

Gut content analysis of invasive amphipod *Apocorophium lacustre* in Illinois waterways

Alex Quebbeman, Reuben Keller

INTRODUCTION

Apocorophium lacustre, an aquatic amphipod commonly called scud, is an invader in Illinois waterways and has the potential to invade Lake Michigan (Keller et al. 2017). Little is known about the basic biology of scud, including its diet. Scud were collected from the Illinois River and their digestive tracts were removed and stained to identify what scud are eating in Illinois. I am using DAPI, a dye that presents itself in various fluorescent colors depending on the type of organisms present. I will determine the percentage of bacteria, protozoa, algae, and detritus that scud eat.

METHODS

1. I removed the digestive tract of a dead scud under a dissecting microscope.
2. I put the sample into an ultrasonic cleaner to break up the pieces.
3. I added pre-diluted DAPI to the sample and placed it in the refrigerator to allow the DAPI to stain the DNA of the organisms present.
4. A black-stained Nuclepore filter was placed in a filter apparatus and the liquid was pulled through the filter with a vacuum pump, leaving just the sample on top of the filter.
5. I placed the filter onto a slide. The samples are being observed under a fluorescence microscope on 100x immersion objective.

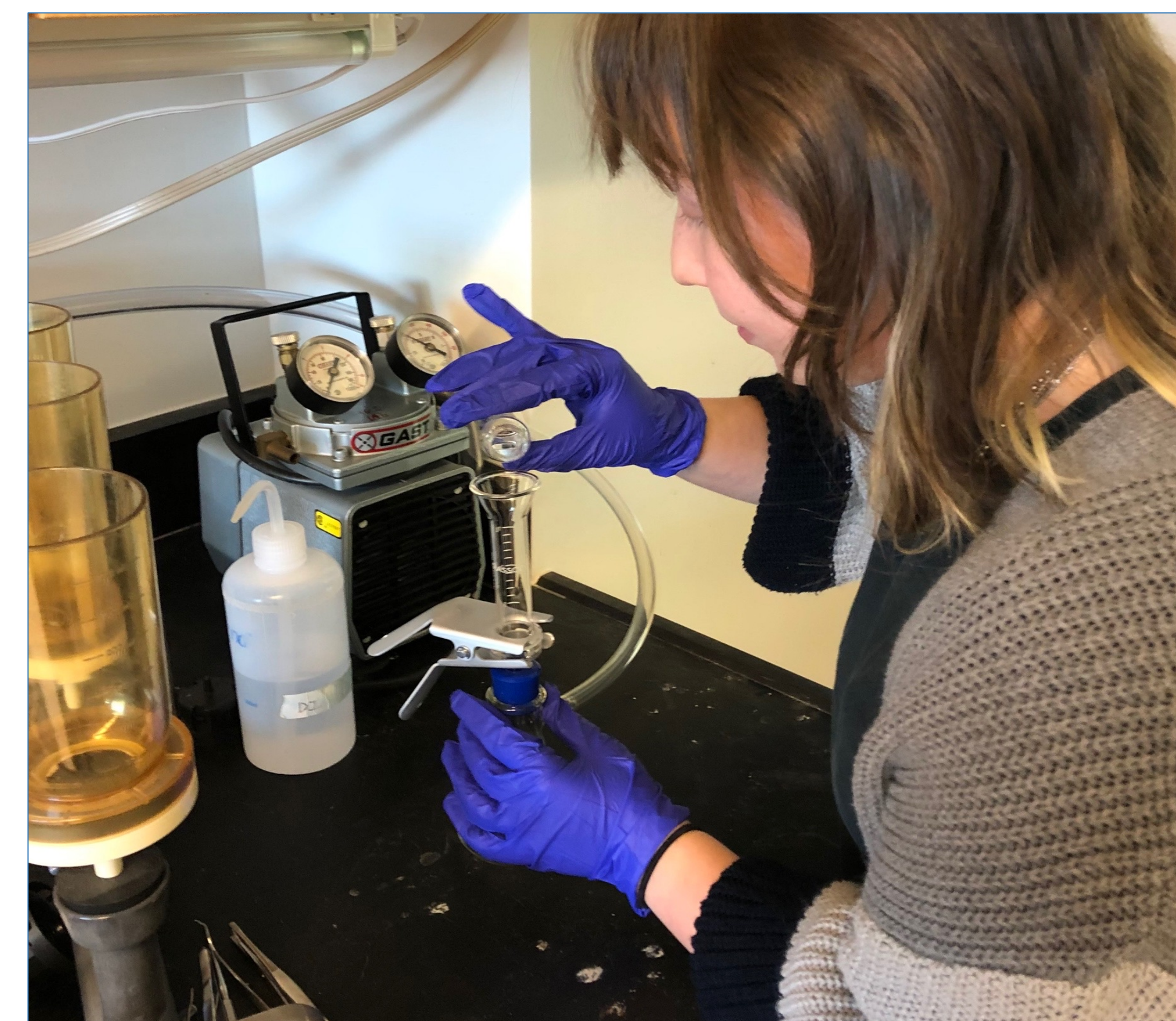


Image 3. Stained scud sample being run through a filter apparatus using a vacuum pump.

