Cooperative Extension Service

Enteric Septicemia of Catfish

University of Arkansas, United States Department of Agriculture, and County Governments Cooperating

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Enteric Septicemia of Catfish (ESC) is the biggest disease problem in the catfish industry. ESC is a bacterial infection caused by the bacterium *Edwardsiella ictaluri*. The disease was discovered and the causative agent determined in 1976. From ESC's initial invasion into commercial catfish culture more than 15 years ago, it has spread throughout the industry and is now present in most fish stocks and culture ponds.

E. ictaluri is a type of bacteria that is fairly host specific for channel catfish. ESC usually occurs in a temperature range of 22°-28° C. This corresponds with the optimal temperature range for *E. ictaluri*. This narrow temperature restricts ESC to being mainly a spring and fall disease problem. When the water temperature rises above 30° C or drops below 20° C the bacteria becomes inefficient and becomes dormant or dies. The bacteria can no longer cause disease in catfish until the environmental temperatures are again favorable.

Researchers have demonstrated that ESC bacteria can survive for three months in pond mud at 25° C. As a result of this study, it is thought that pond muds are one source of reinfection in culture ponds during the fall. In this same study, *E. ictaluri* was shown to survive less than five days in mud held at 5° C. Pond muds do not appear to be a source of infection in the spring. Studies have shown that ESC bacteria can be isolated from the brain when the bacteria is dormant due to low water temperatures (< 20° C). Springtime disease outbreaks are thought to be initiated by carrier fish which have maintained *E. ictaluri* over the winter.

ESC effects all ages of channel catfish. The group of fish hit hardest by ESC seems to be the overwintered fingerlings going into their second growing season. Natural immunity does develop with exposure to the bacteria which corresponds with increased age of fish. Older fish are generally more resistant to ESC infection than younger fish.

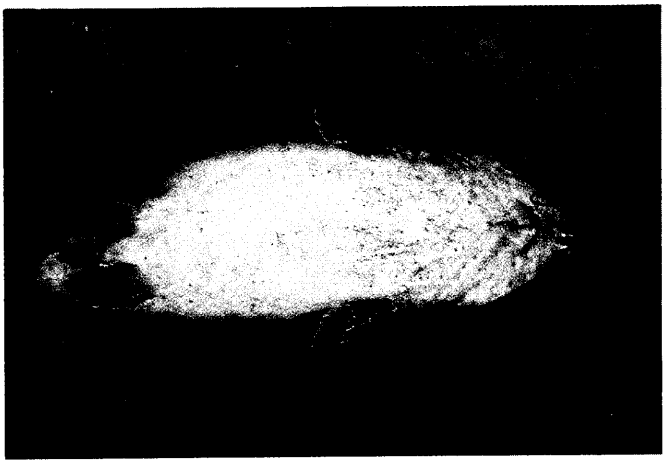
Clinical Signs

E. ictaluri causes a number of devastating changes in channel catfish. There are a number of clinical signs associated with ESC, but it should be noted these signs are by no means restricted to ESC infections alone. Other disease problems do share some of these clinical signs. Channel catfish infected with *E. ictaluri* in the same pond may exhibit a number of different signs of the disease.

Below is a list of some common physical and behavioral signs of ESC infections.

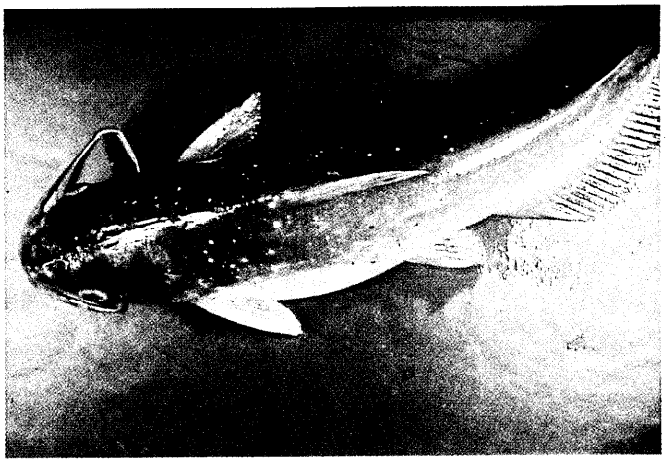
Physical Signs

- Small (2-3 mm diameter), circular, red spots over the entire body.
- Rash-like areas on body.



