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## Epidemic Oral Ulceration in Largemouth Bass (*Micropterus salmoides*) Associated with the Leech *Myzobdella lugubris*

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**ABSTRACT:** An epidemic of severe ulcerations of the tongue and buccal cavity was documented in subadult and adult largemouth bass (*Micropterus salmoides*) from Currituck Sound, North Carolina (USA). Other external clinical signs were not present. Between November 1986 and May 1987, reports from fishermen indicated that as many as 90% of large (>300 mm total length) bass were affected. Older fish were the most commonly involved. The leech, *Myzobdella lugubris* (= *Illinobdella moorei*), was consistently present on or near the lesions. Lesions were heavily infected with several different bacteria that were apparently secondary invaders. Stressful (high) salinity or an interruption in the normal migratory cycle of the parasite are suggested as possible causes for this condition in these bass.

**Key words:** Leeches, largemouth bass, *Myzobdella lugubris*, *Micropterus salmoides*, ulcers, estuary, epidemic, epidemiology.

Currituck Sound (North Carolina, USA; 36°8' to 38°30'N, 75°50'W) is a mesohaline estuary that supports a mixture of typically freshwater, estuarine and marine fishes. It sustains a large, reproducing population of largemouth bass (*Micropterus salmoides*) in the low salinity (0 to 3 ppt) part of the system. Beginning in the fall 1986, sport fishermen began to report largemouth bass with mouth ulcers. Although a systematic survey was not conducted, some reports suggested that as high as 90% of the legal-size (>305 mm total length) fish were affected. Other fish species were not reported to be diseased at that time.

Four live largemouth bass (about 250 to 340 mm SL) were submitted to the Aquatic Medicine Laboratory (College of Veterinary Medicine, North Carolina State University, Raleigh, North Carolina 27606, USA) on 23 February 1987. All fish had

large ulcerations on the tongue and buccal cavity. There were both small, focal erosions (Fig. 1) as well as large, light red ulcerations that often extended to the underlying muscle (Fig. 2). Each fish had 5 to 7 leeches on the tongue, buccal cavity or gill arches. These were identified as *Myzobdella lugubris* (= *Illinobdella moorei*). Representative specimens were placed in the U.S. National Parasite Collection (USDA, ARS, Beltsville, Maryland 20705, USA; Accession Number 80861).

Eight lesions were touched with sterile swabs (Mini-Tip Culturette, Marion Scientific, Kansas City, Missouri 64114, USA). Each sample was immediately inoculated onto brain heart infusion agar containing 5% defibrinated sheep blood. Cultures were incubated at room temperature (about 25 C). Many bacteria were isolated from most lesions, but no single colony type predominated in the lesions. The most common

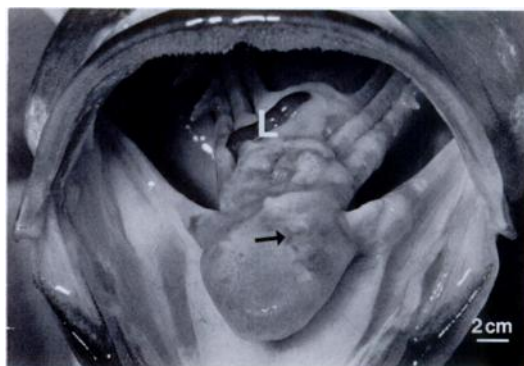


FIGURE 1. Small, possibly early, erosions and ulcerations (arrow) of the tongue and buccal cavity of a largemouth bass (*Micropterus salmoides*) infected with the leech *Myzobdella lugubris* (L).

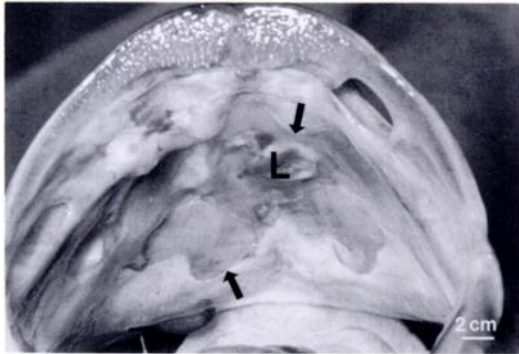


FIGURE 2. Large ulceration of the hard palate of a largemouth bass (*Micropterus salmoides*) infected with the leech *Myzobdella lugubris* (L). Extent of the lesion is delineated by arrows.

organisms from six cultures were *Pseudomonas fluorescens* (two cultures), *Bacillus* sp., *Staphylococcus hemolyticus*, and *Pseudomonas putrefaciens* (two cultures).

