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AQD's breeding-hatchery techniques

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AQD's breeding-hatchery techniques

By **M Castaños** PHOTOS **R Buendia**

It took a lot of experiments before AQD researchers settled on a standardized method to spawn seabass and to develop a method of rearing seabass fry in the hatchery. In all, nearly 40 papers were published out of these experiments (some are on the reference list, pages 21-22) since AQD started working on seabass in the early 80s.

1 TO SPAWN SEABASS IS EASY

Inject wild spawners (weighing 2-8 kg each) with a fresh solution of LHRHa (the luteinizing hormone releasing hormone analogue available from drug companies). The dose is 20-100 (μg of LHRHa per kg of seabass body weight.

An alternative to direct injection is implantation of pelleted hormone but this needs more preparation.

There are certain caveats to the above technique that AQD researchers urge fishfarmers to take note:

(1) that the seabass spawner be in good condition - without wounds, disease-free, body parts intact, strong and active upon capture;

(2) that the farmers be familiar with preparing fresh hormone solutions. This only needs simple calculation based on the amount of LHRHa packed commercially by the manufacturer. The LHRHa is usually in powder form and needs to be dissolved in salt solution. Farmers can easily follow the manufacturer's instructions.

(3) that the farmers maintain a 1:2 sex ratio (female:male) in the spawning tank or cages after hormone injection. Seabass will spawn on the second night.

(4) that the female spawners have eggs averaging at least 0.40 mm in diameter; the male spawner should give out a milky white substance (this is the milt) when its abdomen is gently massaged in a head-to-tail direction. Otherwise, farmers should wait until the gonads of sexually immature adults ripen. Breeders, researchers say, may also be obtained after 3-5 years from fry or juveniles reared in cages, tanks or ponds.

AQD researcher Joebert Toledo has reported that seabass spawn spontaneously between 0.4 to 60 million eggs in a month (this is total from 13 females paired with 28 males in a netcage). These spawners are part of the wild juveniles reared by AQD since 1982.

Toledo noted that spawning appears to be related to the phases of the moon. It took place within 4 days before or after the first quarter moon, or 3-5 days before or after the last quarter moon. Spawning time is between 5 pm to 1 am.

Seabass are what researchers call multiple spawners. Each fish spawns 2-3 times consecutively. AQD scientist Luis Ma. Garcia has found that the number of spawnings can depend on the amount of LHRHa given to seabass.

AQD researchers have also tried to lengthen the spawning days of seabass, increase the number of multiple spawnings, induce the seabass to spawn outside its breeding season, or work on alternative spawning agents like hCG (human chorionic gonadotropin) and 17-α methyltestosterone. But all these are issues of increased production of eggs out of the breeders available to fishfarmers.

The more critical problem is brought by the seabass itself. Seabass are protandrous hermaphrodites — they first mature as males then invert to being female (see page 19). The implication is that we might be getting less and less males for artificial propagation. Seabass males need to be replaced at some point.

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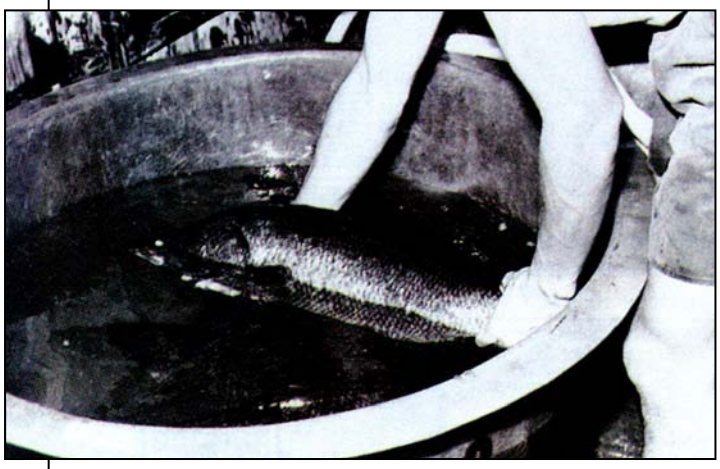
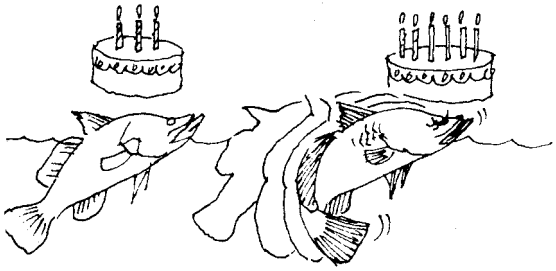
***EASY DOES IT**. seabass are induced to spawn by AQD researchers at the Igang Marine Substation in Guimaras, Iloilo. Top to bottom: seabass under anaesthesia are injected with the hormone LHRHa, allowed to recover in a holding tank, then left in peace to spawn; a beakerful of eggs.*



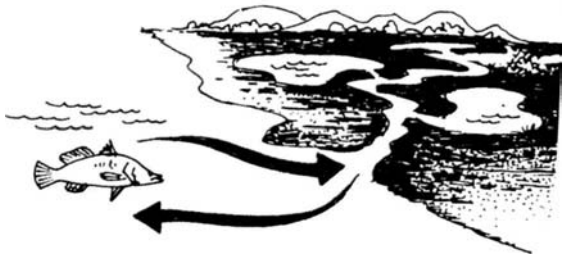
Who, me?

