1990

Antibiotic in hatcheries

Aquaculture Department, Southeast Asian Fisheries Development Center

Southeast Asian Fisheries Development Center, Aquaculture Department (1990). Antibiotic in hatcheries. Aqua Farm News, 8(5), 7-8.

http://hdl.handle.net/10862/2653

Host	: organism (animal or plant) on which another organism depends for subsistence
Infectious	: transmissible from one diseased individual to another; contagious
Larvae	: newly hatched shrimps or prawns
Microorganism	: germ or organism that cannot be seen unless a microscope is used
Pathogen	: any disease-producing microorganism
ppm	: parts per million or milligrams per liter or grams per ton
ppt	: parts per thousand
Precipitate	: amorphous or crystalline solid that separates from the liquid
Quarantine	: isolation of material or animal to prevent the spread of infectious disease it carries
Residual	: remaining
Spawner	: adult female prawn capable of producing eggs
Susceptible	: easily affected by disease
UV	: ultraviolet radiation

Source: **Recommended Practices for Disease Prevention in Prawn and Shrimp Hatcheries** by G.D. Lio-Po et al.. Aquaculture Extension Pamphlet No. 3, SEAFDEC Aquaculture Department. Tigbauan, Iloilo, Philippines. May 1989.

ANTIBIOTICS IN HATCHERIES

The regular use of low concentrations of antibiotics has become widespread in penaeid shrimp hatcheries, but this practice induces the rapid development of antibiotic-resistant bacteria. The genus *Vibrio*, one of the groups of bacteria most affected by this practice, includes some potent human pathogens (disease-causing organisms) that associate with fish and shellfish, especially shrimp.

The first recorded use of antibiotics in the rearing of prawn larvae was in Tahiti for the culture of *Macrobrachium rosenbergii*. Since then the use of antibiotics in shrimp hatcheries has become widespread, although by no means universal.

Antibiotics are used in hatcheries to reduce mortalities either by controlling the general level of bacteria in the culture water or, more specifically, by controlling the level of *pathogenic* bacteria.

In larval culture of *M. rosenbergii*, comparisons were made between bacterial populations and pathology in two hatcheries, one using a green water system and the other a clear water system with water changes, plus antibiotics halfway through the cycle. The results were equivocal: one of the green water hatcheries had low bacterial counts and low incidence of pathology, while the other green water hatchery and the clearwater hatchery that used antibiotics were similar in terms of bacterial counts and numbers of larvae showing pathological signs.

There is no possible way that larvae can be reared in an environment that is free of bacteria, but the sources of bacteria can be reduced through water filtration, ultraviolet treatment, etc., and antibiotics are merely an additional weapon in this battle to control bacterial levels. But the question must be asked: Is this the right approach? At some point every organism must develop the ability to withstand attack by other organisms. Over-zealous protection from bacteria may be the last thing larval animals need for healthy development.

A controllable system. One of the problems of running a commercial hatchery is allowing for failure of larval batches. When antibiotics are used, failure is effectively written into the procedure because it is known that antibiotic resistance will develop and the hatchery must be shut down to be disinfected and dried out. If this drying out period is compared to the production time lost through batch failures that result when antibiotics are not used, there could well be little to choose between the two systems.

To develop a controllable system is a desirable objective. If failure of a larval batch is due to an imbalance between harmful and benign bacteria, it is quite conceivable that a "Probiotic" starter pack could be developed. This could seed culture water with such a concoction of non-toxic bacteria that the *Vibrios* and other pathogens would be unable to multiply sufficiently to cause harm.

Need for research. Like the weather, the prophylactic use of antibiotics in aquaculture is something that many people talk about but no one does anything about. Commercial aquaculturists have a good case for insisting that research on commercial problems should be relevant to the commercial situation.

There is also a reluctance in some countries for growers to take hatchery-reared larvae because they feel that they do not do as well in the ponds as wild larvae. It is conceivable that larvae reared in the presence of antibiotics are not as hardy or resistant as those from wild stock.

Is there an alternative to antibiotics that can routinely yield the shrimp production levels the antibiotic users are achieving now? For reasons of public health and public relations it is in everyone's interest to address this problem. At the very least, hatcheries should disinfect their discharge or discharge through sand filters. The safeguarding of discharges is a first step, but there really is a need for a reliable alternative to antibiotic treatment in the hatchery production system. Research must be done in commercial hatcheries on the quantification, replication and refinement of production methods that do not depend on antibiotics.

Source: Janet H. Brown. "Antibiotics: Their Use and Abuse in Aquaculture," **World Aquaculture**, Vol. 20(2), June 1989.

CONCERN ON ANTIBIOTICS

Experience overseas has shown that the indiscriminate use of antibiotics can rapidly lead to the evolution of antibiotic-resistant strains of bacteria.

To help avoid the inadvertent evolution of antibiotic-resistant bacterial strains the following code of practice for fish hatcheries has been suggested:

- The use of antibiotics should be avoided wherever possible.
- Non-antibiotic therapeutics - such as salt, formalin, malachite green and potassium permanganate - should be used to treat diseases caused by protozoan and metazoan parasites and fungi.
- Antibiotics should only be used where bacterial diseases have been diagnosed or are strongly suspected.
- If a bacterial infection is suspected, then a suitable qualified fish disease specialist should be consulted. Successful treatment of a bacterial infection will require a rapid, accurate diagnosis.

There is, however, also concern over the use of certain non-antibiotic therapeutics.

For example, malachite green is a potential carcinogen, mutagen and teratogen and, apart from the risk to health, there is a lack of information regarding its toxicity, residues, and metabolites.