

FISH DISEASES IN THAILAND: STATUS AND PROBLEMS

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In Thailand, there are several species cultured and systems of freshwater and marine aquaculture. However, improper management and lack of government control on the area and number of ponds contribute to the deterioration of the environment. One consequence of environmental degradation is the occurrence of diseases.

Status and problems

Freshwater fish. The most commonly cultured species include a hybrid of the African catfish (*Clarias gariepinus*) and the native catfish (*C. macrocephalus*); snakehead (*Ophicephalus striatus*); sepat siam (*Trichogaster pectoralis*); Javanese carp (*Puntius gonionotus*); sand goby (*Oxyeleotris marmoratus*); striped catfish (*Pangasius* sp.); Nile tilapia (*Oreochromis niloticus*); grass carp (*Ctenopharyngodon idella*); and freshwater prawn (*Macrobrachium rosenbergii*).

The hybrid catfish, one of the most economically important freshwater fish, was successfully reproduced in 1989. It grows fast and has more resistance to diseases than the local variety. However, rapid expansion and lack of understanding of proper pond management result in disease problems.

Sepat siam is cultured mainly in swampy ponds with a production of 14,240 t from an area of 24,025 ha in 1987. However, this production has been reduced because of the conversion of ponds to industrial and residential areas.

Snakehead culture in the central and eastern parts of the country is rapidly increasing. The culture technique is similar to that of hybrid catfish, with high stocking rates of up to 200 fry (3-5 cm) per m². But disease problems are causing losses; snakehead is always infested with external parasites. *Trichodina* infects the skin and gills and appears to be the most damaging to fry. *Epistylis* sp. does not cause direct mortality but causes hyperplasia at the attachment site (Chinabut and Limsuwan 1983). *Epistylis* sp. causes red spots on the skin (Tonguthai 1985). Several pathogenic bacteria were discovered in diseased snakehead during the severe disease outbreaks in 1981-85. *Aeromonas hydrophila* was isolated from all samples of ulcerated fish (Tonguthai 1985).

Sand goby is a highly priced food fish that is exported to Singapore, Hong Kong, and Malaysia. It is produced in cages along river banks in central Thailand, but the production has been greatly reduced since a disease outbreak

in 1984. Mortalities in cages are not attributed to parasites but are associated with *A. hydrophila*. Infection is indicated by deep ulcers, and skin and muscle necrosis. *Corynebacterium* sp., *Streptococcus* sp., *Pseudomonas* sp., and *Edwardsiella tarda* are occasionally associated with the ulcers (Supamart et al. 1983). In a rare case, about 1% of cage-cultured sand goby in Nakhornsawan Province develop tumors after stocking for four months (Limsuwan and Chinabut 1984). The cause of the tumor has not been determined.

Striped catfish is also an important species cultured in integrated farms. During the outbreak of the epizootic ulcerative syndrome or EUS, infected walking catfish and snakehead cultures suffer heavy losses but striped catfish reared in adjacent ponds are free of the disease.

Herbivorous fishes do not seem to have many parasites or disease problems. *Aega* sp., an isopod parasite, is a blood feeder which occasionally infects. During 1981-85, sepat siam was one of the major species affected by severe EUS but mortality was not as great as in catfish and snakehead.

Freshwater prawn farming is mainly in the central part of the country. However, production has been reduced because of poor water quality and poor management. *Aeromonas hydrophila* is frequently isolated from shells of diseased prawns in grow-out ponds. Prawns are always weak and sensitive to pathogenic infection because they are raised in high densities under low levels of dissolved oxygen (Ruangpan 1992).

Brackishwater and marine fish. Sea bass (*Lates calcarifer*) and grouper (*Ephinephelus* sp.) are the two most common species in brackishwater culture. But cage and pond culture may be increasing too rapidly that they may succumb to diseases. The most concentrated area of cage culture of both species are in the south, followed by the eastern part of the country. The total production of seabass and grouper in 1987 reached 1,158 t and 343 t, respectively (Fisheries Statistic Sub-Division, 1989). Both species are reared intensively using trash fish as feed.

Protozoa are a major cause of fry mortality, especially at the age of 10-20 days (Ruangpan 1985). Streptococcal infection has been found in cultured sea bass, and isolated from eye, kidney, liver, heart, and brain. Characteristics of the disease include sluggish swimming, darkening of skin, exophthalmia, and hemorrhage at the base of the dorsal fins (Direkbussarakom and Danayadol 1987). Columnaris disease caused by *Flexibacter columnaris* has occurred in sea bass cage culture in the outer part of Songkhla Lake in December 1983 through February 1984 (Danayadol et al. 1984). Symptoms of the disease include fin rot, loss of scales, and lesions on the body. Lymphocystis was first reported from sea bass in cages from the Songkhla Lake in 1983. The disease lasted for three months, causing 1% mortality.

Trichodina sp. and *Cryptocaryon* sp. are the major protozoans found infesting the gills and skin of grouper. The monogeneans are commonly found in 1-in fry to adult grouper (Danayadol and Direkbussarakom 1987).

