

The Outside Story

It's a Game of Survival for Eggs Underwater

By Dan Lambert

Each year, soon after ice out, torpedo-shaped fish slip into the lake's weedy shallows from that offshore zone where the bottom falls away. First comes the female, her flanks green and gold, and her ovaries swollen with eggs. The male swims alongside, alert for an opportunity to mate. Over the course of a day or two, they will periodically turn their vents toward each other and simultaneously release eggs and milt. In the next moment, they'll lash their tails to spread the fertilized eggs over submerged vegetation. It's spawning season for chain pickerel, and every egg faces an iffy future.



Fish eggs are gelatinous packages of proteins and fats that carry a blueprint for life. Within these packages poets might see hope; but predators, including other fish drawn by the scent of spawning hormones, see an unresisting and nutritious meal. Through the evolutionary process of natural selection, egg predation has forced fish and other aquatic-breeding animals to develop diverse traits and behaviors that increase odds of survival.

Chain pickerel counter the threat of egg predation with a reproductive strategy that depends largely on volume. Females may lay up to 12,000 eggs for each pound of their mass. Although the eggs are partially concealed among plants, they receive no protection from either parent. After the spawn, males and females leave them unattended.

Yellow perch also deposit and abandon eggs in weed beds, but theirs are protected in an external casing that links them in a skein. Research by Zoe Almeida and others at Purdue University found that predators may be deterred by noxious chemicals in the skein. The researchers also observed crayfish attempting to extract yellow perch eggs from their casing, but without success. In aquarium experiments, both crayfish and round gobies – a Eurasian fish that has invaded the Great Lakes – preferred exposed eggs when presented with the option.

White perch lay eggs differently than yellow perch, as might be expected since the white perch is actually a member of the temperate bass family, introduced to New England's inland lakes and ponds from its native coastal waters. For about two weeks in late spring, females join males in large spawning groups. This behavior allows fertilization by multiple males, mitigating the risk of combining

chromosomes with a “poor-quality” male. The females also scatter eggs widely over various substrates, which may help some go undetected. As with chain pickerel and yellow perch, the eggs are left undefended.

Brown bullheads are more careful when it comes to choosing mates and rearing young. Also known as catfish and hornpout, members of this species pair up in the late spring. The female lays eggs under or near protective cover, normally in a saucer-like depression that she excavates with her fins. A male will sometimes help prepare the nest, and both sexes provide protection, occasionally aerating and cleaning the eggs as they guard them.

When the eggs hatch after a week or so, the young fish are tended by the male or by both parents, rarely by the female alone. Adults protect the developing fry as they move about in a tight school, which resembles a cloud of tadpoles. If you watch closely in the shallows of a productive bullhead pond, you may see adults herding their young. Some observers have even reported seeing parents use their mouths to retrieve wayward individuals and return them to the school.

Fish aren't the only group of animals that employ a wide range of strategies to ensure the survival of their eggs in water. Amphibians and insects also exhibit a variety of behaviors. Eastern newts fold internally fertilized eggs, one at a time, into the leaves of submerged vegetation. The common green darner dragonfly injects its eggs into plant stems just beneath the water's surface. And some species of giant water bug lay their eggs on the backs of their mates, who aerate and protect them until they hatch.

It costs energy to produce, hide, and defend eggs. Guarding them also involves the threat of predation and a commitment of time that could be spent finding food. On the other hand, leaving eggs exposed also has its disadvantages. Through millions of years of evolution, aquatic species have developed many adaptations for balancing the energetic costs and mortal risks of reproduction. For eggs underwater, it's a game of survival with countless ways to play.

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