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# Siganid farming in the Philippines and other part of the world

Aquaculture Department, Southeast Asian Fisheries Development Center

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# Siganid farming in the Philippines and other parts of the world

## Philippines

In the Philippines, certain species of siganids are either monocultured or poly-cultured with milkfish. These fishes are algal feeders, hence, there is no problem if they are cultured in milkfish ponds. Sigánids, however, cannot tolerate low salinities and high temperatures so ponds should be close to the seawater source. If sigánids are farmed alone, the water level in the ponds is maintained over 50 to 70 cm or if they are farmed with milkfish, the ponds are deepened in certain parts for the sigánids to retreat into during the hotter time of the day.

The general principles employed in sigánid farming are similar to those used in milkfish farming. The layout of the ponds, type of food grown, stocking rates, and rearing periods in the various ponds are similar.

Siganid fry are often captured in the various devices used to collect milkfish fry. However, two special methods are used in the Pangasinan Region (Luzon): using green filamentous algae as lures and using a scare line. Bundles of green filamentous algae are suspended in the water from stakes in tidal rivers and estuaries where the fry are likely to occur. The fry that are lured by this food are periodically collected with a scoop net which is taken gently under the bundles of algae. The other method uses a scare line and a fine-meshed net. A scare line with several strips of white palm leaves strung on it is dragged along stretches of water likely to contain sigánid fry, driving the latter into a large fine-meshed net. A fine-meshed scoop net is used for collecting the fry.

As sigánid fry are very sensitive, they are not taken out of the water. If the transport period is short, they are placed in fine-meshed bamboo or cane baskets suspended in water and gently towed along the tidal river or water supply channel leading to the ponds. A small bundle of green filamentous algae is suspended in the water within the basket to serve as food and to keep the fry interested in it

while they are being towed along. The passage of water through the meshwork of the basket helps to keep the fry supplied with well aerated water. The fry should be gradually acclimatized to the pond water.

Siganid fry are also transported in the earthenware pots used for transporting milkfish fry. However, only about 150 to 300 fry are generally placed in each pot. A small bundle of green filamentous algae is suspended in the water within the pot to serve as food. Care is taken to keep the pots containing sigánid fry in a cool place.

If sigánids are farmed alone, the stocking rates are the same as for milkfish. If farmed with milkfish, suitable adjustments are made in the number of both species to maintain optimum stocking rates for the conditions prevailing in the ponds.

The sigánids attain marketable size within five to seven months. If they are farmed with milkfish, both can be harvested by draining the ponds. However, cast nets are often used to harvest the sigánids separately.

Source: Pillai GT.1962. Sigánid Fish farming /in: Fish Farming Method in the Philippines, Indonesia and Hongkong. Rome, Fisheries Division, Biology Branch, Food and Agriculture Organization of the United Nations. pp. 51-52.



*A traditional method of collecting sigánid fry.*

## Tanzania

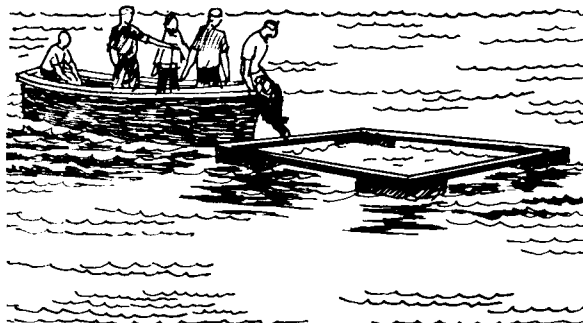
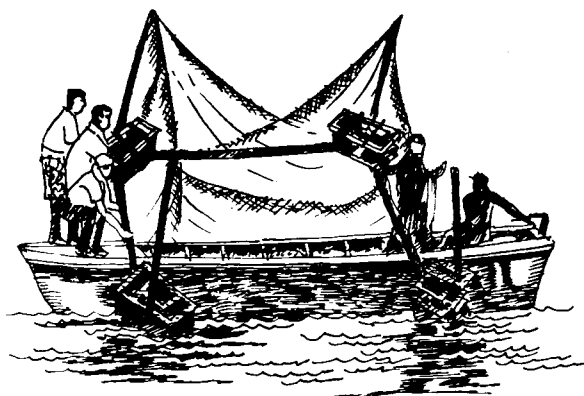
Tanzania has vast areas of aquatic resources but there are shortages of fish for local consumption.

The inland waters give the bulk of the average annual fish production than fishing in the sea. Fish production, however, has steadily gone down because of uncontrolled fishing techniques.

Although several ponds and lakes are productive, the influx of fishermen and intensification of fishing activities resulted the decline of fish production. Thus, to augment fish yield and meet the increasing demands of

Seining for fry usually involves three to five workers. The fry are beach seined, sorted out by hand, and kept in plastic buckets. The bucket is then transferred to a waiting boat and the fry are stocked in the cages. In areas with good algal growth, one seine haul yields between 100 and 400 fry (when seining is done during low tides). It takes two or three days to stock one cage with 1000 fish.

