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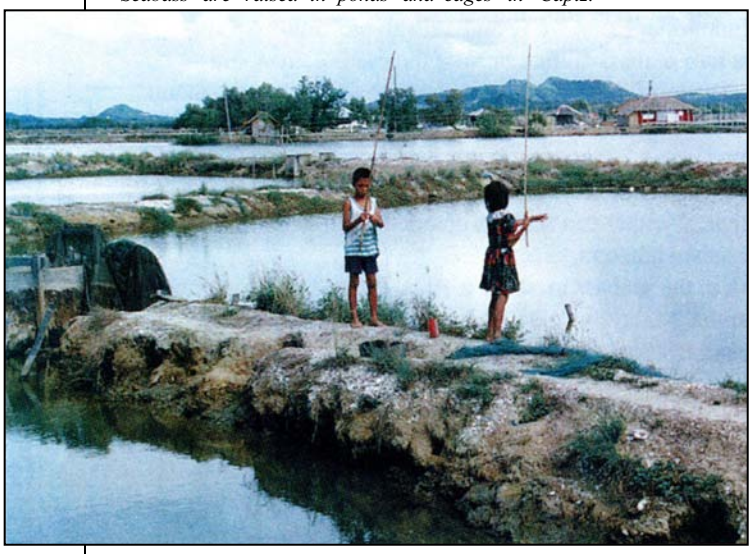
The culture of seabass

By **ET Aldon** PHOTOS **R Buendia**

Seabass are raised in ponds and cages in Southeast Asia. The development of artificial propagation and hatchery techniques contributed to the large-scale development of seabass culture. The report of Baldia and Vasudevan in 1996 showed that culture of this high-value species gave a 74% return-on-investment and 1.4 years payback period for hatchery and cage grow-out.

Seabass culture is done in two phases: **nursery and grow-out.**

Seabass are raised in ponds and cages in Capiz.



NURSERY

Seabass fry are raised in the nursery (1.0-2.5 cm until 8-10 cm) in either ponds or cages. This minimizes competition for space and food, thus controlling cannibalism. The use of tanks, though common, is not recommended because excess feeds can accumulate on the bottom and bacterial disease can become a problem. But this problem can be minimized with proper and frequent water change. Handling of stock during sorting is easier done in tanks than in ponds or cages.

If stocked directly in grow-out ponds, seabass may be difficult to size-grade. Regular sorting of fry is best done during the nursery phase.

POND NURSERY

Kungvankij recommends pond size ranging from 500 to 2000 m^2 with water depth of 50-80 cm. Ponds must have separate inlet and outlet gates for water exchange and a flat bottom that slopes towards the drainage gate. A 1-mm size screen net is installed in gates to prevent predators and competitors from getting into the pond.

Stocking density in pond nursery is 20-50 fry per m^2 for fry size of 1.0-2.5 cm.

Standard pond preparation and management techniques are followed. Fry are acclimatized to pond salinity and temperature before these are stocked in early morning or early evening.

About 30% of water is changed daily to prevent deterioration of water due to uneaten food or excess growth of natural food.

CAGE NURSERY

The rectangular net cage attached to wooden frames is either kept afloat by styrofoam, plastic or metal drum, or fastened (stationary) to a bamboo or wooden pole at each cor-

ner. The cage size varies from 3 × 1 × 1 m to 5 × 2 × 1 m with net mesh of 1.0 mm. The cages may be installed in the river, coastal area or in a pond. Sites should be free from biofoulers and strong currents. Cages should be checked regularly of leaks and clogs. Water exchange is by natural wave action.

