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Catfish Marketing: Arkansas Restaurant Manager Preferences

Carole R. Engle
Professor/Department Head

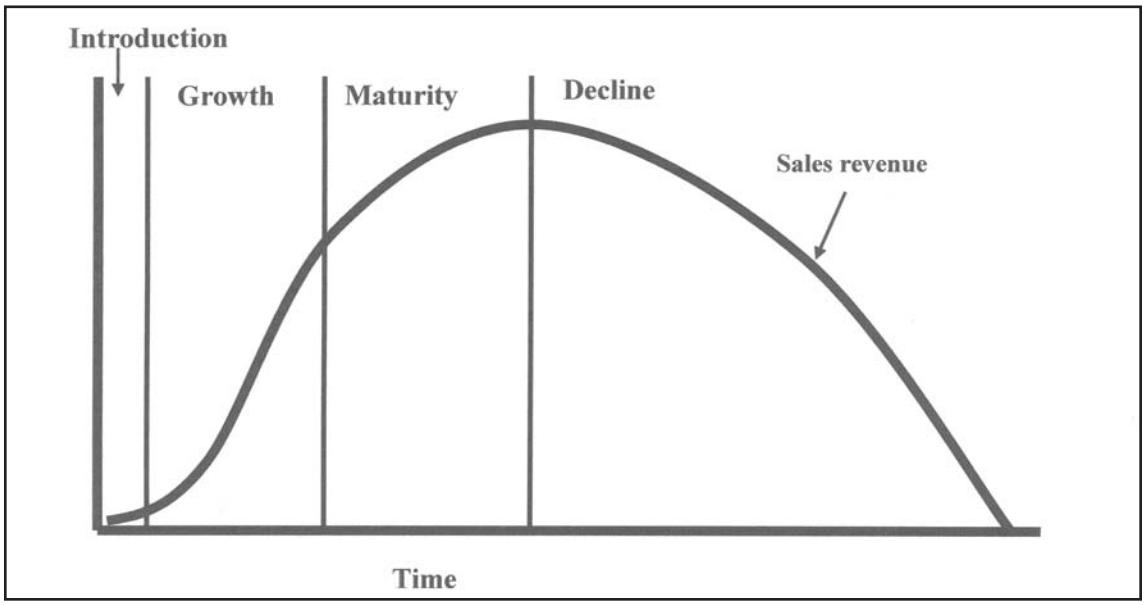
Products on the market go through what economists call a life cycle. See Figure 1. During the maturity phase sales slow as the product attracts competition. If these competing products are viewed by consumers as identical, consumers typically choose the product with the lowest price. Producers then compete with each other almost exclusively on price. As a result, the challenge for a company producing a "mature" product is to differentiate it from its competitors. If products can be developed with somewhat different attributes and are marketed to consumers who prefer those particular attributes, those consumers may be willing to pay higher prices.

It is critical to know what attributes of a product attract specific consumer groups, and what those groups are willing to pay for those qualities. Each consumer group is called a market segment. Market segmentation is the process of identifying groups of consumers with similar preferences. To sell various forms of a product to specific market segments requires detailed understanding of their preferences. Companies can charge higher prices if they match products with very particular characteristics to those market segments that are willing to pay higher prices for those qualities.

Understanding how consumers in different market segments view the attributes or characteristics of a product is fundamental. A product carries a wide range of features, including price, texture, name, availability, and quality. Any or all of these can provide a basis for differentia-

continued on page 2

Figure 1. A typical product life cycle curve.



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tion. A company must establish a unique identity for each product by varying levels of certain characteristics such as price, name, availability, or quality. When a consumer eats a catfish fillet many qualities are considered all at once – taste, texture, overall quality level, and price paid. These characteristics are intertwined in the mind of the consumer, but analytical techniques exist to identify characteristics which most influence the decision to purchase a product.