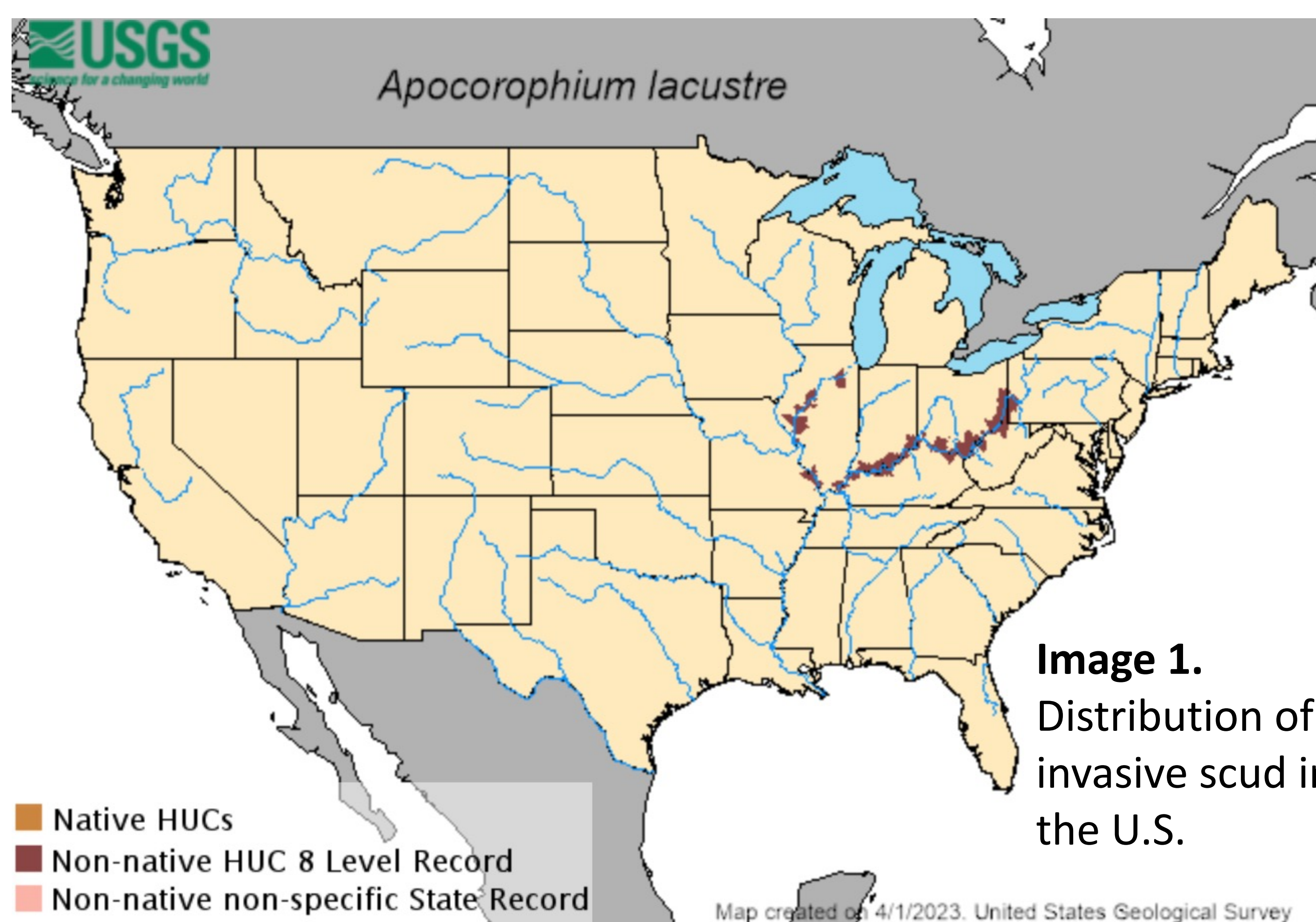


Image 1. Distribution of invasive scud in the U.S.

