

# GUIDELINES FOR PRODUCING FOOD-SIZE CHANNEL CATFISH

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[www.ca.uky.edu/wkrec/Wurtspage.htm](http://www.ca.uky.edu/wkrec/Wurtspage.htm)

Aquaculture is practiced at many different levels. Fish are farmed for recreation and profit. The difference depends on the number or density of fish raised per surface acre (one acre, four feet deep -- 4 acre-feet) of water. Management skills and equipment needs become more technical as the number of fish produced increases. It is important to decide at the outset what level of production or management is most practical for you.

For intensive, extensive and cage production; it is assumed that a 6-8 inch catfish fingerling stocked at the beginning of April will reach a size of 1 to 1-1/4 lb by mid- to late October. Fingerlings are traditionally stocked in spring when water temperatures have become stable between 65-68° F and are rising. However, fingerlings could be stocked during the preceding October when water temperatures have dropped to 65-68° F. Channel catfish grow best when water temperatures are between 83-86° F. The following recommendations are for ponds that have no existing fish populations.

## **Intensive or Commercial Production**

1,500 to 5,000 lb/acre. Densities between 1,500-2,000 lb/acre represent a gray zone where supplemental aeration is not necessary but emergency aeration may be. Daily feeding is required.

## **Extensive Production -- Recreational or Small-Scale Commercial**

200 to 1500 lb/acre. Densities between 1,000-1,500 lb/acre may experience low oxygen

for several days in late summer. Daily feeding is required for good growth.

## **Cage Culture**

1,500 lb/acre without aeration and 2,500 lb/acre with aeration. Cages are made with 1/2- to 3/4-inch mesh netting or black polyethylene screen and stocked with 6-14 fish/cubic foot (approximately 1 fish/gallon) of cage volume. Cages are used in ponds that can not be seined or drained easily. Ponds must be two feet deeper than the bottom of the cage. The minimum distance between cages should be 15-20 feet. Daily feeding is required.

## **Recreational Fishing**

100 catfish fingerlings and 1,000 fathead minnows stocked per acre. The number of catfish stocked can be doubled if an annual pond fertilization program is followed. Catfish spawning containers should not be placed in these ponds. Feeding is not required.

The Kentucky Fish and Wildlife Department recommends stocking 120 bass, 400 bluegill, and 50-100 catfish fingerlings per acre. For more information, contact your local Fish and Wildlife official.

## **Water Needs**

Intensive aquaculture requires 25-40 gallons/minute of good quality water, on demand, for each surface acre of production pond. Water should have a pH of 6.5-9.0 and no less than 20 mg/l (ppm) alkalinity or hardness. Agricultural limestone can be used to raise pH, alkalinity and hardness to the minimum required levels.

Watershed ponds can be used for aquaculture if the recommendations for extensive or cage production are not exceeded. Watershed ponds should have an average depth of 6 feet to compensate for evaporation during hot, dry summers. As much as 24 inches of water may be lost.

### **Pond Size**

Commercial ponds should be no less than 1/2 acre. However, to get the "feel" of intensive fish production, no less than 3 acres -- as one pond -- but no more than 10 acres should be farmed. Fish farms larger than 10 acres are clearly commercial size operations. An average Mississippi producer farms 250 acres with individual ponds as large as 20 acres. While larger ponds are cheaper to build, they are more difficult to manage and harvest.

### **Feeding Channel Catfish**

Feeding can account for as much as 50% of the cost of commercial fish production. Offering too little feed at the beginning of the production season (April to June) can result in fish not reaching market size by autumn. However, feeding too much towards the end of summer can cause poor water quality, which can reduce growth and increase expense because of poor food conversion ratios. Following guidelines for good feeding practices can improve catfish performance and increase profits.

### **Catfish Feeds**

Always feed a nutritionally (100%) complete or balanced catfish feed containing vitamins, minerals and 32% protein. Pellet size should be between 5/32 and 3/16 of an inch in diameter. Catfish fingerlings may grow a little faster if fed a complete diet containing 36% protein for the first month after stocking. Floating feed is the most effective during the traditional spring/summer production season. The number of pounds of feed fed divided by the number of pounds of fish growth/gain is known as the Food Conversion Ratio (FCR). Depending on

management efficiency, it takes 1-1/2 to 2 lb of catfish feed to produce 1 lb of fish (FCR = 1.5 to 2.0).

### **Feed Storage**

Catfish feed should be stored in a cool, dry place. Heat, moisture and long term storage (greater than 3 months) may produce rancid oils and can destroy vitamins. Feeds should not be stored or used more than 90 days past the date of manufacture. Before purchase, make sure feed bags clearly indicate the date of manufacture. Feeds with inadequate vitamins, rancid oils or mold may stress fish and can cause poor growth, disease and bone abnormalities, or deaths. If possible, it is safest to store no more feed than can be used within 60 days of the date of manufacture.

### **General Rules for Feeding**

The simplest rule for feeding catfish is to feed once daily, offering all the fish will eat within 20-25 minutes. This is called satiation feeding. When feeding fish stocked at high densities in commercial ponds, it is best to feed after dissolved oxygen levels have increased above 3.0 mg/l, between 10:00 AM and 1:00 PM. Feed should be distributed evenly over the entire surface of the pond. The wind should be behind you when spreading feed.