Recent studies at UAPB have enhanced our understanding of buyer preferences for catfish on several levels. A 2002 study, funded by the Arkansas Catfish Promotion Board, examined perspectives and preferences of Arkansas restaurant managers for U.S. farm-raised catfish. National surveys were conducted in 2004 of restaurant and supermarket managers, and of consumer households, and these also identified attitudes and preferences towards catfish.

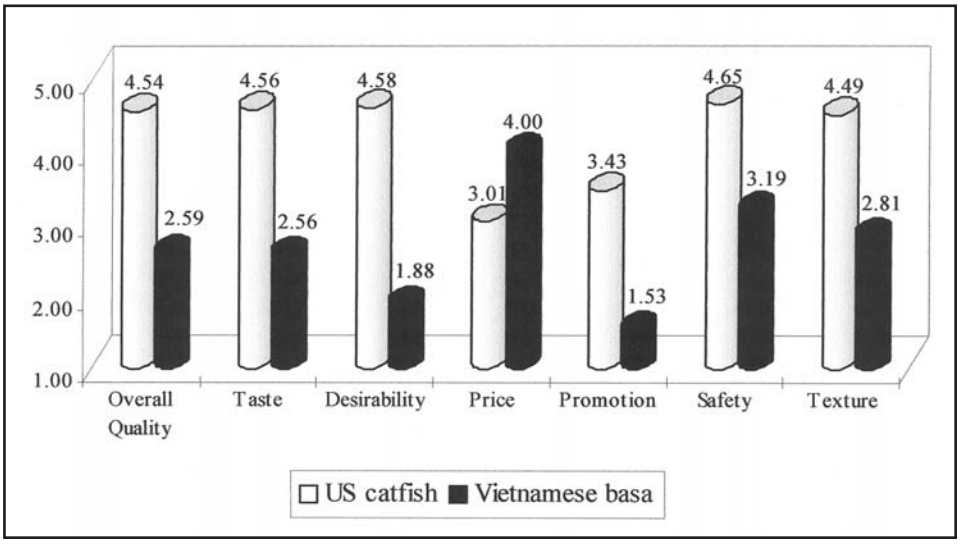
The Arkansas restaurant manager survey was conducted from July to August, 2002. Twenty cities located all across Arkansas with populations greater than 20,000 were selected. A total of 86 restaurant managers responded, giving a response rate of 59 percent. Among respondents who indicated that they sold catfish, 80 percent identified themselves primarily as catfish restaurants. In these restaurants, 76-100 percent of all fish sold was catfish. The most frequently purchased form was frozen fillets – 94% of catfish purchased was in the form of fillets, and 74% of catfish purchased was frozen.

The 2002 study compared U.S. farm-raised catfish with Vietnamese basa in terms of overall quality, taste, desirability, price, promotion, safety, and texture on a scale of 1 to 5, with 5 being the highest and most favorable score. See Figure 2. Scores for U.S. farm-raised catfish ranged from a low of 3.01, for price, to 4.65 for safety. Overall, U.S. farm-raised catfish scored very high (above 4.50) on overall quality, taste, desirability, and safety with texture scoring a close 4.49. The lowest score was 3.01, for price, indicating that consumers would prefer lower prices. The next lowest score was for promotion, at 3.43. This score is still above neutral and is a positive score. Buyers such as supermarkets and restaurants frequently prefer for industries to do more and more promotion. It helps their sales by creating additional demand for products that they offer.
Vietnamese basa scored significantly lower on all attributes except price. During the survey period in 2002 the price of basa was lower than the price of U.S. farm-raised catfish. The higher score on price for Vietnamese basa indicates that consumers preferred the lower price of basa compared to the higher price of U.S. farm-raised catfish. Other scores for Vietnamese basa ranged from a low of 1.53 on promotion to a high of 3.19 for safety. In descending order, the restaurant managers rated texture of Vietnamese basa at 2.81, overall quality at 2.59, taste at 2.56, and desirability at 1.88 – all much lower than scores reported for U.S. farm-raised catfish.