RESULTS

Samples are still being analyzed, so results are pending. When stained with DAPI, bacteria will appear blue, protozoans will appear light blue with a distinct nucleus, organic detritus will be a dull yellow, and the chlorophyll in algae will show up as a dull red color with a blue nucleus (Walker et al. 1988).

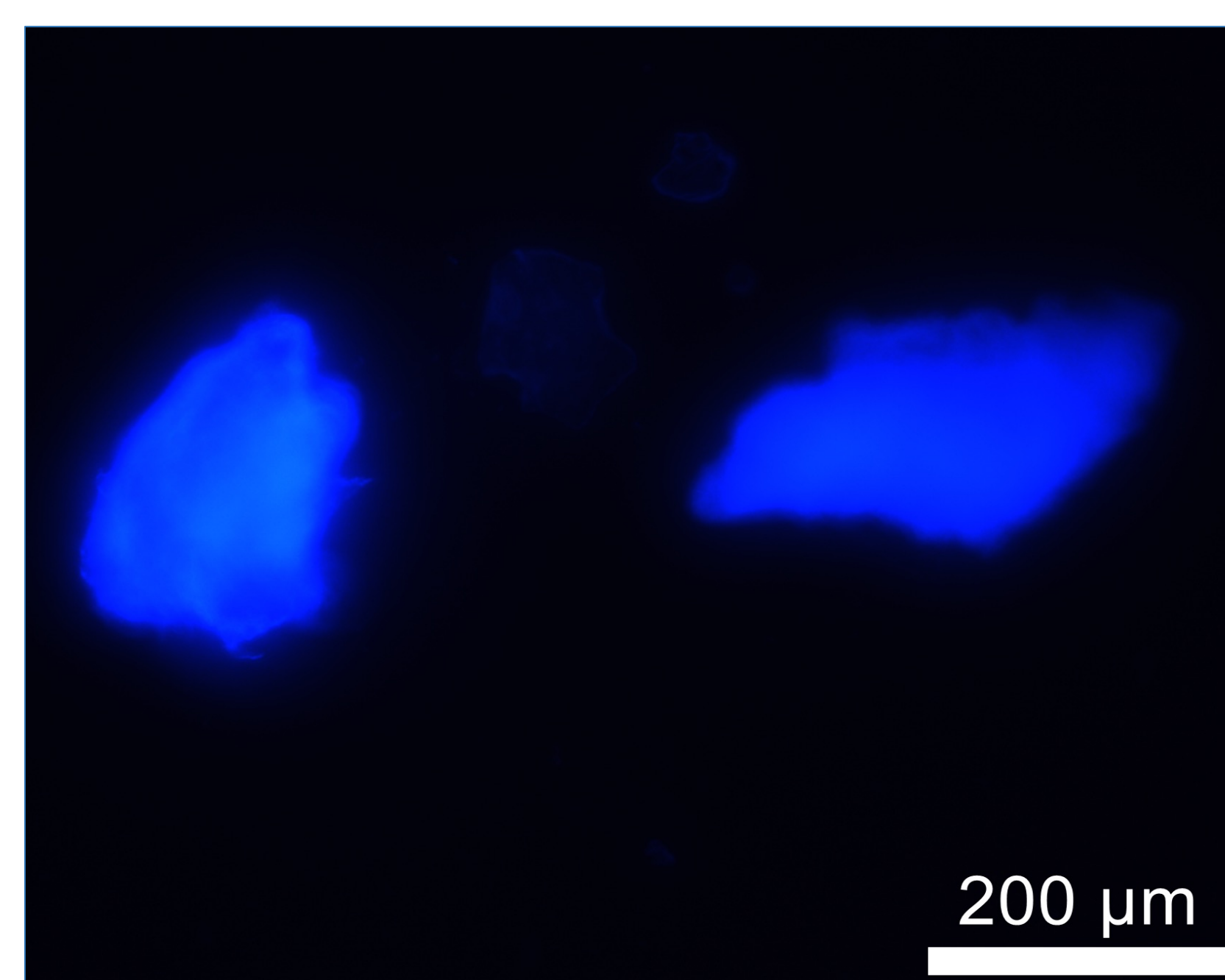


Image 4. Sample fluorescing under microscope at 10x objective.

