

## ESC and Vaccination Practices

Enteric septicemia of catfish (ESC) is an important disease of farm-raised catfish. Fish kills due to ESC in wild catfish populations are rare. The channel catfish is the species most susceptible to ESC infection, while white catfish, brown bullhead, and walking catfish are rarely susceptible. Blue catfish may be somewhat resistant to ESC infection.

Catfish affected with ESC frequently have red and white ulcers covering their skin; pinpoint red spots called petechial hemorrhages; and longitudinal ulcers or raised red "pimples" between the eyes (at the cranial foramen). Catfish are more prone to infection when subjected to stressful conditions, which may include improper diet, poor water quality, close confinement, handling, low chloride levels, or water temperature fluctuations. However, disease also can occur in the absence of perceptible stress.

The causative agent of ESC is a gram-negative bacterial species, *Edwardsiella ictaluri*. Stocking healthy fish into ponds with carriers or stocking infected fish into ponds with healthy fish can spread ESC. Fish that survive an ESC outbreak may carry bacteria for up to 200 days. Transmission from fish to fish is likely to occur via water contamination, with bacteria shed in feces, or by cannibalism of dead or infected fish. The bacteria also have been shown to survive in pond mud for up to 95 days at 25° Celsius (77° Fahrenheit). Birds that pick up infected fish from one pond and drop them into another can spread disease from pond to pond. Additionally, *E. ictaluri* can be transferred from pond to pond on wet equipment, but air drying in direct sunlight should kill the bacteria.

ESC outbreaks generally occur in the spring and fall. Symptomatic ESC infection generally takes place within a water temperature range between 20 and 28°Celsius (68 to 82° Fahrenheit). Mortality due to infection decreases greatly outside this temperature range.

In January 2003, the USDA's National Animal Health Monitoring System (NAHMS) conducted its second national study of America's catfish industry, Catfish 2003. Participating producers were divided

into two regions. The East region was defined as Alabama and Eastern Mississippi, the West region as Arkansas, Louisiana and, Western Mississippi. Results from Catfish 2003 related to ESC are presented here.

### Broodstock Operations

In Catfish 2003, 9.1 percent of breeding operations reported losing broodstock to ESC. However, the percentage of broodstock lost was relatively small (0.2 percent) compared with other reported causes of loss such as visceral toxicosis of catfish (5.5 percent) and fighting (1.6 percent). Unknown causes accounted for 2.5 percent of reported broodstock losses, and other causes accounted for 3.6 percent.

### Fry/Fingerling Operations

Catfish 2003 found that 52.9 percent of all fry/fingerling operations experienced some fry/fingerling loss due to ESC during the previous 2 years. About 46 percent of small fry/fingerling operations (operations with 1 million or less fingerlings stocked) reported fry/fingerling loss attributed to ESC, while about 57 percent of large operations (operations with more than 1 million fingerlings stocked) reported fry/fingerling loss from ESC. By region, 42.1 percent of operations in the East region reported some fry/fingerling loss due to ESC, while 57.8 percent of operations in the West region attributed some fry/fingerling loss to ESC. ESC was the leading cause of fry/fingerling loss (27.3 percent of losses) followed by columnaris disease (24.8 percent of losses) and unknown causes (18.4 percent of losses). ESC accounted for 18.8 percent of all fry/fingerlings lost in the East region and 28.5 percent of all fry/fingerlings lost in the West region.

### ESC Vaccination Practices on Fry/Fingerling Operations

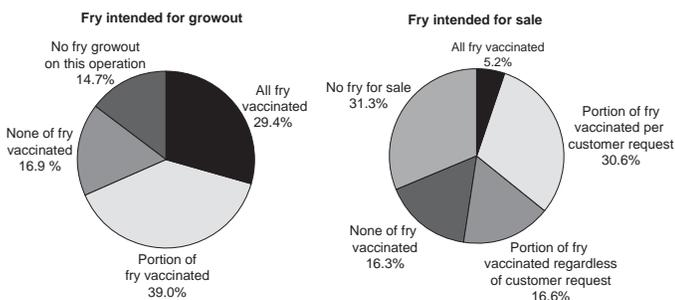
Only 7.5 percent of small fry/fingerling operations vaccinated any fry for ESC in the past 2 years, while 13.8 percent of large fry/fingerling operations vaccinated any fry in the past 2 years.

Vaccination practices were similar by region: 8.9 percent of operations in the East region vaccinated fry for ESC in the past 2 years, compared to 12.4 percent in the West region. The operation average age of fry vaccinated for ESC was 8.8 days.