Econometric analyses were used to identify different groups of buyers, in terms of preferences. The results show that Arkansas restaurant managers fall into two classes. One of these groups is seeking low price, is not concerned with the color of the product, and also prefers a product with a mild flavor and a moist texture. The second group is less sensitive to price but is very sensitive to color. This group prefers off-white to pinkish

continued on page 3

Figure 2. Ratings by Arkansas restaurant managers on various characteristics of fish products, on a scale of 1 to 5, with 5 being very favorable and 1 being very unfavorable. In 2002 at the time of the survey price of Vietnamese basa was lower than the price of U.S. farm-raised catfish. The higher score of Vietnamese basa on price indicates that respondents preferred the lower price of basa.



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white color, moist texture and mild flavor. It is significant that this second group is willing to pay somewhat higher prices if the product meets their preferences for color, texture and flavor, which are, coincidentally, characteristics often used to describe U.S. farm-raised catfish. Different marketing strategies apply to the two groups. Marketing to the group mostly concerned with price must focus on price-competitiveness and consistently mild flavor and moist texture.

Much more research must be done. Arkansas is a state with a strong traditional demand for catfish. Restaurant managers in other states are not likely to have the same preferences. Additional research must define market segments in various other regions of the country. National survey data which is currently under analysis at UAPB will provide additional insight into preferences elsewhere in the U.S. For more information feel free to contact me at 870-575-8523, or cengle@uaex.edu.

Further detail on this study can be found in:

Quagrainie, K. and C.R. Engle. 2006. A latent class model for analyzing preferences for catfish Aquaculture Economics and Management 10(1).

Researchers Attach Transmitters on Cormorants

Andrew A. Radomski and Scott C. Barras
USDA-ARS Research Wildlife Biologists

This winter USDA biologists in Arkansas and Mississippi captured cormorants, also known as water turkeys, and attached transmitters, aluminum leg bands, and blue plastic leg bands with white numbers. These transmitters allow us to learn more about cormorant behavior and movements at fish ponds.

Prior to satellite transmitters and other technological advances, researchers relied on leg band returns to determine bird migration routes. Unlike ducks and geese, cormorants are not hunted so band return rates are extremely low. It took several decades, starting with leg bandings in 1973, to verify that the cormorants hatched in northern US and Canada increased their numbers inland within the southeastern states rather than migrating to the Gulf of Mexico. Banding information is biased because most cormorants were banded as immature birds caught at nest sites. As a result, researchers were unable to determine for many years if they observed an actual change in migration or something unique to young cormorants.

Very little research information is available specifically on cormorant movements around aquaculture facilities. Furthermore, most state researchers are no longer banding cormorants, and the ability to decipher the exact movements of cormorants at fish farms is difficult, given the small number of banded birds and low rate of band returns. This partially explains why we are capturing cormorants again. Many of you will remember that we captured cormorants and attached transmitters on them in 1999-2000. The current generation of transmitter technology has allowed us to equip cormorants with global positioning systems and solar panels which extend battery life to three years. With these improvements we expect to determine which ponds the birds are selecting, the preferred areas for day and night roosting, and daily movement patterns during the winter months around fish farms.

Some readers will point out the obvious – that all cormorants are fish-eaters. However, we know that birds are not randomly foraging at fish ponds. Some farms have fewer predation problems than their neighbors. Our transmitter data will allow us to determine if the same birds revisit the same ponds, and will help us with strategies for management of cormorants around ponds. We can also observe movements from the roost sites and determine which factors influence the choice to forage in fish ponds rather than lakes. We will look at the impact of weather, hazing programs, and other conditions that fish farmers implement against these predators. Ultimately, if we determine how ponds and roosts are selected, then we are one step closer to being able to reduce the damage to aquaculture sites.

Understanding the year-long movements of cormorants is important for establishing management strategies at the national scale, just as it is for ducks, geese, and other migratory animals. Many of you are aware of the ongoing Arkansas Game and Fish study with transmitters on mallards and their web site maps. More information can be seen at their website, http://www.agfc.com/mallards/. Biologists responsible for manag-

continued on page 4

Continued from page 3

ing cormorants need similar information on the timing, duration, and routes of migration to determine the most appropriate start and end dates for management activities.

