

Investigate how indicator species and changes in pH and oxygen levels may be used as signs of pollution

Introduction

This is a fieldwork exercise that involves sampling water from streams (ideally) or ponds, in two different situations. Sample data are provided which could be used to discuss the process if you cannot carry out the practical work.

Apparatus

- large container
- indicator species sheet
- animal keys
- plastic trough or enamel dish (deep enough for water at a depth of 3-5 cm without spilling)
- net
- disposable gloves

Diagram of Apparatus



Method

1. Identify two locations to be tested e.g. these may be two different areas in the same river.
2. Collect some water in a large container – about 2-3 cm deep.
3. Collect samples of invertebrates using the net and transfer them to the tray. Try to use the same technique each time you collect the sample – holding the net the same way for the same amount of time. Scoop up some of the material from the bottom of the stream, or stir up the bottom and place the net downstream.
4. Study the organisms in the tray and try and identify the invertebrates against the chart – ‘Invertebrate indicators of pollution’. If you cannot identify an invertebrate, take a picture or make a drawing to help identify it later on.
5. Record the number of each invertebrate that has been caught.
6. After identifying and counting the invertebrates, pour them and the water gently back into the stream.
7. Repeat steps 1-6 at the second location.

Analysis

1. Compare the invertebrates from each location and make a judgement as to the level of pollution in each.

Invertebrate indicators of pollution

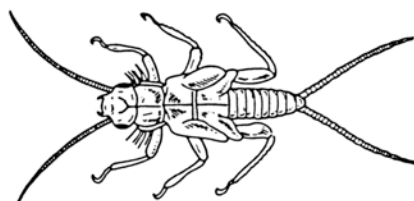
Different invertebrates will live in the water according to how polluted it is.

Unpolluted water is clear and also contains plenty of oxygen.

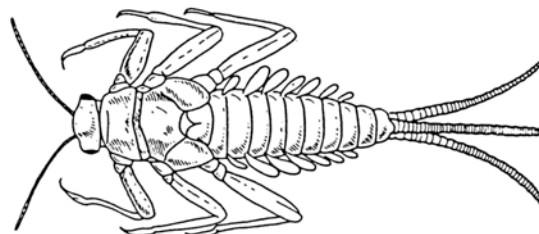
Polluted water may be cloudy, but more importantly, it often contains less oxygen.

Pollution level

A Clean water

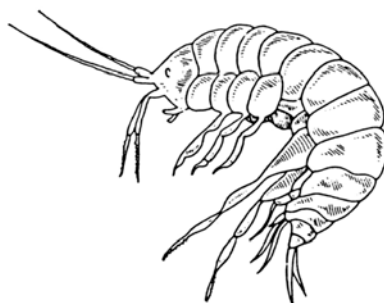


Stonefly nymph (about 10 mm)

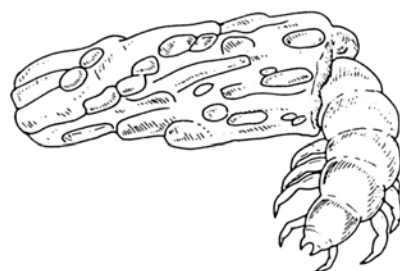


Mayfly nymph (about 20 mm)

B Some pollution

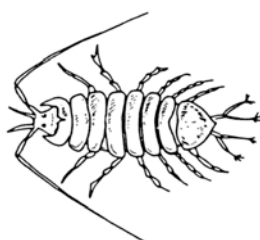


Freshwater shrimp (about 20 mm)



Caddis fly larva (about 10 mm)

C Moderate pollution

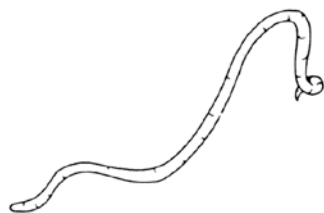


Water louse (about 10 mm)

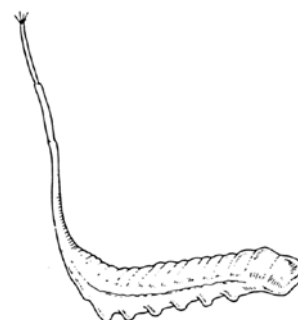


Bloodworm (about 20 mm)

D High pollution



Sludgeworm (about 120 mm)



Rat-tailed maggot (up to 55 mm)

E Very high pollution – no life