Enteric Septicemia of Catfish

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SUMMARY

- Enteric septicemia of catfish (ESC) is a common problem on commercial catfish farms.
- Antibiotic treatment does not prevent fish from developing immunity to ESC.
- Proper antibiotic treatment minimizes mortality and production losses from ESC.

Introduction

Enteric septicemia of catfish (ESC) is a common problem and major cause of production loss on most commercial catfish farms. Fish commonly get their first clinical infection with ESC when they are fingerlings. Once a fish is infected, it may either:

1. *Become clinically ill and die*
2. *Become clinically ill, recover and develop protective immunity*
3. *Become clinically ill, recover and develop protective immunity but become a carrier*
4. *Become sub-clinically ill (the catfish farmer cannot detect the infection) and develop protective immunity*

All of these scenarios may occur in different fish within the same pond.

Antibiotic therapy can prevent death and production losses due to ESC. When antibiotic therapy is initiated after a pond has become clinically ill, fish will either:

1. *Die if they do not ingest enough antibiotic or if the disease has progressed too far*
2. *Recover and develop protective immunity*
3. *Recover and develop protective immunity but become a carrier*
4. *Remain healthy and develop protective immunity*

A common misconception

Some producers have expressed concern that the use of antibiotics will clear ESC infection too fast, thereby preventing the development of protective immunity. In a production pond, this is impossible, according to aquaculture specialist Dr. Lora Petrie-Hanson of Mississippi State University.[1]

First, ESC is widespread and can be found in virtually every pond. Antibiotic therapy in fish feed has no effect on the organisms in the environment. ESC can survive in pond sediment for many months and in carrier fish for four months. Thus, even in previously treated ponds, ESC organisms will continue to infect fish and fish will continue to make an immune response, Dr. Petrie-Hanson says.

Second, as soon as fish are infected, the immune system is triggered. The incubation period for ESC from first exposure to first death is eight days. Once dead fish are observed in a production pond, diagnosed and treated with antibiotics, at least another two days will have passed. By this time, high levels of ESC will have permeated the pond and infected all of the fish, Dr. Petrie-Hanson explains.

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In other words, the catfish farmer has to wait until fish become sick and, by this time, the whole pond is likely infected but building immunity. This is in sharp contrast to a laboratory setting where researchers place the ESC organism into a clean tank of healthy fish. They know the exact day the fish are infected and can treat on that very day.

Finally, the alternative of no medication or feed restriction is a poor option. Dr. Terrill R. Hanson of Mississippi State University, who analyzed various methods of managing ESC outbreaks in fingerlings and their economic implications, found that feed medicated with AQUAFLOR® (florfenicol) could provide "greater receipts and net returns compared to the use of non-medicated feed or not feeding at all." In fact, treatment could result in over double the revenue per acre compared to the other two methods.[2]

Can ESC re-breaks occur in antibiotic-treated fish?

Protective immunity to ESC can be very effective in preventing infections later. However, it is not a silver bullet.

Fish can become immunosuppressed due to a variety of conditions and can re-break upon exposure to ESC in the pond or from carrier fish. This can occur whether fish have immunity from vaccination, natural exposure or from a previous outbreak that was treated with antibiotics. Fish immunity can be compromised due to nitrite toxicity, chemical over-treatment, oxygen depletion or another disease. In addition, large numbers of ESC organisms can overwhelm protective immunity.

Conclusion

Clinical disease from ESC is costly due to mortality and reduced weight gain.

Antibiotics can prevent losses during initial ESC outbreaks while at the same time allowing the fish to develop protective immunity.

Protective immunity, however, regardless of the fish's history, can be overwhelmed due to immunosuppression or a high pathogen load in the pond, resulting in re-breaks. In these cases, proper antibiotic treatment can again minimize losses.

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[1] Petrie-Hanson, Lora. Catfish immunity and the effect of antibacterial treatment. *AquaFocus*. SPAH-AQF-56. 2007.

[2] Hanson, Terrill. The economic implications of feeding fingerlings during outbreaks of enteric septicemia in catfish. *AquaFocus*. SPAH-AQF-43. 2006.

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