Our previous transmitter study provided routes, timing, and dates of cormorant migration. The accuracy of these transmitters was within hundreds of yards at best and information was only transmitted every few days because of the low battery power. Nevertheless, much information related to managing cormorant numbers and depredations were determined. These were the most important findings:

Of 53 captured cormorants, six (five immature, and one adult) *did not* migrate, and stayed in the southeastern U.S. (Alabama, Arkansas, Louisiana, and Mississippi). Aquaculture producers must be prepared to manage these birds year-round.

Mean daily distance traveled was 45.5 miles per day. This did not differ between immature and adult cormorants.

We request your help to retrieve dead birds. Contact us if you find or collect any of these birds on your property. Please return the transmitters. They will be refurbished and reused. We appreciate our mutual cooperation, and the opportunity to help you find solutions to your bird problems, and we will keep you informed of our research findings.

If you observe or collect cormorants with electronic equipment attached to their backs, please contact us promptly.

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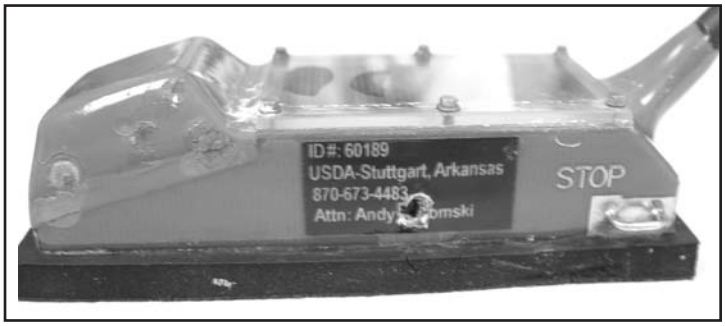
Left photo shows a transmitter on the back of a cormorant. The photo below is a close-up of a transmitter.



Upcoming Events

Arkansas Aquaculture 2006
January 26-28, 2006. The Catfish Farmers of Arkansas will hold its annual meeting at the Embassy Suites Hotel in Hot Springs. 870-672-1716.

Fish Farming Trade Show
February 2-3, 2006. Regional trade show and conference. Annual event. Washington County Convention Center, Greenville, Mississippi. The event is sponsored by Catfish Farmers of Arkansas, Catfish Farmers of Mississippi, Alabama Catfish Producers and Louisiana Catfish Farmers Association. 601-206-1600.

Arkansas Bait and Ornamental Fish Producers
February 9, 2006. Lonoke Community Center, Lonoke, Arkansas. Annual educational meetings. 501-676-3124.

Catfish Farmers of America Annual Convention and Research Symposium
February 23-25, 2006. Hyatt Regency Riverwalk, San Antonio. 662-887-2699.

Improving Farm Efficiency

Larry Dorman
Extension Fisheries Specialist

Although catfish prices have risen to $0.72 - 0.75 per pound, producer profits are squeezed by ever-increasing costs. For economic survival, producers must operate as efficiently as possible. This article examines some avenues for savings and provides tips for improving farm efficiency.

Rising Fuel Costs and Equipment Maintenance

Fish producers pay close attention to the price of farm diesel. The current price is roughly $1.95 per gallon for a transport load, 7,500 gallons, and this price excludes delivery costs. Diesel is used to supply power to nearly all tractors, and many wells, hauling trucks, and emergency generators on Arkansas fish farms. The rising cost of diesel must be tempered to some degree by proper maintenance and operation of equipment.

Dirty injectors cause inefficient combustion of fuel and a loss of power. If black smoke is seen in the exhaust, clean the injectors. Sometimes a fuel additive can be used to do this. Make sure to use a product intended for cleaning diesel injectors. If in doubt, contact the machinery dealer to identify acceptable types of fuel additives. If your engine continues to release black smoke even after using a cleaning additive then have a qualified technician clean and service the injectors. Contact your machinery dealer for recommendations on cleaning and service intervals.