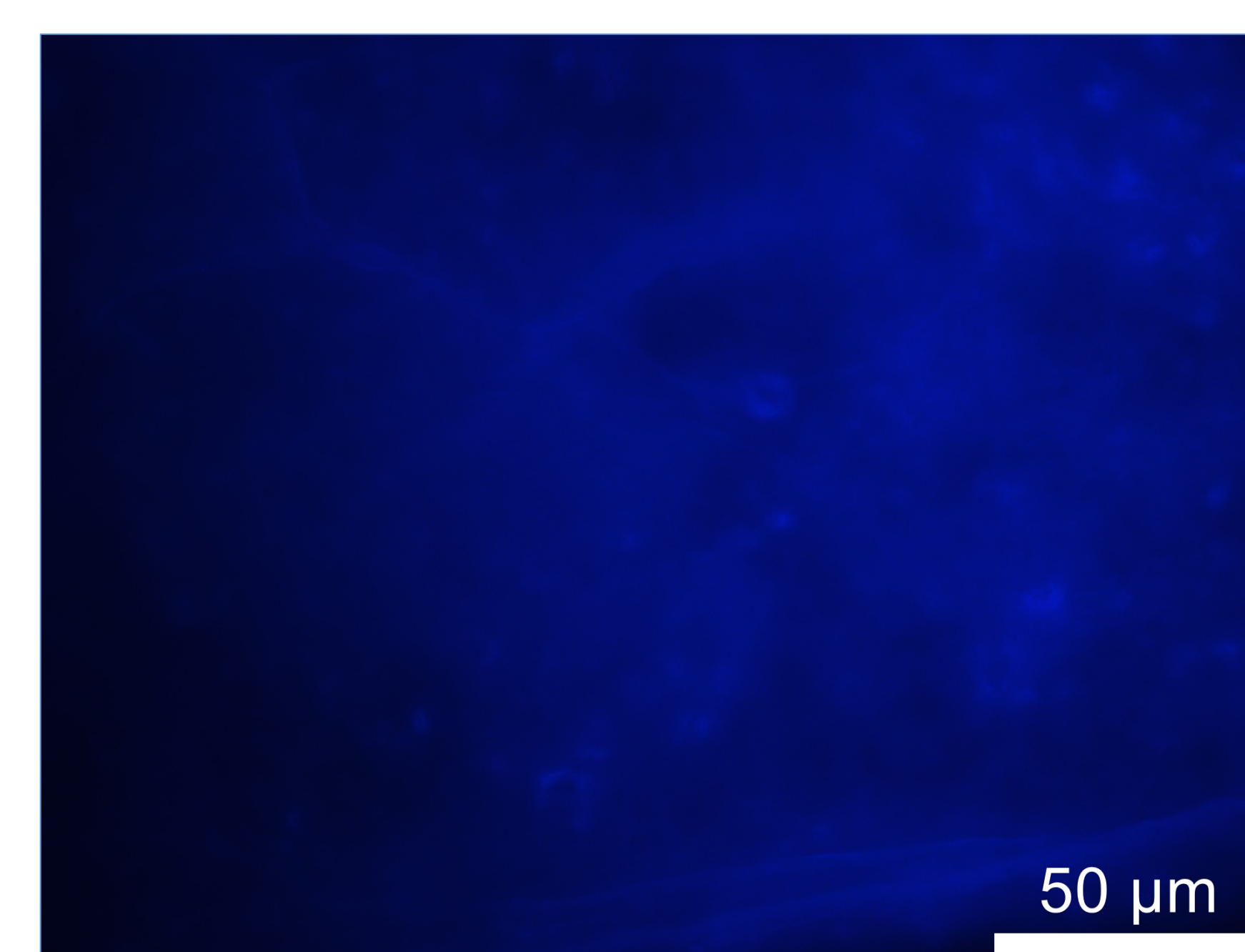


Image 5. Sample fluorescing under microscope at 40x objective.



Image 2. Female scud preserved with 4% formalin under dissecting microscope.

DISCUSSION & FUTURE RESEARCH

- Scud is a very under-studied species, so it is important to know what they eat as invaders in the Great Lakes region.
- Knowing what their diet consists of will be important for determining how they compete with other suspension feeders.
- I will continue to refine my methodology and analyze my scud samples as I enter my master's program with Dr. Reuben Keller in Loyola's School of Environmental Sustainability.

REFERENCES

1. Keller, R. P., G. Habeeb, T. Henry, and J. Brenner. 2017. Non- native amphipod, *Apocorophium lacustre* (Vanhoffen, 1911), in the Illinois River and Chicago Area Waterway System. *Management of Biological Invasions* 8:377–382.
2. Walker, E. D., E. J. Olds, R. W. Merritt. 1988. Gut Content Analysis of Mosquito Larvae (Diptera: Culicidae) Using DAPI Stain and Epifluorescence Microscopy. *Entomological Society of America* 25(6): 551-554.