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Journals/Magazines Aqua Farm News

1993

[Catfish aquaculture] industry and problems

Aquaculture Department, Southeast Asian Fisheries Development Center

Southeast Asian Fisheries Development Center, Aquaculture Department (1993). [Catfish aquaculture] industry and problems. Aqua Farm News, 11(6), 9-11.

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Industry practices and problems

Toward adequate seed supply

The present supply of *hito* fingerlings in the Philippines is very limited and cannot totally meet the demands of the increasing number of farmers. Every year, *hito* fry are gathered from their natural habitat -- rice paddies, swamps, irrigation canals, marshes -- and stocked in ponds. This practice is expensive due to heavy mortality during transport and stocking. There is also uncertainty in the availability of fry at the proper time. These problems of seed supply prompted several experiments on induced spawning.

Mature and gravid females are selected. The hormone gonadotropin and commercial preparations such as synahorin can be used. A dose of 500 IU per breeder is sufficient. A 0.6% saline solution can be used for fertilization. Japanese technicians use Ringer's solution but buying, preparing and preserving the chemicals to compose the solution requires knowledge in chemistry which ordinary fish farmers and small-scale culturists do not have. Saline solution is available in local drug stores.

Local materials such as baking pans, water basins saucer plates, and duck feathers can be used in artificial spawning.

Production of catfish fry is possible anytime of the year. This, however, depends on : (1) water pH, 7.5 - 8 being ideal; (2) water temperature, 26-30°C; and (3) sufficient oxygen supply. There should be a dependable water source for continuous inflow of water. Water is not chlorinated, otherwise hatching of eggs is inhibited.

Troughs are used for incubation, hatching and larval rearing. They must be flushed regularly to combat growth of fungi and the spread of diseases and parasites. Sufficient agitation should be provided to aerate the entire egg mass. Fry are sensitive to shock and should be handled carefully.

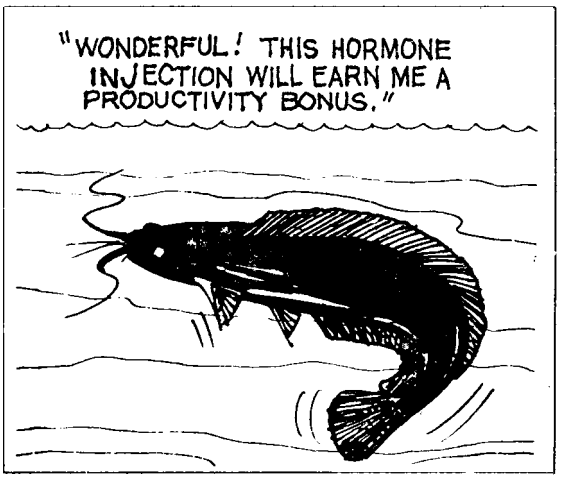
Source: WR Rosario. 1980. *Induced spawning of freshwater catfish (Clarias macrocephalus) using local materials and 0.6% saline solution.* **PSU Research Journal** V.1(1): pp. 31-41. Pangasinan State University. Pangasinan.

Spawning by hormone injection may happen spontaneously, or may be done by stripping. Gravid or pregnant females and healthy, mature males weighing at least 200 grams are used. The gravid *hito* has a distended abdomen, the genital part pinkish, and the blood vessels on its belly prominent. Breeders should be conditioned first in concrete or semi-concrete tanks or vats 2 to 5 months before they are injected with hormone.

The natural method entails injecting hormones into gravid females and males near the anus. Gonadotropin, synahorin or fresh hormone extracts from pituitary glands of fish may be used. Each female *hito* should receive 200 to 250 IU (international units) of gonadotropin, and each male, 50 IU. Wrap fish in a small net so they struggle less during injection. After injection, put the male and female together in a tank with oxygenated water and improvised nest made of cabo negro (black palm fibers).

The stripping method entails the sacrifice of several males. Remove the pinkish yellow testes and extract sperm by macerating the testes in distilled water.

Inject hormone into the gravid female, a little above lateral line. Use this dosage: gonadotropin, 750 to 1500 IU; synahorin, 1000 to 1500 IU. After 12 hours, squeeze the female's abdomen to force the eggs out. A 250 gram



female produces 8000 to 15 000 eggs. Mix eggs with sperm and stir for a minute. Spread eggs thinly in hatching troughs with running water at temperatures 26-36°C. Eggs hatch 24-36 hours later.