Dirty air filters restrict the flow of air needed for the combustion process. Insufficient air flow results in an excessive fuel-air mixture so fuel consumption increases. The result is higher fuel cost. Excessive fuel burning also results in black exhaust smoke. Check the air flow indicator found on the air cleaner. Service the air cleaner and replace the filter if needed.

Use the proper viscosity of oil in the engine to maximize engine efficiency. Oils that are too thick decrease power and lubrication and increase fuel consumption. Change the oil on a regular schedule to remove contaminants, improve lubrication, and reduce friction between moving parts.

Contaminants change the viscosity of the oil and cause corrosion of engine parts if left in the engine too long. Running an irrigation engine for 24 hours is equivalent to 1,000–1,200 miles on an automobile. Engine use hours add up fast. Oil and filter changes must never exceed one year and many service manuals call for oil and filter changes at 250 hours.

Fish producers will improve efficiency with proper training of tractor operators. Operating a tractor in a low gear at high engine speed increases fuel consumption and wear on the drive train components. If the task allows, operate the tractor in a higher gear and at a lower throttle setting. This conserves fuel and reduces drive-train wear. Reducing engine speed by 300 rpm reduces fuel consumption by about 10%.

Another way to improve efficiency is to match tractor size to the load. A large horsepower tractor isn't needed to operate a small "bushhog" rotary cutter. Most emergency aerators in use today are "sidewinders" and designed to be powered by a 50 or 60 hp tractor. Using larger tractors for that purpose is a waste of energy.

Reduce fuel and maintenance costs by shutting off engines rather than letting them idle for hours. Recent studies show significant savings by not letting a diesel engine idle for more than ten minutes.

Train operators to perform daily service on-site. Notice and correct small maintenance tasks at the pond bank to avoid hauling the machinery back to the shop for repairs.

Improving Feeding Practices

Enterprise budgets show feed cost to be the major expense associated with a catfish operation, accounting for approximately 45% of the total costs. Feed is a major expense. It is often possible to make significant gains in overall farm profitability through small improvements in feeding.

The practice of multiple batch stocking of catfish makes it difficult to accurately determine the feed conversion ratio (FCR). However, FCR is a critical factor for anyone working to improve farm management and budgeting. Small improvements in FCR sometimes indicate substantial increases in overall farm profits.

Most producers estimate FCR at 2.3 or higher for budgetary purposes. A hypothetical 200 acre catfish farm uses six tons of feed per acre per year. The whole farm uses 1,200 tons or 2.4 million pounds of feed, and produces 1.043 million pounds of fish. An improvement in the FCR from 2.3 to 2.2 would yield an increase of 48,000 pounds of fish. At $0.75 per pound each 0.1-unit improvement in FCR yields $36,000 more in gross farm revenue.

continued on page 6

Continued from page 5

Much attention is focused on ways to improve FCR. Producers, researchers, and Extension specialists have debated this for years. Many factors influence FCR. The following suggestions are offered. Feed a high quality diet. Most feed manufacturers offer this. Use floating feed. Use good feeding techniques. "Work" the fish. That is, feed a small area of the pond and wait for the fish to consume everything. Drive down the levee and blow out more feed. Be observant and focus on the task. Feed the fish to satiation but avoid overfeeding. Avoid the tendency to work too fast even if you are responsible for feeding 400 to 500 acres in a day.

As we know, over-feeding wastes money and affects water quality and fish health. Using the hypothetical situation mentioned above, 1,200 tons of feed was used across the farm. If the farm is overfed by 5% for the season, 60 tons or 120,000 pounds of feed will be wasted. At a cost of $250 per ton, that corresponds to $15,000 worth of feed wasted. As you can see, it is vitally important to feed as efficiently as possible.

