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Commentary

Types of Bacterial Pathogens in Aquaculture

Ryan Howell *

Department of Fisheries, University of British Columbia, Vancouver, Canada

DESCRIPTION

Indian fisheries and aquaculture is a significant food-production sector, providing nutritional security to the food basket, contributing to agricultural exports, and employing around fourteen million people in various activities. Since independence, the nation has consistently increased fish output because of its vast aquatic resources. The industry provides 1.1 percent of GDP and 5.15 percent of agricultural GDP, accounting for around 6.3 percent of world fish output. The inland sector currently contributes about 65 percent of the total fish output of 10.07 million metric tons, with cultural fisheries contributing roughly the same. Fish diseases have become a major impediment to long-term aquaculture production and product commerce, threatening the livelihoods of Indian fishermen. Low physicochemical and microbiological quality of culture water, high stocking density and poor nutritional status are all examples that might be cause of opportunistic infections. Acute exposure to pollution and suspended particles can cause deformities and deaths in seed fish and adults. Different opportunistic bacterial infections and parasites cause significant losses to the fish business in terms of high mortality and morbidity, decreased growth, and increased spending on chemical control and prevention [1].

Among the most common bacterial infections in aquaculture are: *A salmonicida*, *Vibrio* species, *Edwardsiella ictaluri*, *E tarda*, *Aeromonas hydrophila*, *Streptococcus* species. and other similar gram-positive cocci can infect aquaculture species as well [2].

In highly bred salmonids, yersiniosis (enteric redmouth disease) is a potentially lethal acute or chronic bacterial infection. The causative organism is *yersinia ruckeri*. Symptoms include darkening and bleeding of the lips (red mouth), skin, anus, and fins. Exophthalmos, inappetence, edoema, and internal organ deterioration are all chronic symptoms. The death rate fluctuates, but poor water quality and other factors increase it. Pure cultures of the organism collected from the internal organs of affected fish are isolated and identified for diagnosis [3].

The most common infectious disease in the channel catfish industry is *Edwardsiella ictaluri,* which causes enteric septicemia. Infection develops when water temperatures vary from 22°C to 28°C in the spring and fall. There are two types of meningitis: Meningeal and enteric (or intestinal). Infected fish may develop skin lesions with big petechial haemorrhage around the mouth, operculum, and eyes, or measles-like red punctate lesions along the body wall in the intestinal variety. There is hemorrhagic enteritis, and the gut may be hemorrhagic and filled with fluid or gas. Liver lesions are prevalent and can manifest as multifocal necrosis and bleeding [4].

Flavobacterium columnare, is the cause of columnaris disease which is mostly found in warm water fish species. A preliminary diagnosis might be made by looking at distinctive organisms on wet mounts of damaged skin or gill tissue. Disease can be detected by isolating the organism on ordal's or other cytophaga medium. Because *F columnare* does not grow on muller-hinton medium, sensitivity testing is difficult to conduct. If the disease is detected early on, therapy with hydrogen peroxide or potassium permanganate may be successful. Florfenicol or oxytetracycline medication is recommended if the disease becomes chronic. *F branchiophilum* is a bacterium that causes bacterial gill disease in young farmed salmonids and fish maintained under high organic loading conditions. Overcrowding, poor water quality, excessive ammonia levels, especially large organic loads and debris, can all contribute to it. Gills seem swollen and mottled, with patchy areas of bacterial growth that may be validated under a microscope by looking at direct gill smears. The gill lamellae show hyperplasia, adhesions, and deformities. The disease causes severe mortality and long-term morbidity in juvenile fish. Improving water quality and preventing overstocking are two prevention strategies. A single treatment with potassium permanganate followed by the addition of salt (2-5 ppt) to the system may help limit losses, although sanitation is essential for long-term resolution [5].

CONCLUSION

In India, like in many other countries throughout the world, disease is a serious restriction to aquaculture and a limiting factor for economic and socio-economic growth. Some diseases have caused damage on not just the livelihoods of fish farmers, but also the industry's future development. Increased growth techniques without a fundamental knowledge of the delicate

Correspondence to: Dr. Ryan Howell, Department of Fisheries, University of British Columbia, Vancouver, Canada, E-mail: Howell@Ryan684.edu

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balance between host, pathogen, and environment are the source of many diseases infecting modern aquaculture. Environmental deterioration, which produces stress in cultured animals, is usually associated to disease outbreaks. Different stress factors in the aquatic environment, including as poor water quality, greater microbial load, low nutritional condition, and high stocking density, might increase the risk of infection by opportunistic pathogens. The majority of bacterial, parasitic, and fungal pathogens are not truly parasitic. These diseases are extremely adaptable to changes in their environment. Saprophytic relationships emerge when parasitism circumstances are inappropriate. Fungal infections can be caused by stress elements in the environment.

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