

South Centers

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Incubating and Hatching Yellow Perch Fry

By: *Laura Tiu and Geoff Wallat*

Incubation of Fertilized Eggs:

- 1) If you want to estimate the number of eggs in a ribbon: Weigh the egg ribbon in grams (i.e. 150 g). Snip off a small piece (i.e. 0.25 inch) of egg ribbon. Weigh the small sample in grams (i.e. 10 g). Divide sample weight by total ribbon weight ($10/150 = .07$ or 7%). Count the eggs in the sample (i.e. 54 eggs). Divide the number of eggs in the sample by 0.07 (i.e. $54/0.07=771$). The egg ribbon has approximately 771 eggs. Egg ribbons contain 10,000 - 40,000 eggs/ribbon.
- 2) Check to see if egg ribbon is fertilized by examining a small piece (1/4 inch) of ribbon under a microscope. Fertilized eggs will contain a small oil globule, and you may see beginnings of cell division (2 cells become 4, 4 divide to 8, 8 to 16, etc), the formation of the fish embryo at the early stages. This also can be done 24 hours post fertilization. Divide total number of fertilized eggs in the sample by total number of eggs in the sample to get percent fertilization.
- 3) Transfer ribbon to incubation tank. In our experience, eggs incubate best in well water. Egg ribbons incubated in tanks supplied with our nutrient-rich pond water grew fungus, did not hatch and died. Pond water without this rich nutrient load may be acceptable in your conditions. Ribbons should be stretched out, somewhat, for good water circulation and oxygen contact around the eggs. We use circular incubation “crowns” constructed out of chicken wire (10” height x 2 feet long) and placed in our small round 10 gallon tanks. We weave the ribbon in and out of the chicken wire (every other gap), going around the crown. To attach end pieces of ribbon to the crown, simply cut/snip one of the wires, bend over, and slip end of egg ribbon onto it. The attaching wire does not need to pinch it down against the crown. You can put it at a 45 degree angle, downward, to keep the ribbon end from coming off and floating up.
- 4) The ribbon should be well secured because as it incubates, in our water, it can give off air or gas bubbles that will make the ribbon float up. A section of ribbon exposed to air will fungus, and cause problems with survival of the whole ribbon. **USE NEW CHICKEN WIRE EACH SEASON.** Rusted metal irritates the eggs, and causes fungus problems.
- 5) Oxygen (small airstone) and sufficient water flow should be supplied to maintain good water quality.
- 6) 25-50 ppm formalin **may** be added to incubation tanks daily to combat fungus buildup. Be sure to have good water flow. **Stop formalin when eggs are eyed.** “Eyed eggs” refer to the darkening of the eyes during development, indicating final

development stages of the eye. This can be seen with the naked human eye. In our water conditions (50-55 °F /10 -12 °C) this usually begins to occur 8 to 10 days post-spawn.

Hatching fry:

- 1) Fry will hatch out of eggs approximately 5-25 days, depending on water temperatures, after spawning. At Piketon, with well water between 50-55°F it takes about 12 days. Warmer temperatures accelerate egg development. However, be cautious not to go too high. Temperatures above 60 to 62 °F (16 to 18 °C) can lead to egg stress and abnormal development.
- 2) Development of egg over time may be monitored with a microscope.
- 3) Fry become very active in the egg several days prior to hatch.
- 4) Aeration is increased to help agitate eggs, assist with hatch-out, and to keep water well oxygenated.
- 5) We typically stock as soon as most of the fry have hatched out, as egg shells will clog our screens rapidly. However, if separated from egg shells and debris from hatch-out, fry can be kept as long as 3 days post-hatch in the hatchery. After 3 days, the yolk sac will be depleted, and the fry will need an external food source (zooplankton).
- 6) Estimate numbers through volumetric sampling and estimation, and stock to a pre-fertilized pond.
- 7) All tanks must have a screened standpipe or outflow. Window screen (200 microns) is too big! You need to use 75-100 micron mesh to screen overflows and pipes. You can order this mesh from Aquatic Ecosystems (1.877.347.4788), or other aquaculture suppliers.

