



Cooperative Extension Service
Institute of Food and Agricultural Sciences

Use of Medicated Feed in Channel Catfish¹

Ruth Francis-Floyd and Peggy Reed²

Pond-raised channel catfish are the most popular species of food fish grown in the southeastern United States. Because of crowding and associated stressors encountered in modern aquaculture, they are more susceptible to disease than free-ranging animals. Bacterial disease is frequently the cause of death of catfish, though often secondary to other problems such as poor water quality or excessive parasitism. Medicated feeds can be used to control bacterial disease. However, the results of treatment may only be temporary unless underlying problems are also corrected.

WHAT IS BACTERIAL DISEASE?

Bacteria are tiny, single-celled organisms which live in the water, the sediments, on the surface and in the intestines of fish. Most bacteria are beneficial and essential for life. They help to digest foods and produce vitamins, as well as break down ammonia and organic debris in the environment.

A few bacteria are considered opportunistic pathogens. These bacteria are always present and usually cause no problem. However, under certain conditions they can cause disease in fish. Common examples of **opportunistic pathogens** which can cause disease and death of catfish include *Aeromonas* sp., *Pseudomonas* sp., and *Flexibacter* sp.

A few bacteria are considered **obligate pathogens**, which means they are likely to be the sole cause of disease

rather than a secondary problem. There is some speculation that *Edwardsiella ictaluri* may be an obligate pathogen.

Separate fact sheets on the bacterial diseases mentioned above are available. *Aeromonas* and *Pseudomonas* cause very similar diseases often characterized by large ulcers on the side of the fish, distended abdomen (dropsy), and exophthalmia (popeye). *Flexibacter columnaris* causes a disease called "columnaris disease" or "saddleback disease." It is usually an external problem which begins by loss of color (paleness) along the back of the fish. As the disease progresses, large ulcers may develop. Mixed infections with *Aeromonas* and *Pseudomonas* are common in advanced cases.

Poor management practices are often the cause of these infections. For example, rough handling damages the skin and mucus of the fish and can result in secondary bacterial infections. Control of these infections often requires the use of medicated feed. Because these infections are usually opportunistic, it is sometimes possible to control the spread of the bacterial infections by correcting management problems that preceded disease outbreak (e.g., excessive parasitism or poor water quality).

Edwardsiella ictaluri is a bacterium considered by some to be an obligate pathogen. This may not be precisely true, but this organism without doubt causes the

1. This document is VM 70, one of a series of the Department of Large Animal Clinical Sciences, College of Veterinary Medicine; Department of Fisheries and Aquatic Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Reviewed November 1995. Please visit the FAIRS Web site at <http://hammock.ifas.ufl.edu>.
2. Ruth Francis-Floyd, D.V.M., M.S., associate professor; Peggy Reed, biological scientist; Department of Large Animal Clinical Sciences, College of Veterinary Medicine, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

The Institute of Food and Agricultural Sciences is an equal opportunity/affirmative action employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, age, handicap, or national origin. For information on obtaining other extension publications, contact your county Cooperative Extension Service office. Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences / University of Florida / Christine Taylor Waddill, Dean

most significant bacterial disease of channel catfish - enteric septicemia of catfish, or ESC . Some producers refer to ESC as "hole-in-the-head disease." It frequently causes ulcers in the middle of the skull of fingerlings, just above the eyes.

Medicated feed is almost always recommended to control ESC outbreaks. Catfish which are becoming sick with ESC often stop eating so early diagnosis and treatment is essential to minimize losses.

What is Medicated Feed?

When referring to channel catfish production, the term **medicated feed** implies a prepared (commercial) feed which contains an **antibiotic**. Antibiotics are drugs specifically designed to control bacterial infections, but they do not control parasitic, viral, or fungal diseases. There are many different types of antibiotics, but the Food and Drug Administration (FDA) has approved only two for use in catfish. These are **Terramycin** and **Romet**. Each is discussed separately below.

Terramycin

Terramycin has been available for treatment of channel catfish for many years . It contains the drug **Oxytetracycline** . This drug is effective against many bacteria which cause disease of channel catfish, including all of those mentioned above . The FDA specifically approved it for control of *Aeromonas* sp. and *Pseudomonas* sp. infections in channel catfish . Terramycin is incorporated into catfish feed by commercial mills and fed at a rate of 2.5 to 3.75 grams of drug for 100 pounds of fish per day . To receive an adequate dosage, fish need to eat at least 2.5 percent of their body weight per day . Therefore, 100 channel catfish which weigh 1 pound each need to consume 2.5 pounds of Terramycin medicated feed to receive an adequate dosage.

