

Heterosporis

Heterosporis is a parasite that infects muscle cells of fish. The presence of this parasite was confirmed only in yellow perch from Lake Champlain in March 2014. To date, little is known about its distribution in Lake Champlain, and to what extent it may be impacting Champlain's fish populations.



Tom Jones - VT F&W



VERMONT FISH HEALTH FACT SHEET

Physical Description

Infected fillets have white, opaque areas in the muscle and appear "freezer-burned" or as if the tissue has already been cooked.

Life Cycle

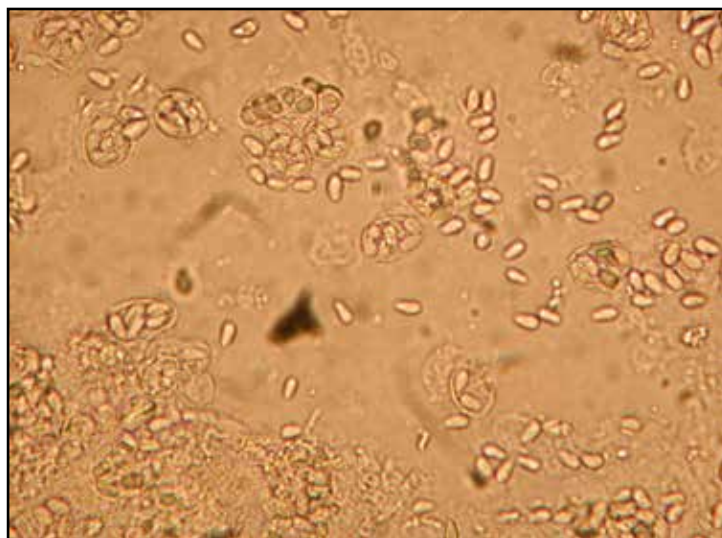
Heterosporis is a microsporidan parasite and part of its life cycle includes the formation of spores inside muscle cells. The spores are the infective stage of the parasite. Infection occurs when a fish eats an infected fish, or when a fish is exposed to spores in the water. Spores are released into the water when an infected fish dies and decomposes and can remain infective in water for at least two months at room temperature and up to one year in

refrigerated water. The role of fish-eating birds is unknown.

Based on lab studies, opaque areas of infection in the muscle are visible about five weeks after a fish becomes infected. Over time, the entire muscle mass of a fish may be filled with spores, and the entire fillet will become white and opaque.

Source of Infection

In North America, Heterosporis was first identified in yellow perch from Catfish Lake in the Eagle River Chain of Lakes, Wisconsin in 2000. Since then, it has been detected in other lakes in Wisconsin, Michigan, Minnesota, and Canadian waters of eastern Lake Ontario. The percent of infected fish in these waters can range from less than 5 percent to about 30 percent. Prior to 2000, Heterosporis infections were only reported in tank-reared aquarium species such as angelfish and cichlids in Europe, bettas in Thailand, and Japanese eels in Taiwan. The source of Heterosporis infections in North America is unknown.



Microscopic view of infective spores in yellow perch muscle tissue. —Tom Jones - VT F&W

VERMONT FISH & WILDLIFE DEPARTMENT

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Other Susceptible Species

In Vermont, the parasite has only been documented in yellow perch from Lake Champlain, but it is probable that other Lake Champlain fish species are infected. In Wisconsin, Michigan, Minnesota, and Canadian waters of eastern Lake Ontario, natural infections have been reported in walleye, northern pike, rock bass, pumpkinseed, burbot, sculpin and trout-perch. Studies conducted at the University of Wisconsin-LaCrosse have shown other species can be infected under laboratory conditions: rainbow trout, coho salmon, brook trout, brown trout, lake trout, white suckers, mosquito fish, channel catfish, fathead minnow, and largemouth bass. Bluegill, lake sturgeon, smallmouth bass, and golden shiners were exposed to spores, but did not become infected.

Threat to Fish

Currently, it is not known whether *Heterosporis* can directly kill fish and impact population numbers. A significant concern is that infections in the muscle tissue will decrease the quality and change the texture of a fillet. People may choose not to consume infected fish for these reasons.

Threat to Humans

Heterosporis is not a human health concern. Based on

studies at the Centers for Disease Control in Atlanta, GA., there is no evidence that *Heterosporis* can infect people.

Controlling the Spread

Due the potential of this parasite having an impact on Vermont's fisheries, caution must be taken to ensure the parasite doesn't get transferred to additional waterbodies. Your cooperation will help safeguard Vermont's fisheries for the future. Please follow these general control measures:

- Do not move live fish from one waterbody to another.
- Do not discard infected fish in a lake or river; place them in the garbage.
- Be sure not to move water & potential microscopic invasive species from one

waterbody to the next by draining water from your boat, motor, bilge, live wells or bait buckets.

- Clean, disinfect and dry all equipment prior to future use on another waterbody.

Vermont Fish & Wildlife Department biologists will continue to monitor this parasite and we strongly encourage anglers to report this condition as well as other unusual conditions to the department. High quality digital pictures are appreciated. Contact:

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References: Great Lakes Fisheries Commission (*Heterosporis* factsheet)
Susan Marcquenski, Wisconsin Division of Natural Resources



Yellow Perch – top fish with infected muscle tissue, bottom fish with normal muscle tissue. Photo: Courtesy of Susan Marcquenski, Wisconsin DNR