

Gustavo Mendez and Florian Reyda

Biology Department and Biological Field Station, State University of New York College at Oneonta

Overview

This study is a result of extensive fish parasite survey work in North America with a heavy emphasis on water bodies in New York state. One objective was to assess the diversity of acanthocephalans which are also known as thorny-headed worms. We encountered a new species of acanthocephalan from two localities in New York, Oneida Lake and Sandy Creek, an eastern tributary of Lake Ontario. This new species appears to be rare since it was only seen in 4 white suckers out of 139 examined in total from those sites in the Lake Ontario drainage. Permanent slides were made of the parasite which was then examined and measured using a light microscope. This made it possible to distinguish the new species from the many other species of *Neoechinorhynchus* in North America that parasitize fishes. This species is distinguished from other *Neoechinorhynchus* species in white sucker in its possession of an unusually large cement gland in males. Other comparisons are currently underway in the laboratory as we prepare a formal description of this new species. The unique nature of this species is further supported by DNA sequence data of the large ribosomal subunit that was obtained in a separate, ongoing study. The significance of this work is to show that there are still new species of organisms waiting to be discovered throughout the United States.

Methods

White sucker in Oneida Lake were captured via gill nets while fish captured in Sandy creek were captured via backpack shocking. All fish handling was in accordance with the guidelines of SUNY Oneonta (State University of New York College at Oneonta) IACUC protocol 201303. Fish were either immediately examined or maintained in an aquarium for 1–14 days before examination. Fish were then euthanatized in 0.3 g/L tricaine methanesulfonate (MS-222), double-pithed, and subsequently dissected by performing an initial ventral incision and removing the digestive system. The digestive system was examined with the aid of a stereomicroscope. Acanthocephalans were placed in tap water for 24 hr, transferred to 70% ethyl alcohol (for morphological study) or preserved in 95% molecular-grade ethanol (for DNA sequencing) and held at 4 C.



Figure 1: Gustavo Mendez, and Hannah Whitcomb dissecting fish looking for parasites



Figure 2: Oneida Lake, Shackleton Point at the Cornell Biological Field Station

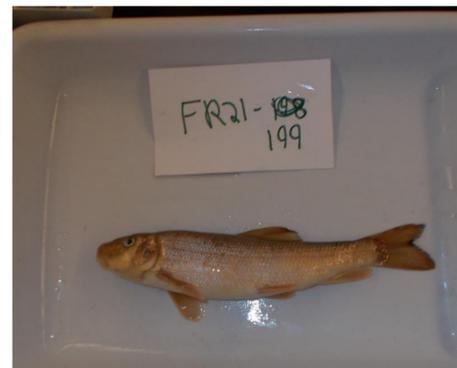


Figure 4: photo of the host: the white sucker being prepared to be dissected

Results and Discussion

We were able to obtain important information from the 5 mature specimens of the new species that were prepared as microscope slides. After studying specimens we focused in on several key features.

Proboscis hooks (left image), even-length lemnisci (center) and relatively large cement gland (right)



Figure 3: Male and Female Permanent slide of new species



Measuring specimens of the new species allowed us to compare it to already known species of *Neoechinorhynchus*. Many species of *Neoechinorhynchus* could be differentiated from the new species in that they possess markedly unequal lemnisci and differences in body wall thickness. One key feature separating the new species from other species is the relatively large cement gland in males.

How do these other species differ from the new species?

N australis- Proboscis is longer, and very unequal lemnisci
N buckneri- Uneven lemniscus, and uneven body wall
N bullocki- Uneven lemniscus, and uneven body wall
N carassii- Uneven lemniscus
N carinatus- Uneven lemniscus and uneven body wall
N carpiodi- Uneven lemniscus
N crassus- Hooks are larger, and proboscis is bigger
N cristatus- Uneven lemniscus, and uneven body wall
N cylindratus- Hooks are larger, and proboscis is bigger
N didelphis- Has two uterine bells, lemniscus is smaller
N distractus- Uneven lemniscus
N doryphorus- Neck is significantly long and wider
N idahoensis- Uneven lemniscus
N limi- Hooks are smaller, and smaller body

N notemigoni- Uneven lemniscus
N prolixoides- Uneven lemniscus and uneven body wall
N prolixus- Uneven lemniscus and uneven body wall
N pungitius- Hooks are smaller, and body length and width are smaller
N robertbaueri- Uneven lemniscus
N rostratus- Hooks are larger, and proboscis is bigger
N saginatus- Cement gland is significantly smaller
N salmonis- Cement gland is significantly smaller
N strigosus- Cement gland is significantly smaller
N tenellus- Hooks are larger, and cement gland is smaller
N tumidus- Hooks are larger
N venustus- Hooks are larger, and cement gland is smaller
N rutili- Cement gland is significantly smaller

Literature

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Hoffman, G. L. 1999. *Parasites of North American freshwater fishes*, 2nd ed. Comstock Publishing Associates, Ithaca, New York, 576 p.

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