TR 73-4

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

Fisheries Division

Technical Report No. 73-4

May 24, 1973

FURUNCULOSIS IN NORTHERN PIKE, ESOX LUCIUS

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Furunculosis, caused by the bacterium Aeromonas salmonicida, is commonly considered to be a disease of salmonid fishes, particularly in hatcheries. There have been a number of reports, however, of this disease occurring in non-salmonid species in the wild and in fish-holding facilities. A few of the species infected have been yellow bass, Morone mississippiensis (Bulkley, 1969), northern pike, Esox lucius (Economon, 1960), and fat head minnows, Pimephales promelas (McFadden, 1970). McFadden, and Herman (1968), each listed additional fish species reported in the literature to be susceptible to this disease.

The purpose of my report is to document the first occurence of furunculosis in a non-salmonid fish in Michigan. Furunculosis has occurred among wild salmonids in Michigan for many years (unpublished data). Records of fish autopsies, conducted for many years by Dr. Leonard N. Allison,[1] were reviewed as to furunculosis in non-salmonids; no such records were found in either hatchery or wild fish.

Methods: All pike autopsied were opened ventrally by a single incision from the vent to the pectoral girdle. Intestines and air bladder were removed. A sterile inoculating loop was used to pierce the posterior kidney for the purpose of inoculating trypticase soy agar (TSA) slants and for making a slide smear for staining. Agar slants were incubated at 20°C for 48-72 hours. Gram stain was used to determine the gram reaction of any bacteria from the kidney smears.

The identification of any bacteria isolated on the TSA slants followed the outline of Bullock (1961). The slant media was observed for the characteristic brown pigment produced by A. salmonicida. Bacteria were gram stained to determine their staining characteristics and morphology. Bacteria motility was checked for by wet smear preparation. The final diagnostic step was to use the macroscopic-slide agglutination test of Rabb, Cornick and McDermott (1965). An inoculating loop was used to remove a small portion of suspect bacterial growth from TSA slants to microscope slides. A drop of A. salmonicida antisera was dropped on the bacteria. A toothpick was then used to thoroughly mix the antisera with the bacteria. The fluid resulting was grossly observed for agglutination. This last test was considered by Herman (1968) to be definitive for furunculosis. Furunculosis was found in pike from three localities:

1. A northern pike from Big Lake, Otsego County, Michigan was found shortly after death on June 11, 1971 (Autopsy No. N-11-71). The subsequent examination revealed a slightly raised area dorsal to the vent and anal fin. This area

[1] Fish Pathologist, Michigan Department of Natural Resources, retired 1971.

was approximately 2.7 inches in diameter, soft and spongy, and the overlying skin was hemorrhagic. The area beneath the skin was filled with a hemorrhagic fluid. The tissues in an area of about 1.5 inches in diameter were eroded away or hemorrhaged. Internally, the kidney was soft and appeared to be deteriorating although the pike seemed to be fresh.

2. A pike from the Houghton Lake pike marsh, Roscommon County, was found freshly dead on May 10, 1972. The marsh was in normal operation at the time, i.e., water level was raised, pike had been trapped at the outlet stream and placed into the marsh area to spawn. The autopsy record is not clear, but there were muscle bulges: on the left side, dorsal to the anal fin; on the left side of the caudal peduncle; and on the lower jaw.

3. A number of northern pike were collected by hook and line fishing from the Muskegon River, below the Reedsburg Dam, Roscommon County, December 10 to 14, 1971. These fish were for experimental disease work at the Grayling Research Station and were brought to the Station for holding in inside tanks. The water supply was well water which has consistently been furunculosis free. On May 10, 1972, two pike were found dead from which TSA cultures were routinely made. No notes were available as to any pathological symptoms observed in either of the fish.

Results and discussion: The four northern pike were found to be infected with A. salmonicida (Table 1), but no other bacteria were found.

Table 1. Diagnostic test results.

Fish Source	Kidney Smear	TSA Pigmentation	Gram Stain	Motile	Antisera Agglutination
Big Lake	Gram - rod	Yes	Gram - rod	No	Yes
Houghton Lake		Yes	Gram - rod	U*	Yes
Muskegon River (2 fish)		Yes	Gram - rod	U*	Yes

The symptoms of furunculosis evidenced by the pike from Big Lake resembles those reported by Economom (1960) for two northern pike from a Minnesota spawning pond. He did not report on internal pathology. The absence of gross internal pathology in both the Michigan and Minnesota pike mortalities is different from the usual symptoms of furunculosis observed in salmonids.

I believe that the pike from Big Lake died because of furunculosis, but not the other three fish. The pike from Houghton Lake marsh had been stressed by trapping, handling, and spawning, and it may have been infected with a second disease. The pike from Muskegon River underwent a temperature stress when transferred from river temperatures of 2-5°C to well water at 9°C; also, these fish had been used experimentally in a disease transmission study.

*U = bacteria not checked for motility

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