INTERESTING FACTS ABOUT SEABASS

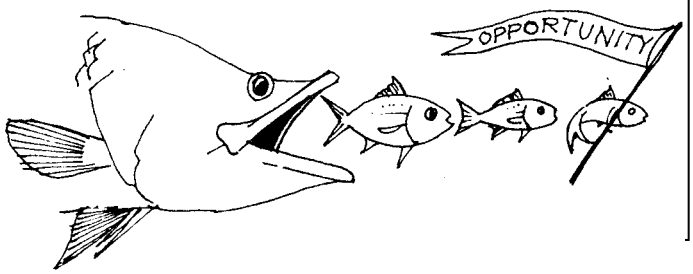
Young seabass mature initially as males after 3-4 years but invert to females on the 6th year. This condition is called protandrous hermaphroditism. But, not all males become females. There are the so-called primary females (seabass that never mature as males).



Seabass appear to breed during the monsoon months (late June until late October). The eggs are spawned and fertilized at sea, and the larvae enter brackishwater swamps and mangroves. Seabass also inhabit estuaries, rivers and lakes. They return to the sea to spawn.



Seabass are opportunistic predators. Young ones (<4 cm in size) feed on "microcrustacea" almost exclusively; bigger ones (30 cm) have diets of "macrocrustacea" and fish. The really big ones prey mostly on fishes.



After the spawning attempts became successful enough to allow experiments on larval rearing, AQD researchers began working on hatchery techniques. In 1990, AQD extended its hatchery technology by publishing the first seabass manual authored by MM Parazo et al. The more important details are noted below.

2 SEABASS FRY CAN BE EASILY RAISED IN THE HATCHERY

Incubate seabass eggs in fiberglass tanks (1,200 eggs per liter). Eggs hatch 14 hours after fertilization (28°C; 32 ppt).

Stock 30 seabass larvae per liter, but reduce this density to 15 per liter on day 10, then to 6 per liter on day 21. The reduction in density gives seabass more "space" to grow. It also minimizes cannibalism.

Add and maintain 1-3 x 10⁵ Chlorella *cells per ml to maintain water quality and to serve as food to the rotifers. It is best to introduce live food before the seabass larvae begin feeding 50 hours after hatching.*

Take care of seabass larvae by daily feeding — 15-20 Brachionus *per ml on days 1-12, 0.5-2* Brachionus+Artemia *per ml on days 12-15, and 5-10* Artemia *per ml on days 15-26 or until harvest.*

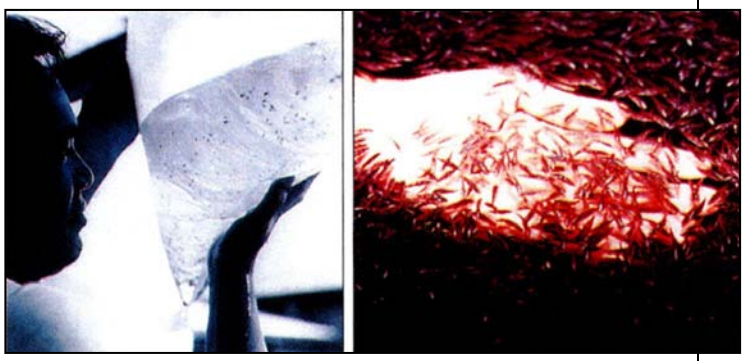
Make sure the tank is cleaned daily and the water changed.

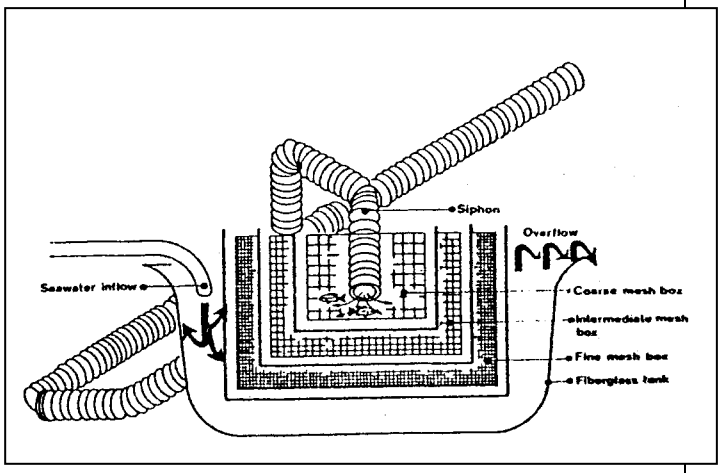
A survival of 90% is common in the hatchery (until 21 days old). (In its heyday, tiger shrimp hatcheries record 30-40% survival.)