Aeration Practices

Farmers like to argue about the benefits of permanently wired aeration versus PTO-powered emergency aeration. This debate ranges from the number of horse power per acre to the minimum level of oxygen to initiate aeration. Other factors include the effect of orientation of the aerators on current. Many producers have two or more aerators per pond. When oxygen levels drop to 4 ppm, the first aerator is turned on. If oxygen drops to 3 ppm the second aerator is started. Some producers prefer to aerate for a set time period each day, from 8 or 10 o'clock in the evening to 8 o'clock the next morning, regardless of oxygen levels. Other producers have decided to aerate only in extreme emergencies to cut fuel and electricity costs.

According to results of our catfish yield verification program, electricity accounted for 1 cent per pound of fish harvested if one paddle-wheel was turned on when oxygen dropped to 4 ppm and kept on until oxygen recovered to that level. Other ponds in the verification program which were aerated with two paddlewheels from 8:00 pm to 8:00 am nightly resulted in electricity costs of over 5 cents per pound of fish harvested. Aeration is most efficient if used only when oxygen levels are well below saturation. The trade-off is, of course, higher labor costs to monitor night oxygen levels.

Another important aspect of pond aeration concerns the amperage drawn by an electric motor. Aerators must draw no more than 90% of the ampere load rating. This amperage usually coincides with a paddle depth of 4 inches. Pay attention to paddle depth. Floatation devices sometimes corrode and develop leaks, particularly in the high salt areas of Chicot County. This causes aerators to run deeper and thus draw excess amperes, causing circuit breakers to trip off and result in oxygen depletion and many dead fish.

Balance your need for sleep with the number of hours you run your aerators. Maintain your equipment. Feed the fish well but don't overfeed. Flexible, committed management is the key to economic success.

USDA 2005 Census of Aquaculture

An Editorial

Census forms were mailed to all known aquaculture producers in the U.S. on December 15. If you produced aquaculture products in 2005 and did not receive a report form, please contact Kevin Mills at 800-327-2970. The Census of Aquaculture is the only comprehensive measure of the scope and value of the U.S. aquaculture industry. If you have not completed the census form yet, please complete and return this important information for our industry.

The 1998 Census of Aquaculture showed that Arkansas was the largest baitfish producer, and third largest food fish producer. Arkansas was second in the nation in total value of aquaculture products sold. Nationally, the value of aquaculture products sold in 1998 was almost one billion dollars. That was nearly double the value indicated by the 1992 census.

Producer organizations, university and Extension personnel, and elected officials use the census information to help define and support research, legislative and trade initiatives. Each Census of Aquaculture provides valuable reference and benchmark information for our industry. We encourage all producers to complete and return the form. All individual reports are kept strictly confidential by law.

Heterosporis: An Important New Parasite

Andy Goodwin
Extension Fish Pathologist

Heterosporis is a tiny parasite that forms cysts in the muscles of fish. In severe infections, the parasite and its spores may replace most of the muscle tissue. It is often noticed when fishermen dress fish and find that the fillets have opaque white patches and are soft and unpalatable. There is no evidence that the parasite kills fish directly, but the destruction of muscle would be expected to make fish more vulnerable to predators.

Several species of *Heterosporis* have been reported in ornamental and sport fish. Historically, the most significant problems have been in Europe and Asia where the parasites are found in ornamental fishes and eels. Recently there have been very severe infections of what may be a new *Heterosporis* species infecting wild fish in the north-central U.S.

In 2000, fishermen in Wisconsin and Minnesota began reporting yellow perch with cloudy white patches of muscle. These lesions are now known to be caused by *Heterosporis* and scientists have described the parasite as replacing as much as 90% of the normal muscle tissue. Initial reports describing *Heterosporis* did not cause much concern in Arkansas because the highly susceptible yellow perch is not an important sport or aquaculture species in this state. However, subsequent studies have found natural infections in walleye, northern pike, rock bass, pumpkinseed, burbot, sculpin, and trout perch. More troubling is recent work where experimental exposures have shown that many other species of fish are susceptible to the parasite including trout, salmon, white suckers, mosquito fish, channel catfish, fathead minnows and largemouth bass. It is clear that the *Heterosporis* parasite has the potential to infect important sport and aquaculture species in Arkansas. Bluegill, sturgeon, smallmouth bass, and golden shiners exposed to the parasite remain uninfected.