Fish can also be fed as a percent of body weight if the producer has a reliable estimate of the total poundage of fish in a pond. What the fish will eat in 20-25 minutes (once daily) is the correct percent of body weight for any given temperature. When water temperature is between 70 and 90° F, feed at 3% of total fish weight daily (e.g. for every 100 lb of fish, feed 3 lb of feed daily). However, fish raised at intensive levels, 4,000-5,000 lb of fish/acre, should not be given more than 75-100 lb feed/acre daily. Without aeration, daily feeding should not exceed 30-35 lb of feed/acre.

When water temperature is between 60 and 70° F, feed at 2% of total fish weight daily (2 lb of feed for 100 lb of fish); or feed what the fish will eat in 20-25 minutes, once daily. At temperatures of 65° F or lower, it would be wise to begin offering a feed that sinks slowly to prepare fish for winter-feeding. Timed feeding is not a reliable method when using sinking feeds.

When water temperature is above 90° F, feed between 1/2 to 1% of total fish weight daily (1/2 to 1 lb of feed for 100 lb of fish). Above 95° F, feed no more than 1/2 % of body weight once every 3 days.

When water temperature is between 50 and 60° F (winter-feeding) feed at 1/2 to 1% of total fish weight daily (1/2 to 1 lb of feed for 100 lb of fish). This would be approximately 1/3 of the spring/summer rate and 1/2 of the amount offered when temperatures are between 60 and 70° F. A common practice is to feed 1/2 to 1 lb of feed per 100 lb fish every other day or 1 lb of feed per 100 lb fish every third day. Timed feeding is not recommended because catfish are reluctant to surface feed at these temperatures. A sinking feed will likely be necessary. Feed fish in a large area of the pond that receives direct sunlight. Try to offer food in the same place and as a single feeding. When ice has begun to form on pond surfaces, water temperatures are below 39° F and catfish will not consume feed.

Except for winter-feeding, feed should be broadcast evenly over the entire pond. Experienced producers offer food to fish in equal portions twice a day -- in the morning when dissolved oxygen has risen above 3.0 mg/l and again in the afternoon. Weight gains can be more than 10% higher for fish fed twice daily. However, deteriorating water quality can become a problem with this practice. Inexperienced producers stocking at low densities, 1,500 fish/ac or less, may have better success feeding once daily between 3:00-5:00 PM when oxygen levels are

highest. For timed feeding, a single daily feeding will be twice as long as one of two daily feedings. For example at the 3% of body weight level, two 10-15 minute feedings become one 20-30 minute feeding.

The use of floating feed when temperatures are greater than 65° F allows the farmer to observe feeding. Poor feeding activity is usually a sign of low oxygen, disease or poor water quality. If oxygen levels are low (3.0 mg/l or less) or fish will not accept feed, discontinue feeding for 48 hours or until oxygen has returned to safe levels and fish are eating aggressively.

## **Aeration**

Emergency -- aerators are operated temporarily when oxygen falls to or below 3 mg/l, during a crisis. Tractor powered paddle wheels or irrigation pumps are typically used. Aeration is continued until oxygen levels have stabilized at 5 mg/l or higher.

Supplemental -- aerators are operated whenever conditions leading to oxygen depletion have developed, or nightly during the last 2-3 months of the season. Aerators are turned on between 10:00 pm-midnight and left running until 10:00 am the next morning or until oxygen levels have stabilized at 5 mg/l or higher. Supplemental aeration is recommended for intensive production densities above 2,000 lb/acre.

Continuous -- aeration equipment is operated continuously (24 hours daily). Some producers manage highly intensive fish farms (greater than 5,000 lb/acre) and run electric aerators continuously from July to the end of September or until water temperatures have dropped to 65-68° F and are falling. The economics of that practice should be carefully examined.

Electric equipment is the only practical and economical way to aerate supplementally or continuously for prolonged periods of time. As a

general rule, 1 hp of electric aeration is used for each surface acre of water.

## **Pay Lake Operation**

Pay lakes represent a large industry in Kentucky. The recommendations discussed above for food fish production are similar for pay lake operation with a few distinct differences:

Fees -- fishermen pay to fish; either an hourly/daily rate, by the pound of fish caught or a combination of both. Profit from food, bait and tackle concessions often equals income from fish sales.

Stocking -- catfish are stocked at either intensive or extensive densities. However, 1-3 lb fish are stocked rather than fingerlings. Fish are replaced regularly as they are removed by fishermen. Therefore, stocking densities are determined by the number of pounds (recommendations above) added per surface acre of water. A pay lake is managed as if it were a production pond ready for harvest, throughout the season. Pay lakes are normally operated from early spring to the beginning of autumn.

Feeding -- many pay lake operators do not feed their fish because their patrons believe it

causes the fish to stop biting. Keeping the customer satisfied is critical. However, feeding at maintenance levels (1/2 to 1% of total fish weight stocked, or 1/2 to 1 lb of feed daily for each 100 lb of fish) keeps fish healthy and feeding aggressively.

People -- pay lake operation requires public relations skills in addition to aquaculture management. If you do not enjoy working with people, the pay lake business is **not** for you. Pay lakes are open seven days a week. Business is typically best on weekends.

Kentucky's licensed pay lakes stock approximately one to two million pounds of fish annually. Most of these fish, channel catfish, are imported from other states. The pay lake industry represents a sizeable market that could be supplied with channel catfish produced in-state. However, farm raised fish are harvested about the beginning of October when pay lakes are usually closing up shop. Therefore, farmers would have to hold their fish until the following season if they wanted to sell to pay lakes.