

the aquaculture alternative

AQD's marine ornamental fish project



AQD has been successful in breeding the seahorses in captivity



Breeding and seed production of seahorses

Dried seahorses are much prized in traditional Chinese medicine, and live ones are traded on the aquarium fish market. But overfishing and habitat degradation are threatening seahorses to extinction. In some areas, a 50% decline in population over the last five years has been reported. This alarming trend has prompted AQD to develop breeding and seed production techniques for two species of seahorses *Hippocampus kuda* and *H. barbouri*.

Results of experiments in 1998 follow:

Initial rearing and breeding trials resulted in small brood size and low survival rates of both broodstock and juveniles, mainly due to lack of information on appropriate food organisms, feeding rates, and stocking densities.

To improve reproduction performance, established mating pairs of *H. kuda* (body weight, 10-20 g) were offered HUFA-enriched live *Artemia* adults (at 30% of

For inquiries about AQD's marine ornamental fish project, contact:
Grace Hilomen-Garcia, project leader,
 SEAFDEC / AQD, Tigbauan 5021, Iloilo
 Fax: (63-33) 335 1008
 Email: ghgarcia@aqd.seafdec.org.ph

body weight) alone (single diet) or a combination diet of HUFA-enriched *Artemia* adults (at 15%) and mysids (at 6%) or tilapia fry (at 5%). After 90 days, *H. kuda* fed a combination diet showed more parturition events (7-8 per pair) and greater brood size (87-91 juveniles per g female) than those given a single diet (2-3 parturition per pair and 18-26 juveniles per g female). When groups of newly born *H. kuda* were fed *Brachionus* alone, copepods alone, or their combination, only seahorses on a combination diet survived until day 10.

In preparation for the planned grow-out culture of seahorses in illuminated sea cages, the effect of illumination on daily feeding patterns (feed used was 0.013 g tilapia fry) was determined under laboratory conditions. Food consumption of *H. kuda* juveniles (mean weight, 1.9 g) was significantly higher during daytime than during nighttime. When exposed to continuous illumination, however, similar amounts of food were consumed during the two consecutive 12 h feeding intervals per day. Moreover, when food was made available only for 12 h under continuous illumination, *H. kuda* consumed comparable amounts of food per day as when food was made available for 24 h under continuous illumination or natural photoperiod (12 h light:12 h darkness). This indicates that seahorses may not eat for 12 h when food



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is not available but will compensate for the 12 h non-feeding period when food becomes available.

Preliminary simulated transport experiment on 33-day old *H. kuda* (stretched height, 16-38 mm) showed that seahorses at higher loading densities (10 and 20 juveniles per 500 ml) were grasping each other by the tail and had higher survival rates 48 h post-transport than those at lower loading density (5 juveniles per 500 ml). This result indicates the importance of providing a holdfast during transport at low loading densities.

Pairing trials to establish mating pairs among wild and hatchery-produced *H. barbouri* resulted in 30 successfully mated pairs but only six pairs have been regularly mating. A preliminary experiment on the feeding cycle of *H. barbouri* under natural photoperiod showed a distinct diurnal feeding behavior, that is, food consumption was significantly higher during daytime (about 3-7 times) than food consumption during nighttime.

Following improved techniques based on the above results, seahorse production in 1998 for both species has considerably increased compared with 1997 production. The total number of hatchery produced potential broodstock has almost doubled in *H. barbouri* (190 in 1997; 319 in 1998) and has increased by seven-fold in *H. kuda* (59 in 1997; 409 in 1998). The total number of broods (51) from 20 mating pairs of *H. barbouri* in 1997 increased to 103 broods

from 30 mating pairs in 1998; broodsize remained within 1-287 but average broodsize increased from 39 in 1997 to 86 in 1998. Similarly, a total of 43 broods from six mating pairs of *H. kuda* increased to 74 broods from 7 pairs while broodsize range and average increased from 1-721 and 325 in 1997 to 44-1751 and 749 in 1998, respectively.

Broodstock development of panther fish and blue tang

The panther fish (*Cromileptis altivelis*) in its juvenile stage and blue tang (*Paracanthurus hepatus*) are among the highly-priced marine ornamental fishes. When grown, *C. altivelis* is one of the high-valued species in the live food fish industry. Hatchery propagation of these species will reduce dependence on wild populations, thus minimizing reef resource depletion and reef habitat degradation. Since very little is known on the biology and life history of these fishes, investigation of the reproductive biology was initiated. AQD will look into factors that trigger spawning, so these can be manipulated to enhance artificial propagation.

All panther fish broodstock were still in the female phase as shown by the presence of yolky oocytes (mean diameter, 0.38-0.45 mm).

Two of the 37 blue tang expressed milt in April, another 7 in August. In this group, 15 females were noted (mean weight, 145 g) as immature or maturing (mean oocyte diameter, 0.3 mm). No gonadal tissues were obtained from the rest.

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Southeast Asia and Japan, (6) biennial / annual reports, (7) various issues of the *Aqua Farm News* and *SEAFDEC Asian Aquaculture*, and (8) AQD brochures.

Further, seven schools have reserved allotted publications to be picked up by their students who attend this year's summer classes at UPV. The schools that reserved were two each from Regions VII and IX and one each from Regions V, IV, and X. - MBS

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The Philippines has a different scenario. Here, she said, there is a wide gap between exporters and collectors, with some opportunistic middlemen in between. "Exporters have pressures on them to improve quality and maintain market growth, but don't know how to deal with collectors."

Instead of advocating a ban, she stressed, there is a need to organize at the collectors' level. "There should be an effort to manage collection grounds, otherwise, the problem can't be resolved."

Certification (for fish caught without the use of cyanide) works up to a certain point, she said. "It is important to show that there is an existing market for certified products."

In Davao, Flores related, Badjao divers / fishers had been organized by an NGO and were taught coral-friendly fish collection skills by IMA. They now have investors who are willing to give access to a responsible market. The Badjao community can take a step further, into eco-tourism. An eco-tour of fishing and diving sites, wild-life sanctuaries, villages, etc. may be organized; thus, earning jobs and incomes for, and boosting local pride and morale of, everyone in the community. Pleased and delighted by the engaging treat, the visiting traders would be persuaded to take or ship out only a few spectacular species, which they would come to prize and value highly.

Net benefits of coral reef protection

White and Cruz-Trinidad (1998) noted that currently, the average yield of a Philippine reef is 15.6 tons per km² per yr. Healthy coral reefs can supply up to 35 tons per km² per yr of economically valuable fish and invertebrates.



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Twelve fishery schools were from Regions II, VIII, IX and XI and one each from Regions IV and V. Among the titles received were the (1) *Proceedings of the first international conference on the culture of prawn/shrimps*, (2) *Prawn hatchery design and operation*, (3) *Milkfish breeding and hatchery fry production*, (4) *Prawn industry development in the Philippine*, (5) *Perspectives in aquaculture development in*