Wet mounts which were prepared of other lesions had many bacteria but no other pathogens. Five lesions were fixed in 10% neutral buffered formalin, decalcified with EDTA, embedded in paraffin, and stained with either hematoxylin and eosin, MacCollum-Goodpasture Gram's stain, or Gomori methenamine silver (Luna, 1968). A severe, mixed inflammatory infiltrate was seen (Fig. 3), sometimes with heavy bacterial colonization on the surface of the ulcers. One ulcer had a large number of bacterial rods just below the surface of the tissue.

A common feature shared by all fish examined was the presence of leeches near or within the wounds. Leeches are common ectoparasites of fishes and usually cause relatively little damage to the host (Hoffmann, 1967), but in this case, they appear to have left ulcerated feeding wounds. There is increasing evidence that ectoparasites can be important vectors of fish-pathogenic microbes, including bacteria and viruses (Cusack and Cone, 1986). However, no bacterial pathogen was consistently isolated from the lesions; but, the small sample size prevents any conclusions on the role of bacteria. While large num-

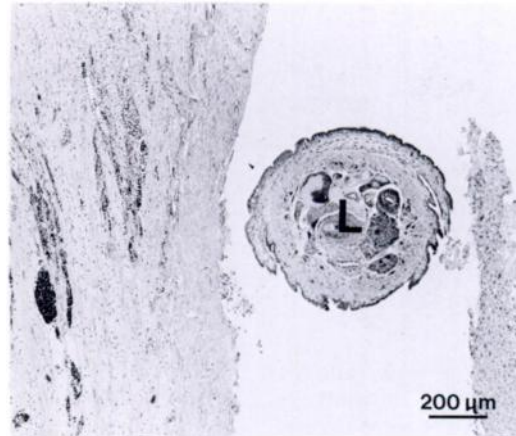


FIGURE 3. Buccal ulcer showing primarily mononuclear inflammation associated with extensive congestion and hemorrhage near site of attachment by a leech *Myzobdella lugubris* (L). H&E.

bers of bacteria were present, this is to be expected in any open lesion in an aquatic environment.

*Myzobdella lugubris* is a common piscicolid leech that infects many freshwater and estuarine fishes (Amin, 1981; Hoffmann, 1967). It has been associated with many different host responses, varying from mild epithelial hyperplasia, erosion, and ulceration (Appy and Cone, 1982), to massive gross ulceration (Paperna and Zwerner, 1974). Interestingly, the latter case was associated with a massive oral infestation in a white catfish (*Ictalurus catus*). *Myzobdella lugubris* most commonly affects the fins and other skin surfaces of host fishes (Amin, 1981; Daniels and Sawyer, 1975; Sawyer et al., 1975). However, in fall, when water temperatures drop, large numbers of mature leeches migrate into the buccal cavity where they become engorged with blood (Daniels and Sawyer, 1975). Normally, these engorged leeches move from the mouth to other parts of the body after several weeks; they then leave the fish in order to deposit egg cocoons on blue crabs (*Callinectes sapidus*). In this study, reports of leech-infected oral lesions persisted through the winter of 1986–1987, suggesting that, for some unknown reason,

many leeches failed to undergo their normal migration pattern.

All largemouth bass displayed no other clinical signs of disease. Since largemouth bass are a normal host for this parasite, some type of immunosuppression cannot be dismissed as a possible cause for the lesions and heavy infection. Largemouth bass are relatively intolerant of salt and have been reported to do poorly in areas where salinity exceeds 3 ppt (J. Kornegay, pers. comm.). The salinity in Currituck Sound inhabited by the bass had been slowly rising since the late summer of 1986. During the outbreak, salinity varied from approximately 4 ppt in the northern part of the sound, to about 10 ppt in the southern part. Salinities are usually 2 ppt in the north and 4 ppt in the south (J. Kornegay, pers. comm.). While elevated salinity is probably not the only stress that could have influenced this disease, it may be an important one.

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