In 2001 on operations that vaccinated fry, 71.3 percent and 22.1 percent of fry were vaccinated on small and large fry/fingerling operations, respectively. The difference was even more pronounced in 2002, with small fry/fingerling operations vaccinating 87.1 percent of fry, and large operations vaccinating 17.1 percent. Overall, 18.1 percent of fry were vaccinated in 2002 on operations that vaccinated fry.

For all fingerling operations that vaccinated any fry in the past 2 years, 29.4 percent vaccinated all fry intended for growout on the operation, and 39.0 percent vaccinated a portion of the fry intended for growout. In contrast, 5.2 percent of hatchery operations vaccinated all fry intended for sale, and 30.6 percent vaccinated a portion of fry for sale (Figure 1).

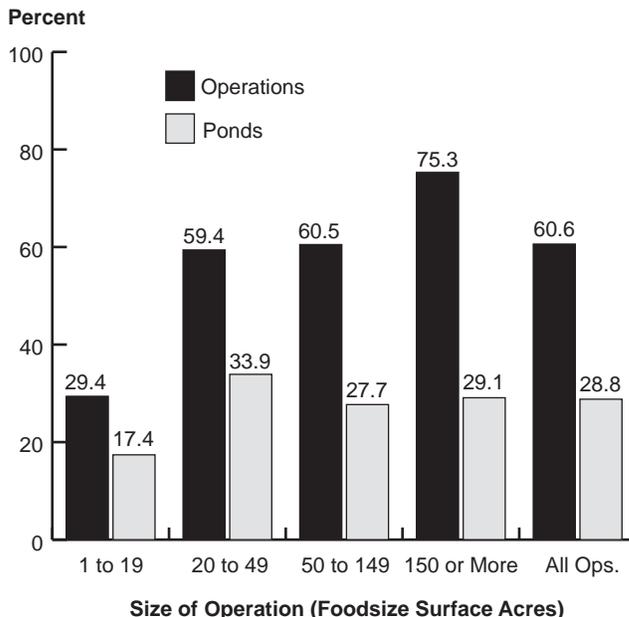
Percent of Operations by ESC Vaccination Practice for Fry Intended for Growout and For Fry Intended for Sale



## Foodsize Fish Operations

In 2002, 65.1 percent of foodsize fish operations in the East region experienced ESC outbreaks, compared to 54.9 percent of foodsize fish operations in the West region. Operations of 20 or more acres were more likely to have an outbreak than were smaller operations. On average, larger operations also experienced outbreaks in higher percentages of ponds than did operations of less than 20 acres (Figure 2).

Figure 2. Percent of Foodsize Fish Operations and Ponds that Experienced Any ESC Outbreaks in 2002, by Size of Operation



For foodsize fish operations that experienced losses due to ESC in 2002, 50.5 percent classified the loss as light (less than 200 pounds of fish); 39.5 percent described the loss as moderate (200 to 2,000 pounds of fish); and 10.0 percent categorized the loss as severe (more than 2,000 pounds of fish).

Overall, 15.8 percent of foodsize fish operations stocked any fish vaccinated for ESC. In the East region, 20.3 percent of operations stocked vaccinated fish, compared to 10.7 percent of operations in the West region. Smaller operations were less likely to stock vaccinated fish than operations with 20 or more acres. Of foodsize fish operations planning to stock fish in 2003, 23.6 percent in the East region and 8.4 percent in the West region planned to vaccinate for ESC. In both regions, operations planned to vaccinate about 14 percent of fish.

## ESC Treatment Options

In Catfish 2003, the most common treatment reported for ESC outbreaks was taking fish off feed (54.7 percent of fingerling operations). ESC can be transmitted to fish orally and withholding feed may reduce transmission efficiency. Currently, Romet<sup>®</sup> (sulfadimethoxine and ormetoprim) is the only antibiotic approved for treating ESC. About 18 percent of fingerling operations treated ESC outbreaks with feed medicated with Romet.

## Reference

Hawke J.P., Durborow R.M., Thune R.L., and Camus A.C. 1998. *ESC – Enteric septicemia of catfish*. Southern Regional Aquaculture Center Publication No 477.

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For more information, contact:

USDA:APHIS:VS:CEAH  
NRRC Building B., M.S. 2E7  
2150 Centre Avenue  
Fort Collins, CO 80526-8117  
970.494.7000  
E-mail: [NAHMSweb@aphis.usda.gov](mailto:NAHMSweb@aphis.usda.gov)  
[www.aphis.usda.gov/vs/ceah/cahm](http://www.aphis.usda.gov/vs/ceah/cahm)

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