Terramycin must be fed for 10 days, and the fish must be held an additional 21 days before they can be marketed to allow complete elimination of the drug from the fish . This 21-day **withdrawal period** assures that the drug will be absent from fish intended for human consumption . Slaughter of fish before the end of the withdrawal period is a violation of federal law . Consider market plans before treating fish with Terramycin. Once treatment begins, the fish are non-saleable for 31 days (10-day treatment period + 21-day withdrawal period).

A final consideration when feeding Terramycin is that it is only available as a **sinking feed** . This drug is broken

down by the high temperatures needed to make a pellet of fish feed "puff up" so it will float . Feeding a sinking fish food to sick fish is a disadvantage because it is very difficult to determine if fish have eaten the medicated food.

Romet

Romet is a relatively new product approved by the FDA for use in channel catfish in 1985 . This product is a **potentiated sulfonamide** which contains two drugs, sulfadimethoxine and ormetoprim. These two drugs work in combination and are more effective than either drug would be if used alone . Romet is also effective against many bacteria which can cause diseases of catfish. However, it is specifically approved for use against *Edwardsiella ictaluri* infections. Generally, Romet is considered ineffective against *F. columnaris*. It is recommended that Romet not be used if catfish have a primary or secondary infection with *F. columnaris*. Romet is prepared by commercial feed mills and fed at a dosage of 22.7 mg drug per pound of fish (50 mg/kg) per day for 5 days.

The withdrawal period for Romet in channel catfish is only 3 days . This is considerably less than the withdrawal period for Terramycin . With only 5 days required for treatment and a 3-day withdrawal period, catfish treated with Romet can be slaughtered 9 days after the drug treatment is started.

Another advantage of Romet is its availability as a floating feed . This allows direct observation of the fish eating the medicated pellets. Again, early diagnosis and treatment are necessary because once fish are sick they are unlikely to eat.

Homemade Medicated Feeds

As the popularity of catfish increased, the availability of commercially prepared medicated feeds improved. It is much easier to feed a prepared medication by following label instructions than to mix your own feed. If medicated feed is not readily available in your area, it may be advisable to special order a few bags to keep on hand . Delivery of feed may take several weeks.

Once a bacterial disease is in progress, medicated feed should be used immediately . It is possible under emergency circumstances to mix your own feed in small quantities if the commercially prepared diet is not available . Terramycin premix may be purchased as a soluble powder, which is available at many stockman supply stores. A 6.4 ounce packet should contain 10

grams of oxytetracycline, but check the label to be sure. One 6.4 ounce packet contains 50 level teaspoons of premix. Each teaspoon, therefore, should contain 200 mg of active oxytetracycline. If fish eat 3 percent of their body weight per day, each pound of feed should contain one gram of drug (5 teaspoons). Vegetable oil or fish oil work well as binders. The oil, feed and powdered premix should be thoroughly mixed to assure even distribution of the drug to all pellets. To coat the pellets properly, mix the powdered premix with the oil, then add this mixture to the feed. This mixture should be made daily immediately before feeding. This is an expensive, time-consuming and laborious process and is practical only in emergency situations.

Romet is available in a form called Romet-B. This product has easy-to-follow directions for mixing the premix with the feed. Again, binding agents like fish oil or vegetable oil can be used. A disadvantage of Romet-B is that it is only sold in 10 lb. canisters which are too expensive to be practical for use by small farmers.

Storage of Medicated Feed

As with all fish food, store medicated feed in a cool, dry place. Antibiotics and important nutrients will break down more rapidly if kept in a warm, moist environment. Excessive breakdown of antibiotics because of improper storage can be an important reason for unsuccessful treatment. Discard unused medicated feed after 3 to 4 months.

How to Know Which Medicated Feed to Use

Terramycin and Romet each have an important role in disease management of channel catfish. Table 1 is a summary of the advantages and disadvantages of each feed. The FDA has approved Terramycin for control of *Aeromonas* and *Pseudomonas* infection and Romet for control of *Edwardsiella ictaluri* infections. Ideally, however, the selection of an antibiotic should be made following isolation of the bacteria and performance of a sensitivity test. A sensitivity test (Figure 1) shows the ability of disease-causing bacteria to grow in the presence of several different antibiotics.

