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# Production and Feed Training of Yellow Perch Fingerlings

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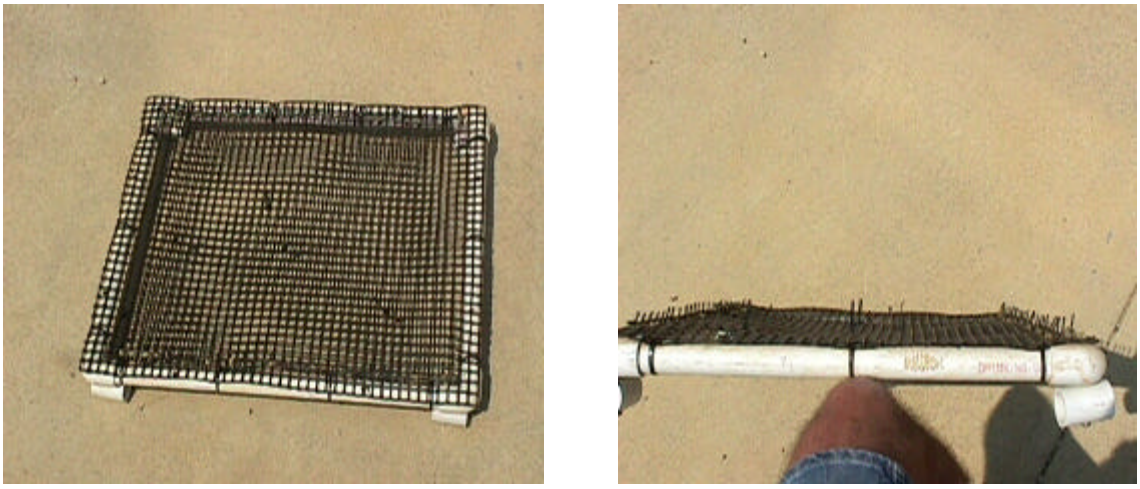
Commercial culture of yellow perch (*Perca flavescens*) is dependent on the ability to economically produce or purchase fingerlings (1 to 3 in) that have been trained to accept an artificial diet. Researchers and farmers have developed a variety of methods for producing eggs, fry (newly hatched fish), and fingerlings. These methods range from natural reproduction of adults with pond culture of fry and fingerlings to induced reproduction by light period and hormone manipulation with culture in tank systems.

Traditionally, commercial operations use the natural reproduction/pond culture method because it is economical and requires minimal technology. While the general method is well understood, information on specific techniques is not readily available. Our objective was to follow the economical, low-technology method and document the specific techniques used.

## Egg Collection/Incubation

In mid-March of 1999, domesticated adult yellow perch were collected from a 1/4-acre pond located at Piketon (temperature 42.8 $^{o}$F) and moved to an indoor holding tank. The tank was initially filled with pond water to receive the fish. Flow-through well water (51 $^{o}$F) was introduced slowly to allow for acclimation. Natural spawning began to occur

in the tank two days after stocking. The fertilized egg ribbons were collected from the tank and placed into 3 shallow tanks supplied with flow-through well water. Ribbons were kept in separate groups based on the date of collection. The ribbons were stretched over a plastic mesh-covered PVC frame (Figure 1a) in a single layer. Each end of the ribbon was slipped onto a vertical "peg" located on the edges of the plastic mesh (Figure 1b). Clothespins were attached on top of the peg to prevent the end of the ribbon from slipping or floating off. Ribbons were incubated until the embryos reached the eyed stage (10 to 12 days at 51 $^{o}$F). Over 80 ribbons were collected during a 7-day period.



a. b.

Figure 1. PVC frame and plastic mesh used to incubate yellow perch egg ribbons a) top view, b) side view showing "pegs" at the ends.

## Pond Preparation/Egg Ribbon Stocking

On March 29$^{th}$, three ¼-acre ponds were prepared to incubate the egg ribbons in their final stage of maturation, so that fry would hatch-out directly in the pond. Approximately 50 lb of horse manure was placed into the dry bottom of each pond to stimulate zooplankton (microscopic animals) growth, as a food source for the yellow perch fry. Well water was slowly added (0.5 gal/min) to the ponds. One day later, eyed egg ribbons from the first incubating tank were stocked into pond 1. Ribbons from the second incubating tank (pond 2) and the third incubating tank (pond 3) were stocked two and three days later, respectively. For the first 2 ponds, the best 15 egg ribbons were chosen from each incubating tank. The final pond received 18 ribbons, due to an excess

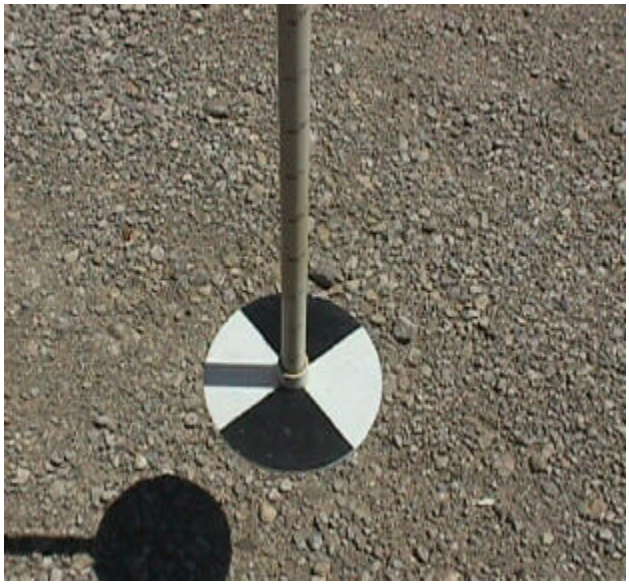
supply (Table 1). The selected ribbons were wet-weighed (*Weight of ribbons and water – Weight of water = Weight of ribbons*) as a group before being placed into the pond. Two sub-samples (each 0.5 in long) were weighed and the eggs were counted to estimate the total number stocked into the pond.