The critical issues in the hatchery remain to be cannibalism and the need to size-grade fry. AQD researchers advise that there should be no more than 33% size difference of seabass in the same tank, otherwise, cannibalism will get out of hand. Hatchery operators must separate the "shooters" or the fast-growing seabass from the smaller ones.

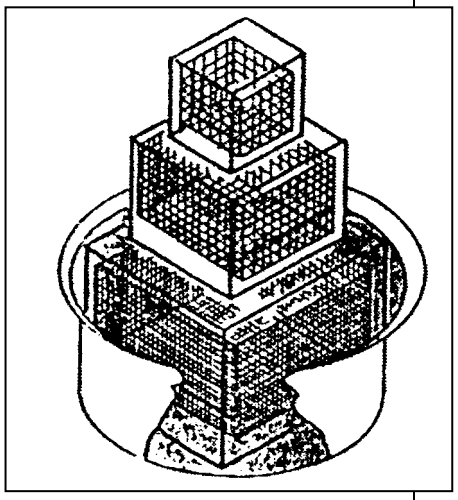
AQD researchers have designed sorter boxes to aid in size-grading seabass (see illustration). These boxes are fitted with different net mesh: coarse mesh, intermediate mesh, and fine mesh.

Newly hatched seabass larvae and 30-day old fry

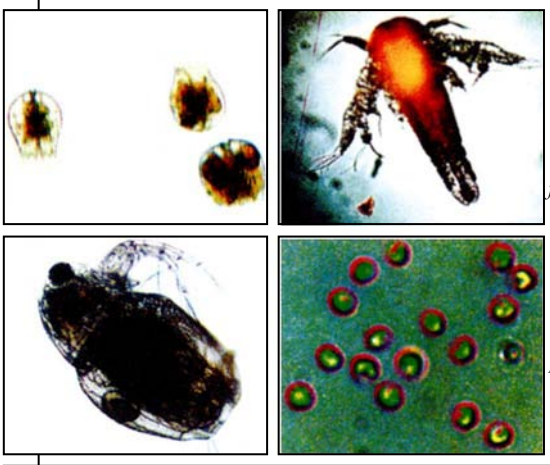




AQD researcher M. Parazo has found that cannibalistic seabass swallow its prey whole. Since the maximum size of prey that a cannibal may ingest is 2/3 of its length, seabass with length differences of 33% or more must be separated. A series of sorter boxes can facilitate in size-grading sea bass fry. (cross section above, box arrangement in a fiberglass on the right; from Parazo et al. 1990).



The boxes are arranged serially in a fiberglass tank (coarse mesh box inside the intermediate mesh box; fine mesh box is outermost). Hatchery operators can siphon all the fish into the coarse mesh box. To separate fish, the



Different live food that are fed to seabass larvae: (clockwise) the rotifer Brachionus, Artemia, *the phytoplankton* Chlorella, *and the cladoceran* Moina.

AQD's marine fish hatchery where seabass larvae are reared until these can be stocked in cages or ponds for grow-out culture.

innermost (coarse) box is moved gently until only the big fish remain inside. The box and the fish are removed; they constitute one size class of seabass. The middle intermediate box is next and the fish that can't go through the box is another class size. The fine box will hold the smallest sized fish. AQD researchers note that shooters usually develop several days after *Artemia* feeding. They advise that the first size grading be done around this time.

Needless to say, spawning and hatchery rearing of seabass cannot be this simple. Although the main ingredients so-to-speak have been described, fishfarmers are urged to maintain contact with AQD's research staff for technical support.

AQD RESEARCH PUBLICATIONS ON SEABASS **1985 - 1997**

(Our AQD Library has a Document Delivery Service; for inquiries / addresses, see page 36)

Harvey B, J Nacario, LW Crim, JV Juario and CL Marte. 1985. Induced spawning of seabass, *Lates calcarifer,* and rabbitfish, *Siganus guttatus,* after implantation of pelleted LHRH analogue. Aquaculture 47: 53-59

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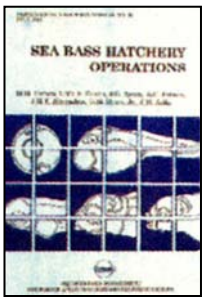

This manual is presently under revision. Copies of the first print may be ordered from AQD's **Sales/Circulation.** Manual costs P30 (local), US$ 15 (foreign). Price includes postage.

Includes useful terminologies and general principles of hatchery operations; seabass biology; selecting a suitable site for the hatchery; hatchery design; broodstock management; egg collection, transport and hatching; larval rearing; harvest and transport of fly; propagation of larval food (Chlorella, Brachionus *and* Artemia); *a list of references. Appendices are useful to fishfarmers, detailing fixation and measurement of eggs, hormone preparation, estimation of water volume for stocking of larvae, estimation of the required volume of larval food particularly rotifers, and estimation of* Chlorella *density.*

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