Transfer hatched larvae into basins half-filled with water. The young fish will absorb all the yolk in 5 days, then begin to swim actively and take food.

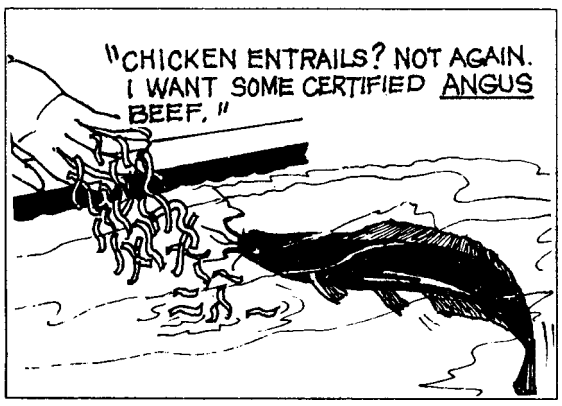
About 15 000 - 20 000 fry can be reared in a space of 1 x 3 x 6 meters. Zooplankton are the best food for the fry at the early stage. Peanut cake may be supplemented in the diet. After one week, fry should have grown to 1.5-4.3 cm long.

Tackling high feed cost

Although it eats almost anything, *hito* prefers fishes and animal carcass. If raised on a low-protein diet, it grows very slow with a head much larger than the rest of its body. Its meat becomes tough and leathery which may not be acceptable to consumers. Thus, the feed should be 90% meat and may be fresh trash fish, worms, insects, slaughterhouse by-products, chicken entrails, dried or fresh water shrimp, fish offal, the golden kuhol, and by-products of canning factories. The remaining 10% is composed of boiled broken rice mixed with vegetables or rice bran. To augment food supply, install a strong light over the pond to attract insects at night.

Feed the catfish twice a day. To avoid waste, give the feed slowly, handful by handful, until the fish stop eating. Daily feed ration is 6-7% of the fish body weight. If the fish remain small, provide 30 kg of manure.

Remember that catfish are cannibalistic and quarrelsome. If the larger fish are very hungry, they gobble up the smaller ones as quickly as any other food that come their way.



Preventing and controlling diseases

Parasites and bacterial infections, and nutritional diseases have been reported for the walking catfish in Thailand. High-density culture of *Clarias* is conducive to high incidence of disease that often decimates half the stock. The three most common diseases of cultured catfish are *Trichodina* infection of the gills, bacterial infection of the kidney and *Gyrodactylus* infection. Infections by *Aeromonas* spp., *Flavobacterium* spp., *Flexibacter columnaris*, *Pseudomonas* spp. and *Edwardsiella tarda* have been identified in *C. batrachus* and *C. macrocephalus.*

Aeromonas infection is characterized by distended abdomen filled with opaque or bloody fluid, red spots on the body, stomach filled with yellow mucus, swollen kidneys, eroded fins, inflamed mouth, pale or green liver and excess secretion of mucus. When catfish lose their balance, are pale, with distended abdomen filled with bloody excretion, they are infected with *Pseudomonas.*

Most of these infections are brought in with the fry or fingerlings, or by diseased frogs. Treatment with 25-50 ppm formalin in the pond or a one-hour bath of 250 ppm formalin in tanks is recommended before the fry or fingerlings are stocked.

Most diseases can be minimized through proper management of the culture system and the avoidance of stress. Two of the most common types of stress are related to abrupt temperature changes and exposure to low dissolved oxygen levels. If fish are moved from one temperature to another, they should be allowed to do so gradually, ideally not more than a degree centigrade or two hourly.

Accumulation of hydrogen sulfide is another cause of mortality in *Clarias* ponds. Dissolved oxygen levels do not appear to be so

critical for the survival and growth of the species.

In Pangasinan and Mindoro (Philippines), *C. batrachus* and *C. macrocephalus* are noted to be susceptible to the epizootic ulcerative syndrome (EUS). EUS is characterized by skin and muscle lesions and bulging eyes and occurs during the cold months of the year. SEAFDEC/AQD has been conducting studies on the etiology and histopathology of EUS in the snakehead *Ophicephalus striatus*.