Stocking density is 80-100 fry per m^2. After 30-45 days or until fingerling stage (5-10 cm), the fry are graded into different size groups before they are transferred to grow-out ponds or cages. This, Kungvankij noted, gives better growth and survival than those stocked directly into grow-out ponds and cages. Parazo (1991) suggested that stocking density be regulated to minimize cannibalism. This is supported by Victor Billanes of Capiz Institute of Technology who claimed that he did not encounter cannibalism in his stock of 400 seabass in the school's experimental pond (1,000 m^2). He said he feeds the seabass twice a day with trash fish. AQD researcher Fermin, however, reported that occurrence of shooters is neither a result of the differences in stocking density nor the lack of supplemental feeds.

A cage nursery in Oton, Iloilo

GROW-OUT

The grow-out phase involves rearing seabass from juvenile to marketable size (300-400 g). Culture period varies from 3-4 months.

CAGE CULTURE

Kungvankij recommends these criteria for site selection:

- protected bays, lagoons, sheltered coves or inland sea
- an area where influence of tidal fluctuation is not pronounced. (Avoid installing cages where the current velocity is strong.)
- an area where salinity ranges from 13-30 ppt
- far from biofoulers; sources of domestic, industrial and agricultural pollution; and other environmental hazards

Design

Square and rectangular cages with sizes from 20 to 100 m^2 are preferable for easy management and maintenance. Cages are made of polyethylene netting with mesh size ranging from 2-8 cm depending on fish size. There are two types of cages used in seabass culture:

Floating cage. The net cage is attached to a wooden, GI pipe or bamboo frames and is kept afloat by plastic, styrofoam drum or bamboo floaters. Concrete weights attach or anchor the corners of the netcage to the bottom. The most manageable size is 50 m^3 (5 x 5 x 2 m); nets of this size are easy to change once clogged with fouling organisms.

Stationary cage. The cage is fastened to the bamboo or wooden poles installed at its four corners. Stationary cages are usually installed in shallow bays.

Stocking density in cages is usually between 40-50 fish per m^2. This is reduced to 10-20 fish per m^2 after 2-3 months, when the fish attain 150-200 g in weight. Farmers must provide spare cages for easy grading of stock.

Cages are checked regularly of clogs and leaks. Damaged net should be cleaned, repaired or replaced since clogging could reduce water exchange. Low oxygen and accumulation of wastes may stress the seabass and likewise affect its feeding and growth.

Feeds and feeding

Feeding of trash fish is done twice daily (morning and afternoon) at a rate of 10% of total biomass in the first two months of culture. Fish are fed to satiation. The artificial feed which AQD has formulated still needs to be verified in large-scale cages and ponds. Also, its economic profitability has yet to be established. The formulation is shown on page 23.

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POND CULTURE

There are two culture systems employed in pond culture of seabass. *Monoculture* is a culture system where a single species of fish is produced. *Polyculture* is the system where two or more fish species are produced. Forage fish like tilapia are combined with the main species - like seabass - in the pond. They feed on natural food and will not compete with the main species for food. Forage fish should also continuously and sufficiently sustain the growth of seabass throughout the culture period.

Kungvankij recommends that seabass ponds, whether for mono- or polyculture, be situated in suitable sites. The parameters normally considered as suitable water supply are:

pH	7.5-8.5
dissolved oxygen	4-9 ppm
salinity	10-30 ppt
temperature	26-32°C
NH_3 (ammonia)	< 1 ppm
H_2S (hydrogen sulfide)	< 0.3 ppm
turbidity	< 10 ppm

Seabass farms should also have moderate tide fluctuation of 2-3 meters for complete draining during low tide and tidal entry during spring tide. The soil should have enough clay content to hold water. Acid sulphate soil should be avoided.

Other considerations are accessibility of site to transportation and communication, availability of seed, labor, technical assistance, market demand and social condition.

Seabass ponds are generally rectangular with size ranging from 2,000 m^2 to 2 ha and depth of 1.2-1.5 m. Pond bottom is entirely flat but slopes toward the drainage gate.

Pond preparation is similar to other monoculture systems. In polyculture system, however, organic fertilizer (chicken manure) is applied at the rate of 1 ton per ha alter the pond acidity is neutralized. Then water depth is gradually increased to grow natural food.

