

Catfish Nutrition: Feeding Food Fish

Since feed is the most expensive part of catfish production, feeding a nutritious feed that converts efficiently and promotes growth without hurting water quality should increase production and profit.

Unlike other farmed animals, fish don't have feed available at all times and can't feed at will. The feeder decides how much feed to offer to the fish. There are no standard feeding practices across the industry, mainly because many factors affect feeding and every pond of fish behave differently. So, feeding catfish is a highly subjective process.

The information in this publication is based on results from feeding studies done over several years at the National Warmwater Aquaculture Center. Consider our recommendations as guidelines, since management practices vary from farm to farm. The guidelines are for feeding healthy fish grown from advanced fingerlings to market size.

Feeding Rate

Several factors dictate how much to feed catfish in a production pond. These include standing crop (number and weight of fish in the pond), fish size, water temperature, water quality, and weather. Generally catfish should be fed daily as much as they will eat without wasting feed and without hurting water quality. Feeding what the fish will eat is especially important when you raise catfish in a multiple-batch cropping system where there are several sizes of fish in the pond, because it is easier for the smaller, less aggressive fish to feed. This type of feeding may be a problem, though, since you might not know when

the fish have eaten all they will eat. Thus, it is easy to overfeed, which wastes feed and may hurt water quality.

Feeding rates should not be more than what the fish in the pond need. Long-term average daily feeding rates should not be more than about 120 to 150 pounds per acre. But it is okay sometimes to feed at higher rates. Our data showed that daily feeding the fish as much as they will eat resulted in higher production and weight gain, but feed conversion was increased, compared to feeding a restricted rate of not more than 80 pounds per acre per day. The lower feed conversion in fish fed the restricted rate is mainly because of less wasted feed compared to that of fish fed to their fill. We also found that total feed input, net production, weight gain, and feed conversion were about the same when fish were fed as much as they would eat or fed at a "cut-off" rate of no more than 120 pounds per acre per day under a single-batch cropping system.

Feeding Frequency

- **Once vs. Twice Daily** – Generally, feeding once daily is satisfactory for food fish grow out. Research has shown that feeding food fish twice daily is not necessarily beneficial. Although fish fed twice daily were offered more feed than fish fed once daily, the extra feed fed was not completely converted into weight gain. It is likely that feeding twice daily increases feed conversion because, if the feeder is not careful, feed can be easily wasted by overfeeding.

- Once Daily vs. Once Every Other Day or Third Day** – Although we recommend that catfish grown for food be fed once daily, feeding less frequently than daily may be called for under certain circumstances. Our data have shown that fish fed every other day or every third day consume up to 50 percent and 65 percent more feed on days fed, respectively, compared to fish fed once daily all they will eat. The increased feed consumption in fish fed less frequently than daily on days fed is mainly the result of compensatory growth, or at least a partial compensatory growth. Fish can compensate for all or part of the weight loss during a short period of not feeding when you resume full feeding. Although there are some advantages (reduced feed conversion, labor cost, and aeration) to feeding every other day or every third day, we do not recommend this for routine feeding, since fish fed every other day or every third day cannot consume enough feed on days fed to make up for the missed feed on days when you don't feed them. Also, feeding every other day or every third day appears to reduce fish processing yield, and it extends the production cycle. So, in the long term it may not be economical.
- Seven Days vs. Five or Six Days per Week** – During the growing season, most catfish producers feed their fish seven days a week, but some producers feed six days a week. Our data show that feeding six days a week (not feeding on Sundays) reduced net production by 3.3 percent, and feeding five days a week (not feeding on both Saturdays and Sundays) reduced net production by 6.9 percent, compared to fish fed seven days per week for a growing season. Feed conversion was reduced by 4.8 percent and 7.9 percent, respectively, for fish fed six days and five days a week, compared to fish fed seven days per week. Feeding six days per week may reduce production cost for food-sized channel catfish, but in our study, we used a single-batch cropping system and the fish were fed as much as they would eat. If feed is restricted, you would expect more decrease in net production by feeding six days per week compared to fish fed seven days per week. Also, if you use this strategy in a multi-crop system, skipping feed days may have a more negative impact than in single-crop systems because the smaller fish may lose more weight than was shown in our study.