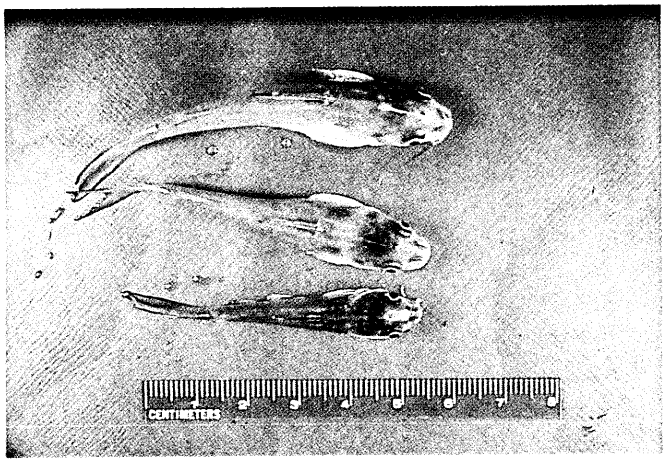
ESC rash

Photo by A. J. Mitchell, Fishery Biologist,
Fish Farming Experimental Laboratory, Stuttgart.



ESC showing white circular spots

Photo by A. J. Mitchell, Fishery Biologist,
Fish Farming Experimental Laboratory, Stuttgart.



ESC "hole-in-the-head"

Photo by A. J. Mitchell, Fishery Biologist,
Fish Farming Experimental Laboratory, Stuttgart.

- Bloody areas on base of fins.
- White circular spots (2-3 mm diameter).
- Raised reddish area on top of head.
- Ulcerated areas on top of the head (hole-in-the-head).
- Protruding eyes.
- Bloated fluid filled belly (yellowish or bloody).
- Internal organs and tissue hemorrhages.
- White pustules in the liver.

Behavioral Signs

- Reduction of feeding intensity.
- Erratic swimming, swirling, and jumping.
- Hanging head up, tail down in the pond.

Treatment

All suspected cases of ESC should be confirmed by a disease specialist before treatments are initiated. Antibiotics sensitivity should also be determined to ensure the effectiveness of the prescribed treatment. ESC infections can usually be controlled by Terramycin® and/or Romet® antibiotic feeds. A few strains of *E. ictaluri* have been discovered that are resistant to both Romet and Terramycin. When this occurs, there are no legal means of treating the epidemic. The antibiotic to treat ESC should be based on drug sensitivity tests, feeding intensity of the fish, associated secondary infections (in most cases of ESC other disease organisms such as protozoan parasites and other species of bacteria are present and must be considered) and economic considerations.

Terramycin should be fed for 10-14 days and then followed by a 21-day withdrawal period before slaughter. Romet feeds should be fed for five days followed by a three-day withdrawal period.

Catfish infected with ESC usually slow or stop feeding as the infection progresses. Fast and accurate diagnosis is extremely important since the only way to treat the infection is through oral antibiotic therapy.

When feeding an antibiotic feed, it is best to administer the feed two to three times a day to ensure more sick, weak fish have a chance to feed.

Future Outlook

Most cases of ESC can be controlled if diagnosed early with minimal economic losses.

A new drug, Sarafloxin®, should be on the market in 1992 that is a new bactericide. This new weapon will greatly aid the industry in combating ESC infections but will not solve all problems.

The development of ESC vaccines is a promising area. Studies have shown that vaccines reduce the incidence of ESC related mortality but do not completely eradicate the problem.

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