Diseases of channel catfish

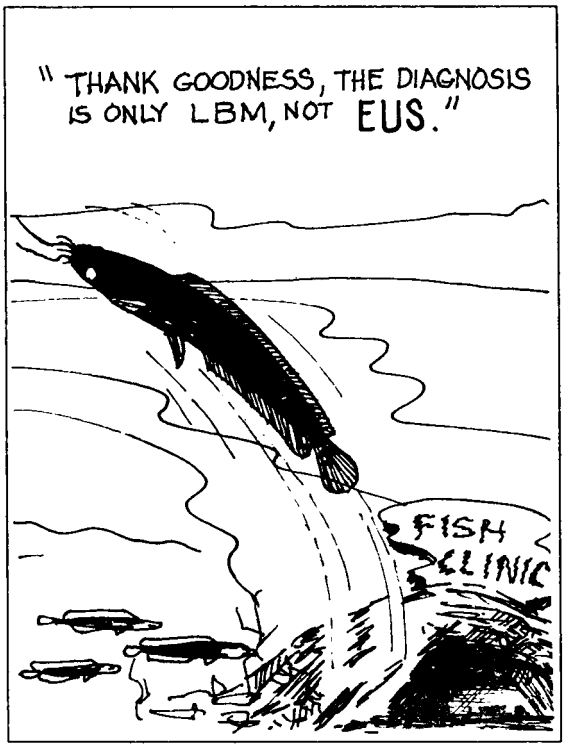
The channel catfish virus disease (CCVD) may cause large losses of fingerlings in a short time. Like most viral diseases, the only means known of eliminating CCVD is the destruction of all infected broodstock. Hemorrhagic septicemia and columnaris disease are bacterial diseases that also cause considerable mortality. A variety of protozoans also infect catfish; of these, ichthyophthiriasis or 'ich' is the most harmful. Eradication of the parasite is possible only during its free-swimming stage and repeated treatments over a period of days or weeks are needed. Costiasis is another common protozoan infection among fingerlings.

Various species of the external parasite *Trichodina* affect channel catfish. They occur on the body, fins and gills. Trichodiniasis is characterized by irregular white blotches on the head and back, frayed fins, loss of appetite, and excessive production of mucus. Dips in 30 ppt salt water, a 1:500 solution of acetic acid, or a 1:4000 solution of formalin are the usual treatments.

Myxosporidian parasites of the genus *Henneguya*, monogenetic trematode *Gyrodactylus* and the copepod parasites *Ergasilus, Argulus* and *Lernaea* can cause mortality.

A relatively small percentage of fish farmers experience serious disease problems within a given year, but nearly all farms have occasional problems. In the United States, formalin has recently been approved for use on catfish as well as trout, salmon, largemouth bass, and bluegill. The antibiotic Terramycin (Oxytetracycline) was approved in the early 1970s and is effective against various bacteria.

The most common preventive treatment applied to catfish is during egg incubation when fungus problems are common. Antiseptic solutions of 1% Betadine have been used in 10-min immersion dips with some success. Some catfish farmers routinely offer feed containing Terramycin. This practice is discouraged because bacteria can become resistant to the antibiotic. Medicated feed may be used only when a bacterial infection has been found. Diseases usually appear 3 to 14 days after being stressed.



Some diseases of catfish are due to poor water quality (such as nitrite or ammonia toxicity) or poor nutrition. Vitamin C deficiency leads to deformities and, in severe cases, fracturing of the spinal column. Other vitamin deficiencies can lead to anemia, deformation of the gills, and other organ damage. Any nutritional deficiency leads to poor growth and feed conversion, and is a stress that opens the way for bacteria, parasites, and other secondary infections.

Sources: (1) **Agriscope** Vol. 1 No.1 1987. (2) TVR Pillay. 1990. **Aquaculture Principles and Practices.** Fishing News (Books). (3) RR Stickney. *Catfish culture.* **World Aquaculture.** Vol. 22 (2), June 1991. (4) 1991 and 1992-93 reports of SEAFDEC Aquaculture Department. Iloilo, Philippines.