Before fry are stocked, a sub-sample of 30-50 fish is taken and preserved for length and weight measurements to get the average size and weight of fish in the rearing cages. The size and weight measurements are then



*The cage being lowered into the water.*

the people, mariculture of the rabbitfish was initiated in 1978.

Studies showed that the fish breeds throughout the year with peaks occurring between November and March/April. They are herbivorous, feeding mainly on blue green and calcareous algae. This fish also consumes a number of zooplankton species to supplement its plant food.

There are at least six distinct species of *Siganus* in the area: *S. canaliculatus* (= *S. oramin*), *S. sutor*, *S. luridus*, *S. corallinus*, *S. stellatus*; *S. rivulatus* and *S. argentus*. Of these species, *S. oramin* appears to be dominant.

Fry are plentiful immediately after the peak breeding season and usually found in the grassbed and weedy areas.

taken monthly to study the growth of the fish. The average weight of the specimens enables workers to determine the amount of food to be supplied to each cage (about 5% of total weight of food is supplied every day). The amount of food is increased weekly corresponding to the growth rate and checked monthly.

A wooden frame 3 x 3 cm is joined at the edges by means of brass screws (brass is preferred because of its rust resistance.) A hole (2-cm diameter) is made at each corner of a rectangular frame. A galvanized pipe of about 2 cm diameter and 183 cm long is inserted into the hole so that it is about 180 cm suspended in the water. Two plastic floats are

*to page 8*

## ***Fiji***

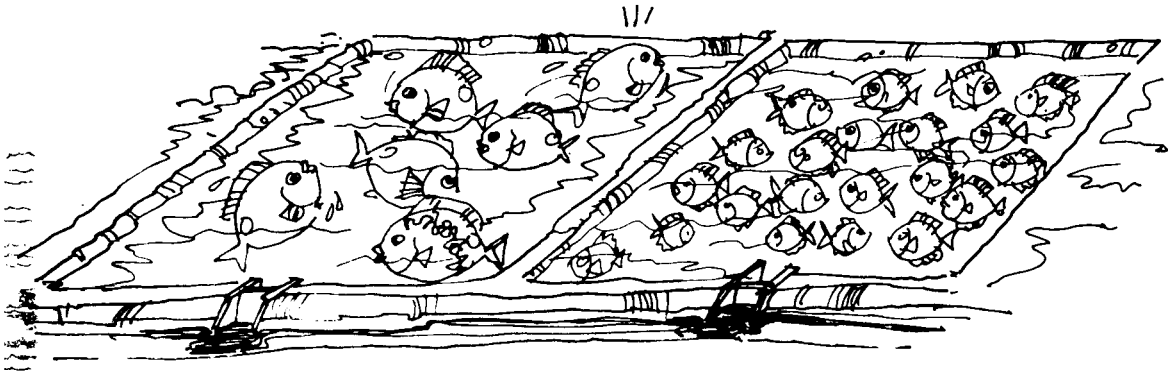
Two 1/2-acre (1.25 hectares) ponds were stocked with rabbitfish (*Siganus vermiculatus*) of varying sizes. The fish (average weight : 70 g) were stocked at 296 and 140 individuals per acre in ponds 1 and 2, respectively. The rabbitfish were grown together with 1600 fingerlings of milkfish and mullets (*Mugil* and *Liza* spp.) in each pond.

Both ponds were initially treated with 10 kg urea, 50 kg superphosphate and 70 kg of

chicken manure. Additional amounts of 20 kg of chicken manure were added after 50 and 100 days.

Within 130 days the rabbitfish reached an average weight of 137 g in pond 1 and 190 g in pond 2.

Source: Lichatowich T and D Popper. Report on the growth of rabbitfish in fishponds in Fiji . *Aquaculture*, 5(1975)212-212.



**"See? Overpopulation could stunt your growth."**

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from page 7.....

enclosed in a small cage and are fixed at the corners of the frame so that about 30 cm of the cage is above the water surface to ensure that the fish could not escape when the sea is rough. A synthetic fiber net is fixed on the cage with all the corners tied to the galvanized pipe with a rope (10 mm) threaded into the pipe from the lower end into the wooden frame where it is tied. The cage is used after the edges of the net are fastened to the wooden frame and then to the bamboo rafts.

The cages are usually set during high tide to allow enough anchor rope length. Rafts keep the cages firmly anchored close to one another and provide a stage for feeding and observing the fish.

Fish like any other living organism needs adequate food to carry out all meta-

bolic processes. Starvation retards growth of fish while over-feeding aside from being wasteful, fouls the habitat. Food fed to the fish was calculated from the estimated weight of the fish at the time of stocking. Conditioning the fish of its "feeding time" daily minimizes wastage of food as very every fish is active at such times and consumes as much food as possible.

