Introduction to Macroinvertebrates at Avon High School

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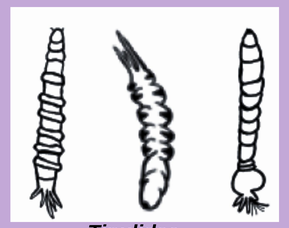
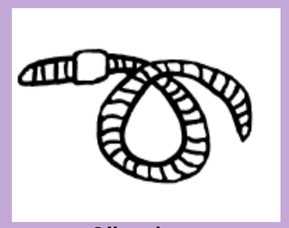
Community Partner: Alisa Phillips-Griggs

Avon High School; Farmington River Watershed Association



Tipulidae
Crane fly



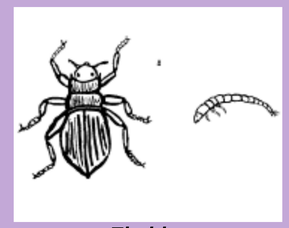
Oligochaeta
Aquatic worm

Hydropsychidae
Common netspinner

Philopotamidae
Fingernet caddisfly

Psephenidae
Water penny

Chironomidae
Non-biting midge



Elmidae
Riffle beetle

Macroinvertebrate Importance

Macroinvertebrates are spineless organisms large enough to see without a microscope (1). They are an important food source for fish and other river dwelling predators, and help recycle nutrients back into streams. They are also used as bioindicators, because different macroinvertebrate species can tolerate different stream conditions and levels of pollution. The presence or absence of certain macroinvertebrate species can be used to interpret water quality. Since the research process is not too time consuming and it is easy to understand, students can take part in the research process.

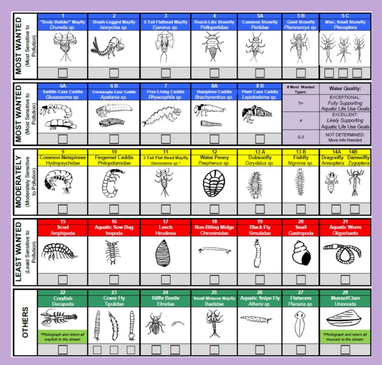


Fig 1. The Riffle Bioassessment by Volunteers (RBV) field identification guide (2), which shows macroinvertebrates from most to least sensitive.

Riffle Bioassessment by Volunteers (RBV)

The RBV is a statewide volunteer program to monitor water quality (2). This program is coordinated by CT DEEP, and allows trained volunteers to test water quality in streams by capturing and identifying macroinvertebrates after undergoing a brief training.

Our Goal

We hope to educate Avon High School (AHS) students about macroinvertebrates so they can:

1. **Become familiar with bioindicators as a scientific tool**
2. **Become more interested in environmental science**
3. **Become more involved in environmental action.**

Step One: RBV Training

- **Five AHS students attended a two-part RBV training offered by Alisa Philips-Griggs, and assisted by Arianna at the Barnes Nature Center on November 8th, 2018 (Figure 2).**
- **The AHS student group learned the proper way to capture, record, and preserve the macroinvertebrates for future order identification.**

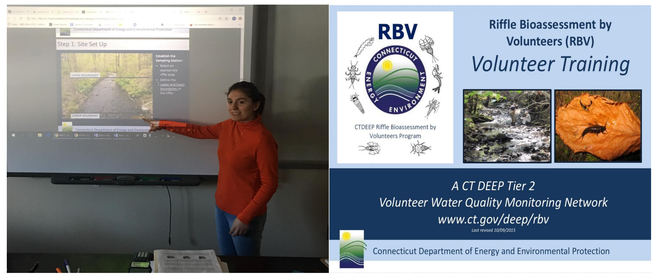


Figure 2. The Barnes Nature Center presentation

Step Two: Pilot Macroinvertebrate Search

- **An RBV search was conducted by the AHS student group at Big Brook in Avon, CT in early December 2018 (Figure 3).**
- **The necessary tools for the search were kindly provided by the Farmington River Watershed Association, and included: net, waders, large trays, ice cube trays, screw top containers with 70% alcohol, pencils, a strainer, data sheets, and vouchers.**
- **All organisms were appropriately collected, and vouchers were sent to Megan Lally, CT DEEP, for identification to determine the quality of the stream.**

Figure 4. (*left)* The AHS student group (Arianna, Ben, Sabrina, and Avery) before the search commenced at Big Brook in Avon, CT (*right).*

RBV Results

- **The final identification provided by CT DEEP confirmed the collection of the above macroinvertebrates.**
  - **These organisms include "moderately sensitive" and "least sensitive" insect orders (Figure 1).**
  - **Importantly, their status does not necessarily imply the stream is bad quality.**
  - **Many factors could have contributed to the group not finding the most sensitive insects such as precipitation, seasonality, riffle occurrence, and others.**

Main Takeaways from the pilot search

The findings gathered during the pilot macroinvertebrate search will help inform decisions and future planning for engaging a larger group of students during an AHS field trip.

For a larger group or more interactive experience, the following changes could include:

- **Modifying the protocol to use different, less expensive equipment to engage more students**
- **Identifying the macroinvertebrates that are collected, by utilizing AHS science lab equipment, rather than sending them to DEEP.**

Future AHS Field trip

Adding a macroinvertebrate field trip to the Avon High School curriculum could be a fun, hands on way to teach students about water quality and the diversity of insects. Since aquatic macroinvertebrates are small, easy to capture, and harmless, it makes them a top choice to study on a warm day with a high school environmental science class. The first macroinvertebrate field trip is planned to take place in mid April, 2019.

References

1. Stumpf, S., Valentine-Darby, P., & Gwilliam, E. (2009). Aquatic Macroinvertebrates. from https://www.nps.gov/articles/aquatic-macroinvertebrates-introduction.htm

2. CT Dept. of Energy & Environmental Protection. Riffle Bioassessment by Volunteers Program from www.ct.gov/deep/rbv

Acknowledgements

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