Seabass juveniles (8-10 cm) from the nursery are stocked in grow-out ponds at a rate of 10,000-20,000 per ha in monoculture and 3,000-5,000 per ha in polyculture. Prior to stocking, juveniles are acclimatized to pond water temperature and salinity. Stocking in uniform sizes is done at cooler times of the day.

In monoculture (where supplementary feed is given daily and excess feeds may pollute the water), daily water replenishment is necessary. In polyculture, a 50% water replenishment can be done once in three days; this is enough to maintain natural food in ponds.

Seabass and red snapper are reared in a farm in Oton, Iloilo.

In monoculture, the same feeding regime as in floating cage is applied. In polyculture, supplementary feeding is not required as the seabass feed on forage fish in the pond. Polyculture can hence reduce the farmers' dependence on trashfish. Several reports suggest the viability of seabass polyculture with other species.

Seabass with milkfish and tilapia

Jessie Banno (1984) studied the culture of seabass combined with milkfish and tilapia in brackishwater ponds. He noted the best stocking density as follows: 5,000 seabass + 1,500 milkfish + 4,000 tilapia per ha. The size range for sea bass should be uniform: 10-20 g, 20-30g, or 30-50 g. Banno noted that culture should not be more than three months because growth rates of milkfish and seabass are affected adversely by wild tilapia spawnings.

Seabass with groupers

Alcantara et al. (1995) reared seabass with the groupers *Cromileptis* and *Epinephelus* in 2.5 x 2.5 x 1.5 m cage for five months at Tiniguiban Cove, Pto. Princesa, Palawan. Trashfish required during culture was supplied by the catch of the lift net installed at one side of the cage. The lift net is operated twice daily. Trashfish were given twice daily chopped or whole depending on size. The growth of seabass is faster (4.0 g per day) than *Epinephelus* (2.3 g per day) or *Cromileptis* (1.59 g per day). Seabass fry were ☞

first reared in nursery ponds and grown as juveniles before stocking in cages.

Seabass with seaweed

AQD scientist Anicia Hurtado-Ponce noted the possibility of seaweed — *Kappaphycus alvarezii* var. *tambalang* — polyculture with carnivorous fishes or molluscs in cages.

Seabass are fed trashfish twice a day. A 1 kg seabass can be harvested after 8 months of culture. Pudadera harvests seabass according to the size and volume requirement of his clients. The farm supplies restaurants in Iloilo City with live seabass.

Grouper and tiger shrimp, both high-value species, may be cultured with seabass.

Individual cuttings of seaweed (150-200 g wet weight) were tied to a 3-m nylon monofilament cord and to two ends of a bamboo frame (3 × 3 m). The bamboo frame was installed inside a 4 × 4 m floating cage of seabass broodstock. Seabass-seaweed culture can make belter use of marine resources, reduce impact of intensive aquaculture, minimize grazing and maximize production.

Seabass with tilapia

Dr. Romeo Fortes and Jerome Genodepa of the University of the Philippines - Visayas studied the potential of seabass as predator on young tilapia and determined the most effective seabass- tilapia combination. A 1:5 seabass-tilapia ratio is suggested. Tilapia are first allowed to grow in the ponds before seabass are stocked.

Seabass with snapper, grouper, shrimp

Florito Pudadera, a farm technician in the Robles Farm in Oton, Iloilo, reported a 90% survival of seabass cultured with red snapper, grouper and tiger shrimp in brackishwater ponds. (Pudadera stocks 500 seabass + 2,000 grouper + 500 red snapper + 600 shrimp in a 0.5 ha pond.) Wild fry are first stocked in tanks and fed with copepods. Survival rate in tanks is about 50%. The fry are next transferred to hapa netcages (survival is 75%) then to grow-out ponds when they are around 12 cm in length.

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