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Recent studies on fish health at SEAFDEC/AQD

Aquaculture Department, Southeast Asian Fisheries Development Center

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10-20% to 40%, and pond yields decreased accordingly. In mid-1990, *Baculovirus penaei* (BP) infections were also found but without adverse impact on production. In January 1992, the farm was stocked with the progeny of SPF *P. vannamei* broodstock. As a result, RDS disappeared and production and yield improved.

Reference: N Carpenter and JA Brock. 1992. *Growth and survival of virus-infected and SPF Penaeus vannamei on a shrimp farm in Hawaii.* In: W Fulks and KL Main (eds).

Shrimp production in the U.S.

Over 2,600 metric tons of farmed shrimps were produced in the U.S. in 1993, continuing the dramatic climb in production that began in 1992. Texas, by far the largest producer, harvested 2,100 metric tons of heads-on shrimp, despite problems in some areas with (parasitic) gregarines. South Carolina continued its steady growth. Hawaii, which is still bearing the effects of severe flooding in 1991, maintained its production.

The availability of affordable and reliable supply of high health shrimp stocks has been credited with the industry's success. Because SPF stocks increase production, producers are expanding their culture area. In Texas, for example, just over 180 hectares of ponds were stocked in 1990. In 1993, that increased to about 590 hectares. Further increases are projected in succeeding years.

Major problems with low yields and profitability are being experienced in many shrimp farms outside the United States. It is generally agreed that the deteriorating quality of stock and water experienced by foreign producers is magnifying the faults that already exist in ineffective disease control programs. These problems open opportunities for U.S. producers to become world suppliers of high health and genetically improved shrimp stocks. The combination of increased domestic production of shrimp and seed export is projected to become a $500 million industry in the coming years.

Reference: ***Newsline***, Vol. 7, No. 7, Winter 1994. The Oceanic Institute.

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Luminescent vibrios in hatcheries

One of the major problems in the otherwise successful *Penaeus monodon* hatchery industry in the Philippines is the occurrence of the luminescent bacterium *Vibrio harveyi.* The possible sources of the bacterium were investigated by SEAFDEC/AQD.

Eggs within the ovaries of wild-caught and ablated females in stage II and IV of ovarian development do not harbor the bacterium. But guts of these spawners and of pond-reared juveniles contain numerous luminescent bacterium. *V. harveyi* is also found in the exoskeleton-associated flora of females.

The marine diatom *Chaetoceros calcitrans* that is fed to shrimp larvae does not harbor *V. harveyi* at any phase of its growth. One-day old *Artemia salina* does not harbor resident *V. haveyi* population although its culture water contains small populations.

To reduce the incidence of luminescent vibriosis in hatcheries, preventive measures should be adopted. The eggs must be separated from the mothers and from feces as soon as possible after spawning. The present practice of spawning many females in big tanks should be modified because the set-up makes its difficult to remove the mothers and allows longer contact between them, their feces, and the eggs. *Artemia salina* nauplii should be rinsed well before being introduced into the larval rearing tanks as feed. Chlorination, ultraviolet irradiation, and filtration of the rearing water should be done to reduce the initial bacterial load. Reduction of the larval stocking density may also prevent luminescent vibriosis in shrimp hatcheries. Diatoms should continue to be used (rather than replaced completely with artificial feeds) for its antibiotic effect at high densities.

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Reference: CR Lavilla-Pitogo, LJ Albright, MG Paner, and NA Suñaz. *Studies on the sources of luminescent Vibrio harveyi in Penaeus monodon hatcheries.* p. 157. In: IM Shariff et al. (eds). **Diseases in Asian Aquaculture.** Asian Fisheries Society, Manila.

Vibrio infection in grouper fingerlings

Vibrio sp. is consistently isolated from the grouper *Ephinephelus suillus* infected with bacteria. Grouper fingerlings are highly susceptible, dying within 48 hours if already injured prior to exposure to the bacterium. Vibrios are opportunistic pathogens and can invade through the injuries inflicted during handling. Mortalities observed among impounded, transported, and newly stocked grouper fingerlings are not surprising, considering that they have been injured during collection by hook and line, bamboo trap, and dip net. Fingerlings are held under crowded conditions with few provisions for water change. Grouper held in tanks have been observed to harbor monogenean parasites that cause lesions in the gills and that can provide entry to vibrios.

Disease and mortality of grouper can only be avoided if the collecting gears, transport techniques, and holding facilities are improved. Although *Vibrio* sp. is sensitive to chloramphenicol, nalixidic acid, and oxytetracycline, application of these antibiotics in grouper rearing facilities is not recommended. Data on the safe administration of these antibiotics are lacking, and indiscriminate use leads to development of antibiotic resistance among pathogens.

Reference: CR Lavilla-Pitogo, AR Castillo, and MC de la Cruz. 1992. *Occurrence of Vibrio sp. infection in grouper, Epinephelus suillus,* **Journal of Applied Ichthyology** 8: 175-179.

Vibrio causes eye lesions in milkfish juveniles

Opaque cornea is the first sign of bacterial infection in the eye of fishes. A combination of injury and exposure to *Vibrio* can produce eye lesions which are not reversible. Injury can be inflicted during fry or fingerling collection, sorting, counting, and transport. In the Philippines, milkfish juveniles are usually held in high density impoundments before distribution and counting is done using perforated plastic buckets that can hold 500-2,000 juveniles. The method is fast, but very stressful.

If the eyes of the milkfish are impaired, fishfarmers must decide whether to stock them for grow-out culture or not. Clouding of the cornea impairs vision and, when severe enough, may affect the ability of milkfish to perceive and escape a predator. If possible, the fish should be held until their corneas are cleared. Fish with advance lesions such as cataract-like tissue formation around the lens should be culled as this lesion has been proven irreversible.

Reference: CR Lavilla-Pitogo. 1991. *Physicochemical characteristics and pathogenicity of Vibrio parahaemolyticus-like bacterium isolated from eye lesions of Chanos chanos (Forsskal) juveniles.* **Fisheries Research Journal of the Philippines** 16 (1-2): 1-13.

Monodon baculovirus infection in hatcheries and ponds

Juveniles that have monodon baculovirus (MBV) infection grow slowly in grow-out culture. Slow growth is due to the destruction of the hepatopancreas, the target organ of MBV. Consequently, digestion of food and assimilation of nutrients are difficult. With MBV, the hepatopancreas appears discolored and necrotic. MBV is indicated by occlusion bodies in the hepatopancreas.

In the Philippines, spawning the tiger shrimp involves putting several breeders in the tank and allowing them to spontaneously spawn. After spawning -- during which fecal matter may also pass out -- the breeders and scum are removed while the eggs are left to be hatched. The nauplii are later transferred to rearing tanks but not before it may have ingested MBV occlusion bodies. The infection is latent and shrimp succumbs later. The earliest stage found infected with MBV is PL 3.

Reference: MCL Baticados, CL Pitogo, MG Paner, LD de la Pena, and EA Tendencia. 1991. *Occurrence and pathology of Penaeus monodon baculovirus infection in hatcheries and ponds in the Philippines.* **The Israeli Journal of Aquaculture - Bamidgeh** 43 (1): 35-41.