Crustaceans. Penaeid shrimps and crabs are the two major crustaceans cultured. Marine shrimp farming has expanded rapidly, and the total farming area has reached 67,200 ha with a production of 145,000 t in 1991. The culture system has changed from extensive to semi-intensive and intensive systems.

The commercially cultured species are black tiger shrimp (*Penaeus monodon*) and banana shrimp (*P. merguensis*). The consequence has been the occurrence of monodon baculovirus (MBV), vibriosis (Sae-Oui et al. 1987), and protozoan diseases. The Veterinary Medical Aquatic Animal Research Center at Chulalongkorn University reports that more than 50% of the diagnostic cases submitted to them by private shrimp farms are infected with MBV (Tangtrongpiroj 1989). In histological samples of captured male and female broodstock obtained from the Andaman Sea, the incidence of individuals with MBV occlusion bodies is approximately 5.7% (Hegel et al. 1990).

Vibrio sp. is found in shrimps with rotten appendages and black spots on their body. Symptoms like black gills and abnormality of body color usually indicate infestation of filamentous bacteria, *Zoothamnium* sp., *Epistylis* sp., and *Acineta* sp. (Boonyaratpalin et al. 1989).

A serious protozoan pathogen often infests the black tiger shrimp, causing the cotton disease. *Thelohania* sp. is isolated from striated muscles, hepatopancreas, and intestine; these organs often degenerate (Prasertpol 1989).

Two species of fungi are reported as an infectious agent in penaeids. *Lagenidium* sp. can cause severe destruction of tissues, particularly in larval stages. *Fusarium* sp. causes black gill disease especially in adults.

Fish health management

Aquaculture and fish health management in Thailand are the mission of the Department of Fisheries of the Ministry of Agriculture as well as the local cooperatives. In addition, there are several universities and private consultancy companies.

Department of Fisheries. Within the Department, several divisions have responsibility over different areas of aquaculture and fish health management. Under the Freshwater Fisheries Division, there are 12 development and research centers and 32 stations. The Coastal Aquaculture Division is a laboratory for brackishwater animal health management that has three biologists working on fish parasitology, mycology, and bacteriology. There are also several centers/stations under this division that have laboratory facilities for disease diagnosis. The National Institute of Coastal Aquaculture or NICA is located in the southern province of Songkhla. The institute serves as a research, training, and extension center for the southern region.

Universities. The Faculty of Fisheries of the Kasetsart University offers fish disease courses for the bachelor and masteral degrees. Laboratories for parasitology, histology, bacteriology, and immunology are available for fish disease research. The Veterinary Medical Aquatic Animal Research Center of the Faculty of Veterinary Science, Chulalongkorn University operates an extension service for shrimp farmers. Two veterinary technicians operate a mobile diagnostic service that is on call for the farmers.

Government rules and regulations. Fish health certificates are issued upon request to the receiving country for live fishery products exported from Thailand. These permits are supplied after examination of the samples by the Coastal Aquaculture Division or National Inland Fisheries Institute. Sanitary

quality control of processed fishery product for export is necessary and this is carried out by the Quality Control Section of the Fisheries Technological Development Division, Department of Fisheries. Samples of fishery products being exported are examined for the number of total bacteria (*E. coli*, *S. aureus*, *V. cholerae*, *Salmonella* spp., and *Shigella* spp.) and for its mercury, cadmium, and lead contents.

Drugs commonly used for shrimp and fish culture include oxytetracycline, tetracycline hydrochloride, furazolidone, sulfathiazone, sulfadiazine, and trimethoprim. Chemicals commonly used are formalin, benzalkonium chloride, copper chelate, Dipterex, acriflavin and methylene blue. These drugs and chemicals are available in the market without any regulation regarding procurement or use.

Fish diseases are difficult to control in later stages and delayed control may lead to severe episodes. Aquaculture in Thailand involves intensive culture systems with high stocking densities, hence, proper management is essential; otherwise, disease problems will continue. In freshwater fisheries, the causative agent of EUS has not yet been identified and practical measures to alleviate the losses should be implemented. In brackishwater aquaculture, MBV appears to be the most important disease in *Penaeus monodon*.

Serious disease problems affecting shrimp farming are attributed to environmental deterioration in areas along the upper Gulf of Thailand. Shrimp mortality has been so severe that a large number of farms have been abandoned and the industry has been forced to relocate to the southern provinces.

The government should manage and control the area and the number of ponds so as not to contribute to environmental deterioration. Research on the impact of aquaculture on the environment is urgently needed. There is also a need to develop the quarantine and fish health certification in Thailand to prevent disease transmission.

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Discussion

The technical issues discussed by the workshop participants include:

- Criteria for fry quality
- Mortalities in grow-out cultures that use MBV-infected fry
- Cotton disease and importation of *Penaeus merguensis* in the Philippines

The participants noted the following training gaps:

- Fisheries technicians in Malaysia have only very basic knowledge in fish diseases. Malaysia hopes to develop their own expertise in disease diagnosis and prevention.
- Thailand's representative noted that most technicians are not knowledgeable in proper pond management which is closely related to disease problems.