Small Creatures, Big Clues: Investigating Water Quality With Macroinvertebrates

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BACKGROUND

- Macroinvertebrates are animals without a backbone.
- Macroinvertebrates react to pollution in different ways. Some can live when pollution increases, but some cannot.
- Fish like to eat macroinvertebrates!
- Leaf litter in streams increases nutrients. This can cause dissolved oxygen to decrease.

RESEARCH QUESTION

What will happen to macroinvertebrates if there are leaf litter piles present in streams during the Fall season?

HYPOTHESIS

I hypothesize that macroinvertebrate numbers will be low during the Fall in Northwest Indiana due to low oxygen caused by leaf litter.

METHODS

Sample Sites

Lake County and Porter County, Indiana

Macroinvertebrate Sampling

- The leaf pack was shaken in the water to release organisms.
- A dip net was then used to scoop in the water to collect the macroinvertebrates and the leaf litter.
- The materials in the net were dumped into a white plastic container for observation.
- Macroinvertebrates were then removed and placed into individual mini condiment cups for identification using the Hoosier Riverwatch ID sheet.
- The procedure was completed 3 times at each site.

Leaf Litter →

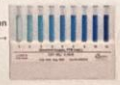
Macroinvertebrate ID →

Dissolved Oxygen

- The CHEMetrics K-7512 visual test kit was used to determine the dissolved oxygen at each site.
- The ampoule tip was snapped in the water sample prompting water to be drawn into the glass tube.
- The glass ampoule was then inverted.
- After two minutes the color that developed was compared against color standards to determine the dissolved oxygen ppm (mg/L).
- The procedure was completed 1 time at each site.

Testing for Dissolved Oxygen →

Dissolved Oxygen Indicators →

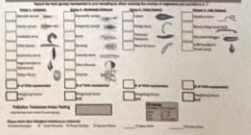


Pollution Tolerance Index (PTI) Rating

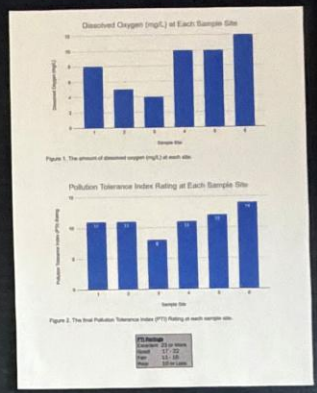
- PTI Rating was calculated and then the health of the water was determined to be excellent, good, fair, or poor.

↑
Mayfly Nymph

PTI Rating →



RESULTS



CONCLUSIONS

- My data suggests the water is polluted, but I do not think it is because I found mayfly nymphs and riffle beetles. They do not like polluted water.
- The macroinvertebrate numbers could have been low because -
  - they have already entered their adult stage.
  - they are competing with bacteria for oxygen.
  - they do not always feed on leaf litter.
  - leaf litter can block sunlight, decreasing food production.
  - leaf litter can cause too many nutrients in the water.
  - leaf litter can slow down stream flow.
  - the streams are going through natural seasonal changes.

BIBLIOGRAPHY

- Indiana Department of Environmental Management. (2022). *Volunteer Stream Monitoring Training Manual*. Hoosier Riverwatch. https://ecm.idem.in.gov/cs/idcplg?IdcService=GET_FILE&dID=83366809&dDocName=83369014&Rendition=web&allowInterrupt=1&noSaveAs=1

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