

6/29/85



Natural History Notes

MIKE DOMBECK grew up in the Moose Lake area, attended Hayward public schools, University of Wisconsin-Stevens Point, University of Minnesota, and Iowa State University. He has a Ph. D. in Aquatic Biology. Mike has worked as an area fishing guide, taught Zoology at UW-Stevens Point, and is a fisheries biologist with the USDA Forest Service, living in Petaluma, California.

MUSKY vs. NORTHERN PIKE: COMPETITION OR PREDATION

Within the past 75 years the northern pike has invaded many musky lakes. In most lakes the musky has declined as northern pike numbers have increased. In some lakes the northern pike has completely taken over. This is the second in a series of five "Natural History Notes" that reviews the biology of these fishes and reasons why northern pike have displaced muskies in many waters.

Why does the northern pike out-compete the musky? Actually competition is probably an inaccurate description of the musky-northern pike relationship. The biological definition of competition is two species occurring together competing for the same resource, such as food or living space, which is in short supply. Predation of young muskies by young northern pike is a more accurate description of the relationship. Put more simply, young northern pike eat young muskies. Both species are very cannibalistic during their first few months after hatching if other food is not plentiful.

When these two fish species spawn in the same areas, which they often do, the northern pike has it over on the musky and here is why. Northern pike spawn shortly after ice-out when waters warm to about 40° F. Muskies spawn about 2-3 weeks later when waters warm to above 50° F. and peak musky spawning activity occurs at about 55° F. As you would expect, northern pike eggs hatch 2-3 weeks before the muskies'. When the musky eggs hatch the very small fry are ideal food for the northern pike fry which are larger than the muskies and already feeding on small fish. It is during their first few months of life that these very small northern pike take their toll on the even smaller muskies. In addition to being larger, the young northern pike are more aggressive, less selective for food (but seem to prefer young muskies), and have physiologically superior food conversion than the young muskies. Even with full stomachs these little northern pike continue attacking and killing prey, often tiny muskies. So when the two species spawn in the same areas the musky is the loser. It is not until their second summer that the young muskies surpass the northern pike in size and by that time it is often too late.

Immediately after fish hatch they are called sac fry because their nourishment is supplied by the yolk remaining from the egg. After about a week the yolk is used up and the young fish are called fry.

This is a very critical period for all fish because they must switch to catching their own food or die. At this stage both muskies and northern pike feed heavily on tiny critters in the water called zooplankton. In another week both species switch to eating small fish and remain on a fish diet for life.

In 1951 a pond experiment was conducted by the Wisconsin Conservation Department where 25,000 northern pike fry were placed in a hatchery rearing pond. The pond had a plentiful supply of zooplankton. To duplicate the natural timing 25,000 musky fry were placed in the same pond 11 days later. During the next two weeks both species were seen in the pond. The following three weeks the muskies were seen less often. The pond was drained after five weeks; 402 northern pike and four muskies were recovered. This is an excellent example of the intense predation and cannibalism that occurs in natural systems, often unnoticed by man.

Recent experiments at the University of Wisconsin have provided more evidence of predation on young muskies by young northern pike. Tanks were set up containing a variety of sizes of musky and northern pike fry. Small minnows were also put in the tanks as food. Two days later in tanks containing 3-inch muskies and 2-inch northern pike neither were eaten. But in tanks containing 3-inch northern pike and 2-inch muskies nearly all the muskies were eaten. This suggests young northern pike prefer to eat young muskies over minnows of equal or smaller size than the muskies.

The very behavior which helps the adult musky function as an efficient predator makes it very vulnerable to predation during the fry stage (2-5 inches). The musky fry lie very still, suspended just below the water's surface, leaving them very vulnerable to any predator approaching them from below. In addition to predation by northern pike, other species of fish take their toll on the little muskies. Abundant stunted panfish populations can greatly reduce the number of small muskies.

All this points out the importance of balanced fish populations in our waters. This balance is everything but simple, and long-term management of our fisheries is a very difficult task. Keep in mind that the intensive angling on our fisheries was not part of the centuries of evolution of these delicate ecological relationships.