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Estimating Yellow Perch Fry

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Tools:

Calculator, tape measure, bucket, siphon hose, beaker (100 milliliters), white bowl

Estimating fry in a tank:

- 1) There are several ways to do this. We use the volumetric method.
- 2) Draw line on a 5 gallon bucket about 1/2 to 3/4th full. Fill the bucket with water and fry to this line. Add an air stone.
- 3) Calculate the volume of a cylindrical bucket, filled 3/4th full.
 - a. $V(\text{ft}^3) = \pi R^2(\text{ft}) \times D(\text{ft})$
 - b. Volume in cubic ft equals pi times radius squared times depth of water in feet.
 - c. $V = \text{Volume}$, $\pi = \text{pi} = 3.142$, $R = \text{radius} = 1/2 \text{ diameter of bucket}$, $D = \text{depth of water line in feet}$.
 - d. Example: Your bucket is 10 inches in diameter and 5 inches in radius. 5 inches equals 0.4 ft ($5/12 = 0.4$): Your water line is 10 inches high ($10/12 = 0.83\text{ft}$). $\text{Volume} = (3.142 \times (0.4)^2) \times 0.83$
 $\text{Volume} = (3.142 \times 0.16) \times 0.83$
 $\text{Volume} = (0.50) \times 0.83$
 $\text{Volume} = 0.42 \text{ ft}^3$
 - e. $1 \text{ ft}^3 = 28.317 \text{ liters}$
 - f. Total liters = 0.42×28.317 :
 Total liters = 11.9 liters
 - g. You have approximately 12 liters (l) of water in your bucket to the water line.
 - h. 1 liter (l) = 1000 milliliters (ml)
 12 liters = 12,000 ml
 - i. You have 12,000 ml in your bucket to the water line
- 4) Calculate the number of fry in a 100 ml beaker or other marked sample container.
 - a. Mix fry in bucket so that they are evenly distributed. An airstone bubbling moderately should do this in a minute or two.
 - b. Dip beaker into bucket and collect a 100 ml sample. It is important that your sample is representative of the density of fry in the bucket. If you get too much, feel free to pour some back into the bucket to get exactly 100 ml.
 - c. Count the fry in your 100 ml sample. We count into a white bowl of some type to make them easier to see. We often get 100-500 fry in a 100 ml sample. You can use lower sample volumes (50 mL) if needed.
 - d. Write down the total number of fry in a 100 ml sample.
 - e. Repeat this procedure three times with three different samples.
 - f. Calculate the mean or average. For example: You get 320 fry in your first sample, 510 in your second and 375 in your third. $320 + 510 + 375 \div 3 = 402$
 - g. On average, you have 402 fry in a 100 ml sample.
 - h. Return samples to the bucket.
 - i. Since your total volume is 12,000 ml, there are 120 100ml samples in the bucket. Therefore, you need to multiply this average sample by 120.
 - j. $402 \times 120 = 48,240$ fry in your bucket.

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Stocking Yellow Perch Fry

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Stocking your fry:

- 1) Do not fill ponds more than 2 weeks prior to stocking. Predators (i.e. aquatic insects)!
- 2) Begin fertilization of pond 2 weeks prior to hatching of fry.
- 3) Fry do not like direct sunlight, protect them as much as possible during stock-out.
- 4) Fry do like oxygen, always keep them well aerated.
- 5) Transport fish to pond in covered bucket. We use buckets with screw top lids, to prevent spilling during transport to the ponds. You can float the bucket off a dock or other attachment to equalize temperature.
- 6) Stocking density to ponds
 - a. We have stocked anywhere from 100,000 to 800,000 fry/acre.
 - i. This is slightly lower than the 400,000 fry per acre (approximately 1 million fry / hectare) found in most literature.
 - b. Our current recommendation at Piketon is 300,000 fry/acre, based on our lower survivals at densities higher than 300,000 fry/acre. In our case, we have trouble maintaining an adequate zooplankton population at the higher densities in the last few weeks of fry culture. This may be due, in part, to trying to manage blooms in a ¼ surface acre pond. Smaller ponds tend to be more difficult to manage and maintain blooms on. Larger surface area / volume ponds may be able to handle higher fry stocking densities.
- 7) Tempering your fry
 - a. Make sure your hatching water and pond water are as similar as possible.
 - i. Fish experience temperature shock when moved into water that is 3 °F or higher in difference.
 - ii. Fish also will experience pH shock, and die, if moving from one water source to another of a significantly different pH (> 0.5 in pH).
 - iii. Fish get also experience alkalinity shock.
 - b. Acclimate your fry slowly to their new home, around 30 to 60 minutes is best.
 - i. Add pond water slowly to their hatching water, several times.
 - ii. Protect fry from direct sunlight during stocking.
 - iii. Don't forget to monitor oxygen in the stocking container.
- 8) Stocking timing
 - a. Predators
 - i. Try to stock fry within 1 to 2 weeks of filling ponds to avoid establishment of predatory insects.
- 9) Grading
 - a. Try to stock fry of similar ages/sizes in same pond to cut down on cannibalism.