Great Lakes Fishery Commission

ESTABLISHED BY CONVENTION BETWEEN CANADA AND THE UNITED STATES TO IMPROVE AND PERPETUATE FISHERY RESOURCES

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SEA LAMPREY TIME THEIR SPAWNING MIGRATION TO NARROW TEMPERATURE RANGE

ANN ARBOR, MI—Research supported by the Great Lakes Fishery Commission is the first to test directly the effect of temperature on the migratory activities of sea lampreys, a factor that could help sea lamprey control experts time their activities to occur when the lampreys are concentrated at their highest. The sea lamprey is a noxious, invasive pest in the Great Lakes that decimates fish populations when uncontrolled. Since the 1950s, with the formation of the Great Lakes Fishery Commission, the commission and its partners have reduced sea lamprey populations by 90% in many areas of the Great Lakes, helping the fishery recover. This research provides the commission with valuable information about the sea lamprey's behavior that can be exploited for better control.

Throughout much of their lives, sea lampreys are nocturnal. Toward the end of their spring spawning migration, they become active during the daytime. This research shows that daytime activity is triggered by rising temperatures, refuting previous studies stating that daytime activity is linked to sexual maturation. By coordinating their migration to temperature, sea lampreys increase the probability that they will reach spawning grounds at the same time as potential mates and within the narrow thermal range required for successful reproduction.

Under controlled laboratory conditions, scientists from the University of Guelph acclimated four groups of sea lamprey to four different temperatures, measuring changes in daytime and nighttime activity levels according to sudden temperature shifts. Below 7C, sea lampreys were relatively inactive during both the day and the night. Sea lampreys were almost exclusively nocturnal at temperatures up to 15C, but as temperature increased, nighttime activity extended into the day. The most acute increase in movement occurred when temperatures were changed from 15C to 22C. As daytime activity increased, nighttime activity decreased. The shift to 24-hour activity was most pronounced between 20C and 24C.

"Sea lampreys cease feeding prior to their spring migration and must rely on stored energy to fuel both the migration and the spawning act," said Dr. Thomas Binder, the study's lead researcher, now with the U.S. Geological Survey's Hammond Bay Biological Station. "Sea lampreys must maximize their energy reserves by timing their run to the ideal temperature window. Lampreys require significantly more energy to swim in colder temperatures. By remaining relatively inactive at low temperatures, lampreys are able to reach their spawning grounds with enough energy to spawn."

Binder continued: "Successful embryonic development only occurs within a narrow thermal range, around 18C. By timing their migration to the temperature range suitable for spawning, lampreys maximize their energy efficiency and the probability that they will reach spawning grounds at the same time as mates, thus increasing their chances of successful reproduction." This information will help control experts concentrate their efforts during times when migratory intensity is likely to be high.

The Great Lakes Fishery Commission is an international organization established by the United States and Canada through the 1954 Convention on Great Lakes Fisheries. The commission has the responsibility to support fisheries research, control the invasive sea lamprey in the Great Lakes, and facilitate implementation of A Joint Strategic Plan for Management of Great Lakes Fisheries, a provincial, state, and tribal fisheries management agreement. Visit online at www.glfc.org

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