If the bacteria are unable to grow in the presence of a certain antibiotic, a clear area, or "zone of inhibition," is seen around the area treated with that drug. If the drug has no effect on the bacteria, they will grow all over the area containing the drug. The area will then have a cloudy appearance.

A fish health professional can perform a sensitivity test for you and recommend which antibiotic to use. Remember there are some circumstances when treatment with an antibiotic may not be necessary.

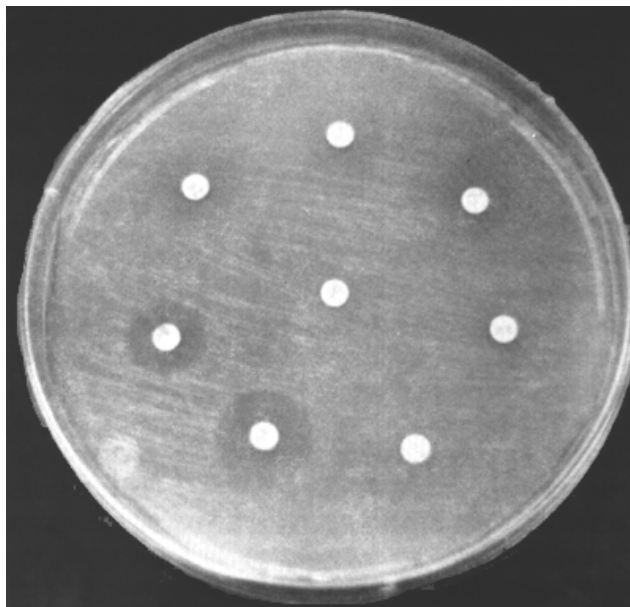


Figure 1. A sensitivity test shows whether or not bacteria can grow in the presence of different antibiotics. Each disc on the plate was treated with a different antibiotic.

SUMMARY

Medicated feeds are commercially prepared catfish feeds which contain an antibiotic. Bacterial infections are controlled by antibiotics. The most common bacterial infections of channel catfish are *Aeromonas* sp., *Flexibacter columnaris*, and *Edwardsiella ictaluri*.

Only two antibiotics are available in medicated feeds for channel catfish. Terramycin contains the drug oxytetracycline. It is effective against all the organisms listed above, but is only approved for use against *Aeromonas* and *Pseudomonas* infections. Feed against *Aeromonas* and *Pseudomonas* infections. Feed Terramycin for 10 days followed by a 21-day withdrawal period. It is only available in a sinking feed.

Romet is a potentiated sulfonamide which contains two drugs, sulfadimethoxine and ormetoprim. It is approved for use against *Edwardsiella ictaluri* infections and against *Aeromonas* infections which are not sensitive to Terramycin. Romet does not appear to be effective against *F. columnaris* disease, therefore, is not recommended for use during *F. columnaris* outbreaks.

Feed Romet for 5 days followed by a 3-day withdrawal period . It is available as a floating feed.

The final choice for an antibiotic should be based on a laboratory test called a sensitivity test . The test determines which antibiotic will work best to control the bacteria isolated from your fish. A fish health professional

can complete this test and recommend the best control of a bacterial disease outbreak on your facility . Keep in mind that bacterial diseases are usually a consequence of poor water quality, excessive parasitism or improper handling . These management problems must be corrected for successful, long-term control of infections.

Table 1. Advantages and disadvantages of the two medicated feeds, Terramycin and Romet, which are currently approved by FDA for use in channel catfish.

Terramycin	Romet
Advantages:	Advantages:
(1) Effective against most bacteria which cause disease in channel catfish.	(1) Effective against <i>Edwardsiella ictaluri</i> and many Terramycin-resistant organisms.
(2) Available in many areas.	(2) Five-day treatment period and 3-day withdrawal period.
(3) Reasonable cost.	(3) Available in a floating feed.
Disadvantages	Disadvantages:
(1) Bacteria can develop resistance to this drug.	(1) Not effective against <i>Flexibacter columnaris</i> .
(2) Ten-day treatment plus 21-day withdrawal period.	(2) Availability is a problem in many areas.
(3) Only available in sinking feed.	(3) More expensive than Terramycin.