Table 1. Estimated count of eggs stocked per pond.

| **Pond** | 1 | 2 | 3 |
|---|---|---|---|
| *Number of Ribbons* | 15 | 15 | 18 |
| *Number of Eggs* | 127,000 | 126,451 | 223,535 |

Eggs were placed in the shallow water along the edges of the pond and allowed to hatch. Ponds were checked once daily for newly-hatched fish (called fry). Water flow into the ponds was stopped when the water depth in the deep end reached 12 in. The shallow water level was intended to maintain warmer water temperatures, decrease fry hatch-out time, and increase the zooplankton population. An initial application of liquid fertilizers (20 oz of 28-0-0; 2 oz of 10-34-0) was added to all 3 ponds to stimulate phytoplankton (microscopic algae) growth, which served as a food source for the zooplankton. The initial pond application was calculated to produce a concentration of 600 parts per billion (ppb) nitrogen and 30 ppb phosphorus.

Water flow into the ponds was turned back on (1 gal/min) once hatch-out had occurred (approximately 1 week after egg ribbon stocking). A Secchi disk (Figure 2) was used to monitor the phytoplankton population. The Secchi disk reading for each pond was taken daily (mid-morning). The liquid fertilizers were added to the pond using a hand sprayer if the reading was below the desired range of 12-18 in. Pond water volumes were calculated before each fertilizer application, due to the continuous addition of well water. Each application of the 28-0-0 and 10-34-0 fertilizers ranged from 20–200 oz and 2-20 oz respectively, based on the Secchi disk reading and the volume of the pond. A wide water temperature range (45.5-65.0 $^{o}$F) was experienced during the fry cultivation period.



a. b.

Figure 2. Secchi disk a) Top view of disk, b) Use of disk in pond.

## Collection of Fingerlings

Newly-hatched fry were allowed to feed on natural pond production of zooplankton during April through May and harvested from the ponds when they were estimated to have reached a length of 1-1.5 in (now referred to as fingerlings). Harvesting of the 3 ponds was staggered over several days, and followed the order of initial egg ribbon stocking. Ponds were slowly drained to allow fingerlings to move into a concrete catch basin (10 ft x 4 ft x 2 ft) located in the bottom of the pond's deep end. When the water level had dropped to the top of the catch basin, fingerlings were collected with a dip net, quickly placed into hauling containers filled with pond water, and transported to the greenhouse.

All fingerlings were wet-weighed, given a 5 parts per thousand (ppt) salt dip (30 to 60 seconds) and placed in tanks supplied with flow-through pond (68-71.6 $^{o}$F) water. A sub-sample of 100 fingerlings were individually weighed and measured for total length. Fingerlings from pond 1 were stocked in a 105 gal tank. This group died several days later due to a drain clog and a subsequent low dissolved oxygen concentration. As a result, the groups from pond 2 and 3 were stocked into larger 210 gal tanks. Table 2 summarizes the estimated number of fingerlings harvested, average weight and length, and tank stocking density for the 3 groups.

Table 2. Pond date of harvest, number of fingerlings harvested, average weight, average length, and tank stocking density.

| **Pond** | 1 | 2 | 3 |
|---|---|---|---|
| *Date of Harvest* | May 19th | May 24th | May 27th |
| *Number Harvested* | 10,257 | 10,499 | 10,736 |
| *Average Weight (oz)* | 0.03 | 0.02 | 0.01 |
| *Average Length (in)* | 1.47 | 1.35 | 1.27 |
| *Tank Density (oz/gal)* | 2.39 | 0.84 | 0.47 |

## Feed Training

Both surviving tanks were fed at 5% of their body weight per day. Feed was distributed over a 24-hour cycle using automatic belt feeders (Figure 3). A trout starter diet (crumble size) was used. Mortalities were removed and counted several times per day. Dissolved oxygen (range 6.2-10.4 parts per million) and temperature (range 67.1-81.4 $^{o}$F) were recorded daily. After 1 week, fungus was noted on several of the fish in both groups. Consequently, formalin (25 parts per million) was added daily to aid in the control of fungus.

Figure 3. Automatic Belt Feeder.

The feed training was conducted over a total of 23 days (late May to mid-June). A small percentage of the fish were observed to accept dry diet almost immediately, with the majority of the group responding to feed within 7 days. The pond 3 group was stocked into a new ¼-acre grow-out pond at 18 days, and the pond 2 group was stocked into the same pond at day 23. The combined number of fish stocked into the grow-out pond was 16,234. Table 3 summarizes the total number of feed-trained fingerlings and growth data. The fingerlings were switched to a new diet (Rangen Trout and Salmon Starter #2) at 5% body weight per day after they were stocked to the grow-out pond.

Table 3. Number, average weight and average length of feed-trained fingerlings stocked into grow-out pond.

| **Group** | 2 | 3 | Total |
|---|---|---|---|
| *Number Stocked* | 6,542 | 9,692 | 16,234 |
| *Average Weight (oz)* | 0.03 | 0.02 | 0.02 |
| *Average Length (in)* | 1.70 | 1.46 | 1.60 |

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