Maintenance Feeding

Maintenance feeding means that all feed eaten by the fish is used to maintain the animal with no gain or loss of weight. You can get this feeding regimen either by feeding fish a maintenance ration daily or feeding as much as it appears they will eat one or two times per week. Since ponds usually have fish of various sizes, it is better to feed all they will eat on days fed than feeding

a little every day. Feeding the fish all they eat on the days fed lets smaller, less aggressive fish feed. Based on our research results, it appears feeding once a week as much as the fish can eat can maintain the body weight of food-sized catfish under a single-batch cropping system. But the condition factor, a nutritional status indicator that measures the relationship between fish body weight and length, is lower for fish fed once a week than fish fed more frequently.

Feeding Time

The best time to feed fish during the day on a large farm is mainly dictated by the logistics required to feed large numbers of ponds in a limited time period. As a result, during warm weather many catfish producers start feeding early in the morning as soon as dissolved oxygen levels begin to increase. This appears to work well. In research we find no advantages to feeding at a certain time of the day. There were no differences in weight gain, feed consumption, and feed conversion among catfish fed to satiation at 8:30 am, 4:00 pm, and 8:00 pm. No differences in emergency aeration time were noted among treatments. But we do not recommend feeding near dark or at night in large commercial catfish ponds unless enough aeration is available, since peak oxygen demand generally occurs about 6 to 12 hours after feeding. This time corresponds to the time when dissolved oxygen levels are low. Generally, it appears most practical to begin feeding in the morning as the dissolved oxygen begins to increase during warm weather. But in cool weather (late fall, winter, and early spring), water temperature is usually higher in the afternoon, and fish will eat better.

Feed Distribution and Duration of Feeding

Since most commercial ponds are relative large (usually 10 acres or larger), it is important to blow the feed over a large area to make the feed accessible to as many fish as possible. It is better to feed on all sides of the pond, but this is usually not possible because of the wind. Feed must be distributed along the upwind side to prevent it from washing ashore.

On a large commercial farm, how long a time to feed the fish in each pond is generally influenced by the number of ponds to feed and the number of feeders. Feeding fish, especially feeding fish to fullness, requires experience and patience. An experienced feeder is invaluable to the farm. The longer the feeder spends feeding each pond, the better chance to optimize feeding. Feeding fish in a hurry often results either in fish being underfed or overfed. As a general rule, in our small research ponds if the fish are actively feeding, they eat all they want in about 30 minutes.

Winter Feeding

Unlike warm-blooded animals, catfish do not feed consistently when water temperature drops below 70 °F. When water temperature drops to 50 °F and below, catfish more or less stop eating. Many catfish producers choose not to feed in winter for a variety of reasons, one of which is that it is difficult to see a positive response from a winter feeding program. But based on research results, winter feeding is beneficial, though how much depends on the severity of the winter. Fish gain (if fed) or lose (if not fed) more weight during a mild winter than a cold one. Research conducted at Auburn University has shown that food-sized catfish held over winter without feed can lose up to 9 percent of their body weight, while catfish fed 1 percent of their body weight when water temperature exceeds 55 °F gain 18 percent weight over the winter. We, and others, have published charts giving feeding rates and corresponding temperatures for winter feeding, but there is really no precise temperature at which to feed during the winter. As a general rule, if it is warm and fish will eat, it is beneficial to feed.

Since feeding activity of the fish is much lower in the winter than in the summer, it is thought catfish may respond to a sinking feed better than a floating feed during the winter. If you use a sinking feed, make sure it is an extruded feed (slow sink) and not a feed made through a pellet mill. Extruded feeds are more water stable and remain intact longer than a feed prepared in a pellet mill.