When fish reaches marketable size (20 cm), they are scooped out of the net into a bucket. The net is loosened and lifted at one end so the fish are concentrated at the opposite end.

Source: Bwanthondi, POJ. *The Culture of Rabbitfish Siganus spp in Tanzania*, University of Dar es Salaam Institute of Marine Sciences, Box 668, Zanzibar, Tanzania. 1981. 35 p.

## Middle East

Valued in Saudi Arabian markets, siganids demand a very high price because suitable areas for sea cage culture are not common. However, shallow confined lagoons with limited water exchange attract substantial seasonal schools of siganid fry.

In 1982, a series of improvised 10-m sea cages made of wooden beams were anchored in Sharm Al-Galawa, 55 km north of Jeddah. A box-shaped net with mesh size of 2.0 cm knotless nylon was hung to eight 170-l drums which were used as float.

*Siganus rivulatus* fry (3 g average) captured from local sharms (lagoons) were stocked into five cages at 20, 30, 40, 50, and 60 individuals per m<sup>2</sup>. One month later another three cages were stocked with *S. rivulatus* fry (3 g average) and a week after with sea bream (*Crenibus crenibus*, 20 g average) at 10, 20, and 30 individuals per m<sup>2</sup>, respectively, in the same three cages. All caged fish were fed a moistened mixture of soya meal (53%), fish meal (14%), maize (15%), and vitamin-mineral premix (3%) which was allowed to harden in plastic feed trays before suspending in the cages. Feed was given approximately 8% of cage biomass per day.

The siganid adapted well to the cages and quickly learned to feed from the trays.

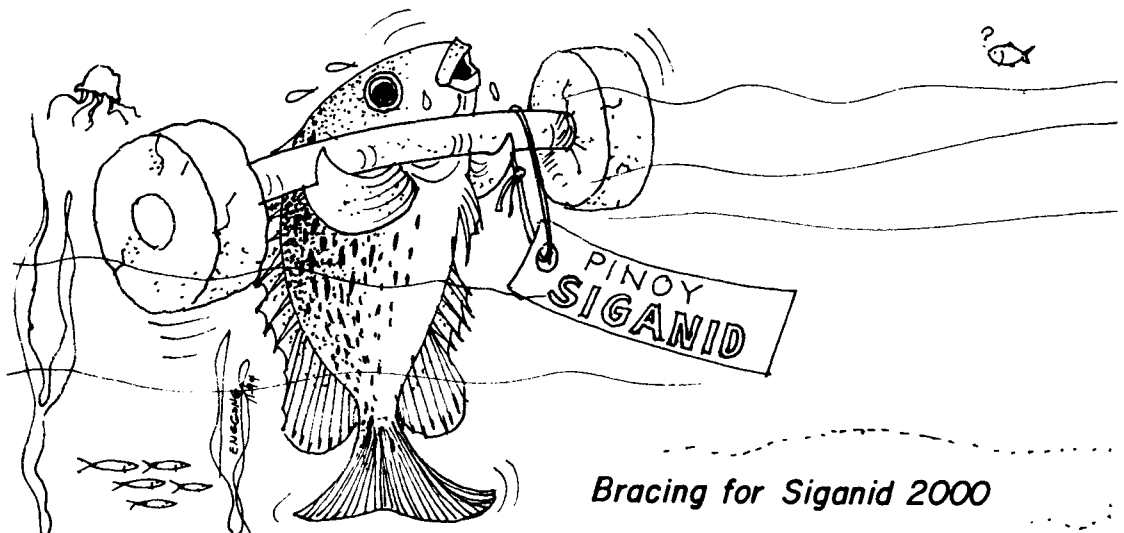
During the first 2 months the larger sea bream competed vigorously with the smaller siganids for space near the feeding tray. Competition around the trays reversed in later months with the larger siganids dominating the trays.

The caged fish showed no signs of stress at high ambient temperatures. Some occasional nipping was observed in the high density monoculture cage. Feeding decreased by approximately 14% at lower temperatures.

In 150 days, the sea bream grew to 45 ± 3 g. The siganids grew to marketable size, 102 ± 6g in the monoculture as well as polyculture cages. Result suggested that density was not limiting growth even at 60 individuals per cubic meter. Although the sea bream could not assert competitive pressure throughout the trials, it is significant that initial competition did not inhibit growth of *S. rivulatus* in the polyculture trials.

Growth of *S. rivulatus* in cages in the sharms at low stocking densities, exceeded that experienced in the Gulf of Aquaba. This in addition to siganid's good market value in Saudi Arabia, justifies the work with cage grow-out system using high stocking densities and intense management techniques to determine its economic viability for producing marketable fish.

Source: Lichatowich T. et al. Growth of *Siganus rivulatus* reared in sea cages in the Red Sea. *Aquaculture*, 40(1984)



*Bracing for Siganid 2000*