



Spawning— Hatchery Style



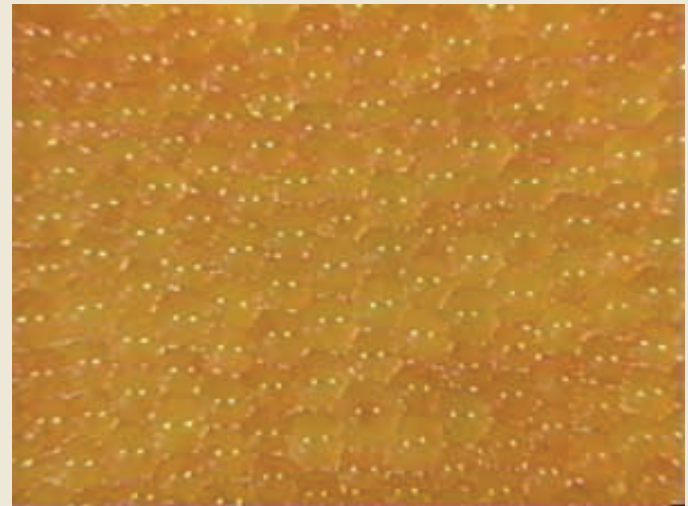
Trout were brought to Missouri in the late 1800s from California. Since then, many different types of trout have been tried in the state, but most did not "catch on" or adapt to our environment. Although natural reproduction does occur in a few of our streams, these populations must be carefully regulated and the harvest limited. The trout fishing that most Missourians enjoy is maintained by periodic stocking from one of the Conservation Department's five trout hatcheries. Three are operated cooperatively with state parks: Bennett Spring, Montauk, Roaring River. Maramec Spring cooperates with the James Foundation at St. James, and the largest trout hatchery is Shepherd of the Hills near Branson. Additional catchable-sized trout are received from federal hatcheries such as Neosho. Over 2.5 million trout were raised at these five facilities in 1987. Three of the hatcheries, Bennett Spring, Roaring River and Shepherd of the Hills, maintain broodstock which are the parents for the majority of the trout in the state. We keep several different strains of broodstock but most of the trout raised and stocked are fall spawning rainbows of the Missouri Strain. They stem from the McCloud Strain brought to Missouri in 1880 from California's McCloud River Station.



The shortened days of fall mark the beginning of spawning or egg taking at the two hatcheries. At this time, the males and female are separated into different raceways. It is fairly easy to distinguish the sexes because the mature males have a hooked lower jaw and usually a thinner or narrower head and body. Females, on the other hand, lack the hooked jaw and have a more rounded head and body. Once separated, the females are checked for eggs. They are dipped from the raceway into a tub of spring water, picked up by hand, and, when relaxed, a light pressure is put on the fish's belly. If she is ready to spawn, the eggs are readily released. Those "ripe" with eggs, ranging from 40 to 150 individuals per check, are put into another holding area while the rest are returned to the raceway to be rechecked in five to ten days. Females ready to spawn are then dipped into a tub of water containing an anesthetic to relax them so the eggs can be taken without injuring the fish or the eggs. At Bennett Spring Hatchery, eggs are taken by the hand-stripping method. To do this, the anesthetized female is cradled in an arm so that the tail is lower than the head. The thumb and forefinger of the free hand then puts pressure on the belly of the fish below the pelvic fins and gradually works the pressure towards the tail. The eggs flow easily and are collected in a pan.



At Shepherd of the Hills and Roaring River Hatcheries, eggs are taken by the air-spawning method. With this technique, a hypodermic needle is inserted into the body cavity near the pelvic fin of the anesthetized fish. A pressure of 2 ½ to 3 pounds of pure oxygen is then injected into the body cavity. The gentle gas pressure forces the eggs out with no harm to the fish. Besides being faster, the benefits of this technique include cleaner eggs, fewer eggs left in the fish, and less damage to the eggs or the fish because handling is reduced. Because Bennett Spring does not spawn as many fish, they can overcome many of the disadvantages of hand spawning by going slower and using only one experienced spawner to do all the egg stripping.



The first eggs taken from a fish are inspected visually to see if they are good. A good egg is one that is ready for fertilization and will have a uniform yellow-orange appearance. Overripe or "bad" eggs have matured beyond the point where they can be fertilized and will have a "bull's-eye" look— clear glassy edge with solid, opaque middle. Eggs can be fertilized only within a very limited time period and a few days on either side of that period decreases the percentage of eggs that can be successfully fertilized. That is why the broodstock are checked every 5 to 10 days. Females with overripe eggs have their eggs stripped and discarded to avoid the stress of having to reabsorb them. Good eggs are collected in a pan which is placed in water to keep the eggs cool. Each female will yield up to 5,000 eggs, depending on her size and age.



