Cooperative Extension Service

Fact Sheet 9009

Aquaculture Series

Channel Catfish Brood Stock-Selection and Management

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Introduction

In the past three decades, the channel catfish has developed into a species of tremendous commercial value. Part of the success is due to improved genetics from the original stock of fish.

To maintain the success of the industry, quality brood fish must be selected, maintained in proper sex ratios, and provided proper nutrition for egg development. This ensures production of top-quality fingerlings that keep production levels rising.

Selection

Mature fish within three months of spawning are selected for brood fish. Fish in the 4- to 6-pound range are preferred. When starting an operation, don't wait for fingerlings to reach spawning size. This takes three to four years. The cheapest and most reliable source of brood fish is large food fish purchased from producers. Hatcheries are often reluctant to sell to potential competitors. If hatcheries offer brood fish for sale, they are usually overpriced, and they may be culling their stock. So be cautious when purchasing.

Avoid fish recently taken from the wild. These fish are unreliable spawners. They serve as carriers for parasites and have little resistance to disease.

Check brood fish thoroughly before buying. Reject any fish with hemorrhages or sores, or fish in poor condition. Avoid fish having a history of channel catfish virus disease (CCVD). IF THIS GETS STARTED ON YOUR FARM, YOU MAY NEVER GET RID OF IT. Diagnostic services are available to help with this.

Desirable sex ratios are three females to two males or two females to one male. Catfish offspring are produced in a 50:50 ratio, but don't take this for granted when buying fish. Larger food fish may contain a higher percentage of males since they grow somewhat faster than females. Determine the sex of each brooder you buy.

Catfish strains with improved growth (10 percent faster) and increased disease resistance are now available from fishery research facilities. Two such strains were developed at Auburn University, Auburn, Alabama. These strains are the *Auburn* X *Kansas* Select strain and the *Auburn* X *Marion* Select strain. Fingerlings or brood fish from these strains cost more than average; but since one female can produce 10,000 to 20,000 offspring, the price difference is not significant.

The catfish farmer should start his own selective breeding program. This can be accomplished by choosing the fastest-growing fingerlings or food-size fish for future brood stock. If fingerlings are selected for breeding, retain additional fingerlings from random samples. This ensures that an adequate number of females is selected, because the larger fingerlings are males. Mix the randomly sampled fish with larger fish and when mature, sex them when selecting to ensure the desired sex ratio.

Determining Sex

Secondary sex characteristics are often used in sex determination. These characteristics include body shape and coloration. Males are usually larger and have broader heads than females. As spawning season approaches, males become lean, develop large muscular heads, and turn a dark bluish to black color.

Females' heads are narrower than their bodies when viewed from the top. As spawning season approaches, they develop soft, swollen bellies. Their color remains gray to olive.

Genital Examination

Turn the fish belly up. Two or three openings are present. The opening nearest the head is the anus. The one nearest the tail is the genital opening.

Males: The genital opening is at the end of a fleshy, nipple-like structure. This is called the genital papilla. It becomes swollen and rigid as spawning time approaches. Select the most robust males with a well-defined papilla, a large head, and dark color.

Females: The genital area is oval and flat. There are two openings separated by a small flap of skin. A slit or groove is located at the head end of the genital area. The urinary opening is located at the tail end of the genital area. The genital area becomes swollen and reddish in color as spawning time approaches.

Many researchers feel it isn't necessary to select brood females based on the reddish genital area. This character only indicates spawning time is near. They feel the swollen abdomen and general body shape are the best characters for selecting brood females.

For immature fish or fish not in spawning condition, use the following technique to determine sex (you'll need an assistant).

Hold the fish belly up. Grasp the head with one hand and firmly clasp the tail with the other. With the fish's head just below your chest and the tail away from your body, gently arch the fish's belly upward.

This causes the male's papilla or the female's genital slit to become more visible. Have your assistant slide a probe (or blunt pencil) over the genital area toward the tail. If the probe catches in the genital opening, the fish is female.

Brood Stock Management

Nutrition

Good nutrition is essential for successful spawning. During warm weather (water temperature 70 to 85 degrees F), feed a complete diet containing 30 to 36 percent crude protein. Feed 2 percent of the fish's body weight per day. A level less than this leads to over-competition by males, taking feed needed by the females.

At water temperatures from 50 to 70 degrees F, feed 1 percent of the fish's body weight three days per week. At this water temperature, 25 to 30 percent crude protein may be used. Fish need more nonprotein energy, such as is found when fish meal is replaced by soybean meal and other oilseed meals, at cooler temperatures. At water temperatures below 50 degrees, don't feed.

Observe the feeding behavior of your fish. In warm weather, offer all the fish will eat in 10 minutes. Add just a little more if the fish are still trying to feed when the 10 minutes are up. Feeding activity diminishes with the onset of spawning, so don't let this alarm you.

The practice of supplemental feeding with a forage species shows promise. Ponds are stocked with Tilapia or fathead minnows after spawning ceases. Tilapia offer the advantage of constant reproduction through September. In late November they begin to die and are readily consumed by catfish.

The forage fish provides supplemental nutrition not found in commercial feeds. Proper nutrition at this time is critical for egg development. Researchers report that brood fish supplementally fed with a forage fish the previous fall produced larger spawns with larger eggs and better fry survival than non-forage fed fish.

Stocking Densities

The total weight of brood fish should **never** exceed 1200 pounds per acre or 50 to 100 pair. Growth of brood fish must be considered when stocking, so stock 600 to 800 pounds per acre, not 1200. Good brood fish gain 50 percent of their weight from one season to the next.

When to Cull Brood Fish

Brood fish need culling when they reach the 10 pound size. Some producers cull brood fish as small as 6 to 8 pounds. Some reasons are as follows:

1. Large spawns are hard to manage. If the spawns are larger than the hatchery spawning basket, they must be separated into several parts.
2. The large males are very aggressive, occasionally killing each other or injuring the female during courtship.
3. Fish this size may be too large for the spawning containers, thus can't attempt spawning in the container.

Tips for Successful Spawning

Another consideration concerning stocking is pond size. Fish in smaller ponds (1 to 5 acres) have better spawning success than fish in larger ponds. This may be due to fewer male and female contacts or reluctance of the fish to come to the feed area in a larger pond. Also, fish in clear ponds seem to spawn better than fish in turbid pools.

Moving brood fish to a recently filled pond prior to spawning improves spawning success. Very poor spawning success results when brood fish remain in the same pond for successive years.

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