The life cycle of *Heterosporis* is simple and involves only fish with transmission through a resistant spore. Fish become infected by eating an infected fish or by exposure to spores in the water. This means that moving infected fish from place to place has the potential to also move the parasite to new areas. Farmers who import susceptible species like fathead minnows from Wisconsin, Michigan, Minnesota, Lake Ontario, or other areas known to harbor the parasite, risk importing this parasite, especially if the fish have spent time in the wild or have been cultured on farms that do not use controlled ponds and well water.

The actual risk of adverse effects from the introduction of *Heterosporis* is difficult to predict. It is possible that the parasite will not do well in southern climates. It is also important to remember that successful experimental infection of one fish does not mean that the species will become infected under natural conditions. However, we know that *Heterosporis* can produce natural infections in a popular sportfish species (walleye), and experimental infections have been proven in some of our most important cultured fish (catfish, fathead minnows, and largemouth bass). Furthermore, the ability to infect other economically important species is still unknown. Indisputably, great caution is required before bringing new fish to Arkansas from states where the parasite is found.

If this exotic parasite is introduced, there are no treatments for infected fish and the resistant spores of the parasite will make control very difficult. The biggest risk right now is the import of wild baitfish from northern states. The import of other susceptible species from farms in regions where *Heterosporis* is present is also risky, especially if the supplier also deals in wild-caught minnows or uses wild minnows for forage. Many state agencies are concerned about this parasite and any finding of *Heterosporis* in Arkansas would immediately jeopardize exports of fish.

Much of the material in this article is from meeting reports presented in 2005 by Peggy Stelzig, Daniel Sutherland, and Sue Marcquenski of the University of Wisconsin La Crosse and the Wisconsin Department of Natural Resources.

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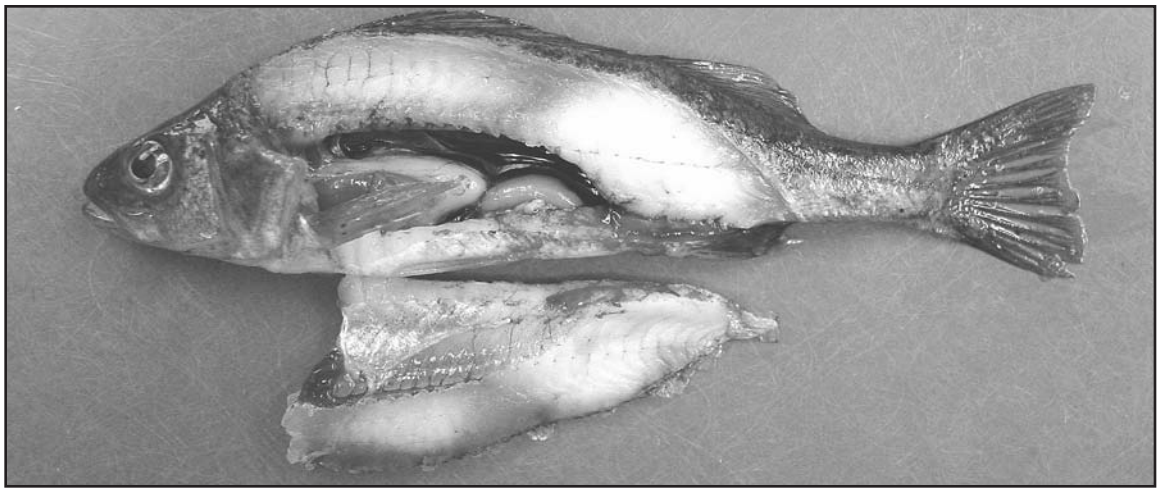

Heterosporis is visible as light patches in about 80 percent of the exposed muscle of this wild-caught yellow perch. Photo by Dr. Dan Sutherland, University of Wisconsin-La Crosse. See article on page 7.

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