbana and J. Luchavez, Marine Laboratory, Silliman University, 1979).

The scarcity of siganid in the market reflects the need for wise resource management and improved fishery. The culture of siganid can augment the market demand thus fishing pressure is decreased.

Siganid culture can be done in sea cages. The size of the cage may be big or small, depending upon how much money the fish farmer can afford for this project.

Materials needed for sea construction

A sea cage measuring 4 x 3 x 3 cm can be constructed using the following materials:

3 bamboo poles
4 m nylon fish net (5 mm mesh)
1/4 kg nylon cord (no. 100)
1/4 kg nylon cord (no. 15)
1/4 roll nylon rope (no. 12)
1 bag cement
20 m rubber line (cut from old tires)
Labor expenses for 5 days

The cage should be anchored firmly to the bottom with bamboo framing as its float. The opening at the center on the upper side of the cage should be kept closed, except when feeding the fish. At least two sea cages will be needed for a ten-month rearing period.

The sea cages should be placed in an area that is protected from strong wave action and where the water is at least three meters deep during the lowest tide, preferrably land-locked bays, lagoons, and sheltered coves. The water should not be warm (it may vary from 28° to 32°C but should never be higher than 36°C) and salinity should s be 30-34 ppt or lower. It has been found that this fish can grow faster at 5-17 ppt. To ensure healthy growth of the fish, the selected site should be free of excessive wastes of any human activity.

Fry Collection

Siganid fry may be collected from mangrove swamps or sea grass communities at night when the tide is low. A small dip net or "sikpao", constructed of soft netting material (so that the fish are not injured), may be used to scoop the fry, after which they are placed in a big, fine basket submerged in water. During transport, they should be placed in large plastic bags filled with air. Care must be taken in collecting and transporting the fry.The fish should be handled gently, for excessive disturbance may make them susceptible to disease.

Stocking the fry

The fry may be stocked directly from the collecting site into the sea cage, or they may be placed first in large holding tanks with fresh, clean sea water at room temperature for about one week. With siganid fry measuring 62 mm from the snout to the base of the tail, the initial stocking rate in one sea cage (4x3x3 m) should be 1000. After three months, half of the siganids may be transferred to another sea cage. The fish may then be kept until ten months from the original date of stocking. The bigger individuals may be harvested at periodic intervals.

Feeding

Siganids are primarily plant eaters; they feed on green filamentous algae, or "lumot", (and possibly the small animals trapped in the lumot). They also readily feed on leaves of terrestrial plants, particularly malunggay (horseradish), kangkong (water spinach), camote (sweet potato) leaves, and also boiled squash. These vegetables are good sources of vitamins and minerals which can contribute to the healthy growth of the fish inside the cage.

The siganids should be fed every day. About 4-5 kg of green algae will be enough to feed 1000 juveniles in one sea cage. After

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Diseases and parasites of siganids

(From the lecture notes for Fish Hatchery Training Course by Dr. T. Bagarinao)

Captive siganids sometimes develop exopthalmia, cataracts, abnormal coloration, bloated abdomens, body lesions and fin rot that lead to mortality. *S. argenteus* juveniles developed exopthalmia in supersaturated (11%) water with 6.7 ppm oxygen at 33 °C. Cataracts can be due to Vit. B deficiency. Pathogenic bacteria are responsible for some cases of mortality among siganids. Mass mortality of cage-cultured *S. canaliculatus* occurred in northeast Singapore due to a Gram-positive bacterium similar to *Streptococcus faecium*. The fish changed body color, moved sluggishly, and later became blind. They exhibited violent movements, convulsion and seizure just before death. Another bacterium *Pseudomonas purrefaciens* also caused a disease outbreak among the *S. rivulatus* stock in the Saudi Arabian mariculture facility in the Red Sea. Chief clinical signs of the disease were discoloration, exopthalmia, hemorrhagic necrosis on the body and mouth, and frayed fins.

There are 35 reported species of parasites in *S. argentus*, *S. luridus*, and *S. rivulatus* in the Red Sea. Of these, the myxosporean *Ceratomyxa* and *Zschokkella* produced acute desquamation of gallbladder epithelium and chronic congestion and distention of the hepatic biliary canaliculi, while the larval nematode *Hysterothylacium* caused massive necrosis and fibrosis of the liver. The acanthocephalan worm *Scherocollum* also parasitizes these three siganid species, specially during extensive grazing prior to spawning of the fish. Sporozoans also cause nodular enlargement of the liver in *S. rivulatus*.

Parasitic monogenean trematodes found in siganids have caused tissue ischemia in *S. canaliculatus* and heavy mucus secretion in gills followed by suffocation among *S. spinus*. Infestation of the gills by a microsporidian also leads to death in *S. canaliculatus*. At SEAFDEC/AQD, *S. guttatus* broodstock are sometimes infested with nematodes that cause the fish to feed poorly, as well as with the ectoparasitic copepod *Caligus epidemicus*.

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three months, the same amount of food should be given to the fish in each of the two sea cages.

Cleaning the sea cage

In order to promote growth and feeding efficiency, the sea cage must be cleaned at least three times a week. Fouling organisms growing on the cage nets may be removed by using a nylon brush or an inexpensive broom. Excess food and fecal matter may be removed by scooping them out through the cage opening. The cleaner should inspect for holes around the cage walls to prevent the fish from escaping.

Harvesting

The siganids may be harvested selectively. After 5-6 months, the big fish may be harvested, leaving the small ones to grow further. Marketable sizes of siganid range from 200 to 300 g in weight. Subsequently, selective harvesting may be done every two-months.

Economics of siganid mariculture

Studies showed that fry weighing 4.55 g grow to an average weight of 52.06 g after four months. The total fish yield will be 46.85 kg if the stocking rate in the two sea cages is 1000, assuming a mortality rate of 10%. The fishfarmer will have a minimal profit after four months but if he allows the fish to grow to a bigger size and harvest selectively, more profit may be expected after ten months The sea cages can be used for 4-5 ten-month rearing periods, if the bamboo floats and nylon cords are replaced every two years. The fishermen can therefore realize more profits after the first rearing period.