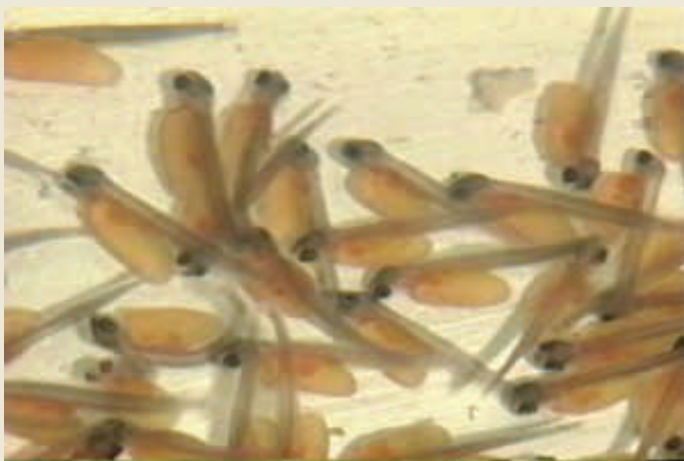
The anesthetized male is stripped of its milt, the solution containing sperm, by the hand-spawning method at both hatcheries. At Shepherd of the Hills and Roaring River the milt is sometimes pre-collected and kept in a refrigerator until it is needed. The sperm can be kept this way for many days as long as it is sealed in a plastic bag with pure oxygen and kept in a thin layer by placing the bag on its side. The milt is added to the eggs and gently stirred with a finger to promote complete fertilization.



A sample of the eggs is counted which gives hatchery personnel an idea of how many eggs there are per ounce and the eggs are then put into jar incubators. The number of ounces of eggs in the jars is measured and the total number of eggs is calculated. During hatching, debris such as egg shells float out of the jar which makes clean up easy. Once the collecting pan is full, the eggs are poured into a bucket of water and taken inside the hatchery to water harden, a process where the egg absorbs water and becomes round and firm. After about 45 minutes, the hardening process is complete.



Water temperature determines how soon the eggs will hatch. At Bennett Spring and Roaring River the normal water temperature is 55°F and it takes about 21 days for the eggs to hatch. Shepherd of the Hills, with its cooler temperatures, requires about 28 days to hatch. The ideal is 25 days. After all the eggs hatch the incubator jars are poured onto wire mesh screens suspended in troughs of flowing water. The sac fry, newly hatched fish which rely on food stored in a pouch on their belly called a yolk sac, will fall through the screens and sink to the bottom of the trough. Dead eggs and other debris will remain on the screen and be discarded. The percentage of eggs that hatch varies from 60 to 70 percent at Bennett Spring and Roaring River to 80 to 90 percent at Shepherd of the Hills because of the more favorable (cooler) water temperatures.



The sac fry receive nutrition from the yolk sac for the first two weeks after hatching. When the sac is completely absorbed, the fry are fed a fine-grained commercial feed made of fish meal, vegetable meal and vitamins. Initially, the fry are fed 12 times a day, but as they grow the number of feedings decreases while the size and amount of the feed increases.



The sac fry receive nutrition from the yolk sac for the first two weeks after hatching. When the sac is completely absorbed, the fry are fed a fine-grained commercial feed made of fish meal, vegetable meal and vitamins. Initially, the fry are fed 12 times a day, but as they grow the number of feedings decreases while the size and amount of the feed increases. During this time, the troughs are frequently cleaned and a disease watch is kept. If any sign of a parasite or disease problem is detected, medication is dripped into the tanks.



During this time, the troughs are frequently cleaned and a disease watch is kept. If any sign of a parasite or disease problem is detected, medication is dripped into the tanks. While at the hatchery, the fish are graded by size, thinned to other raceways and inventoried several times before finally being stocked. At Bennett Spring, it takes 15 to 18 months for a rainbow trout to grow to release size (10-12 inch). At the other four facilities it may take more or less time due to water temperature differences and the amount of food given to them.

Hatching eggs and raising trout at our trout hatcheries is an involved and time-consuming process, but Missouri trout anglers feel it is time and energy well spent. Even though most of the trout have been raised in hatcheries, once released they quickly adapt to their new environment and become a wary challenge for the beginner as well as the experienced fisherman.

Anyone interested in more information or in observing the spawning at Bennett Spring, Roaring River, or Shepherd of the Hills Hatcheries should contact the hatchery and inquire about the exact time and dates. Group tours are available at all the hatcheries and personnel are more than willing to explain what's involved in operating a trout hatchery. At Shepherd of the Hills ask for the naturalist; phone (417) 334-4865. The Bennett Spring Hatchery number is (417) 532-4418. The Roaring River Hatchery number is (417)-847-2430.