

Hester-Dendy Sampling Method

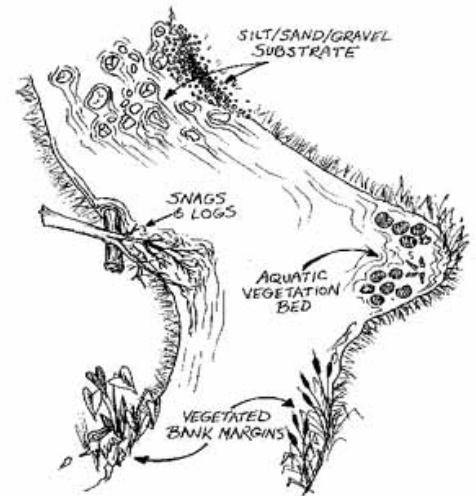
1. Submerge the Hester-Dendy Sampler by attaching it to a rock or cement block with “zip strips”. Make careful notes about the sampler location. Measure out to the location from a permanent structure such as a tree or dock.
2. After 4-6 weeks, retrieve the sampler.
3. Carefully extract the debris and organisms from between the plates. Make sure that this occurs over a tub to collect loose objects.
4. Separate the macroinvertebrates from the other debris.
5. Arrange the organisms on a white plate or ice cube tray according to groups of the same kind. Identify each kind according to Appendix B and keep a tally on the data sheet. Empty the plate, returning the organisms to the stream.

Leaf Bag Sampling Method

1. Fill the leaf bag with decomposing leaves.
2. Submerge the leaf bag with rocks or by tying it to the bank.
3. After six weeks, retrieve the leaf bag.
4. Carefully extract the debris and organisms from the bag. Make sure that this occurs over a tub to collect loose objects.
5. Separate the macroinvertebrates from the other debris.
Arrange the organisms on the plate according to groups of the same kind. Identify each kind according to Appendix B and keep a tally on the data sheet. Empty the plate, returning the organisms to the stream.

D-Net Sampling Method

1. Choose a “riffle” portion of the stream with shallow, faster-moving water and a stream bed of one-quarter inch gravel or sand to ten-inch cobbles.
2. Select an area and avoid disturbing the area upstream.
3. Have one person hold the net perpendicular to the flow.
4. Another person should stand beside the sampling area and remove stones and other objects, holding below the water as the organisms from the rocks go into the net.
5. When objects have been brushed into the net, kick the sampling area vigorously from the upstream edge toward the net. Also, jab the net into the bottom of the stream to loosen other organisms.
6. Dump the collected materials into a shallow white container. Place any macroinvertebrates into another container with clear water for easier identification.
7. Arrange the organisms into a tray (ice cube trays work well) according to groups of the same kind. Identify each kind with available identification charts and dichotomous keys and keep a tally on the data sheet. Empty the plate, returning the organisms to the stream.



Macroinvertebrate Identification

Dichotomous Key

Below is a simplified version of a dichotomous key used by scientists to identify macroinvertebrates. It was created by Hoosier RiverWatch (see sources below) to be used by volunteer monitors who have not had much experience identifying aquatic macroinvertebrates. Each couplet has two or three options to choose from before moving to the next couplet.

Information in this section was modified from the following sources

An Introduction to the Aquatic Insects of North America, Second Ed., Edited by R.W. Merritt and K.W. Cummins

Aquatic Entomology, Patrick McCafferty

Clinton River Watershed Council *Teacher Training Manual*, Michigan, Meg Larson

Field Manual for Water Quality Monitoring, 10th Ed., Mark K. Mitchell and William B. Stapp

Macroinvertebrate Identification Flash Cards, GREEN/Earth Force, Ann M. Faulds, et al.

Pond and Stream Safari, Karen Edelstein, Cornell Cooperative Extension

Save Our Streams Monitor's Guide to Aquatic Macroinvertebrates, Loren Larkin Kellogg

Please be aware that some macroinvertebrates may have missing body parts

CHOOSE ONE:

1a. Has a shell (s)

GO BELOW TO:

2

1b. Has no shell

5

2a. Has a hinged double shell

3

2b. Has a single shell

4

3a. Adult under 2 inches long

19

3b. Adult 2-4 inches long



Mussel

4a. Right-handed opening



Right-handed snail

4b. Left-handed opening



Left-handed snail

5a. Has segmented body or looks like a tiny tick

6

5b. Has an unsegmented body and has an "arrow shaped" head; 2 pigment spots (eyes)



Planaria

6a. No obvious legs

7

6b. Obvious legs

12

7a. Has no obvious appendages (long, tubular body)

8

7b. Has some appendages (small tubes, tiny bumps, or feathery structures)

9

8a. Has a smooth body and suckers



Leech

8b. Has a round body and a rat tail



Rat-tailed maggot

8c. Has a rounded body



Aquatic worms

9a. Body black or brown; more than 1/3 inch long; plump and caterpillar-like

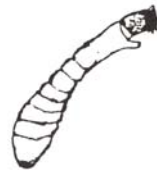


Crane fly larva

9b. Has a distinct head

10

10a. One end of body wider than other end; two tiny feather structures on smaller end



Black fly larva

10b. No difference in diameter along body

11

11a. Bright red body



Blood midges

11b. Grey body

Other midges

12a. Has four pairs of legs



Water mite

12b. Has three pairs of legs

13

12c. Has many pairs of legs

25

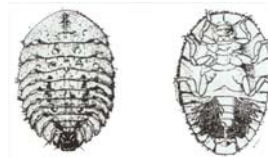
13a. Has no wings or short wing pads on back

14

13b. Has two pairs of wings that cover the abdomen

23

14a. Has a flat, round body with legs underneath (wings are not obvious)

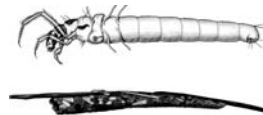


Water penny beetle larva

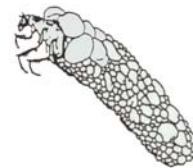
14b. Not flat, has long body with legs

15

15a. Lives in a tube or case or has two hooks in its last segment and is green with three plates on back behind head. (The "green caddisfly" builds a net and tube, but will be washed into the kicknet as free-living)



Caddisfly larvae



15b. Free-living

16

16a. Abdomen possesses lateral filaments similar in size to legs

21

16b. Abdomen does not have "leg-like" filaments (may have feathery "gills")

17

17a. Always with only two tail appendages and no abdominal gills



Stonefly nymph

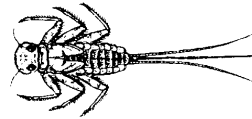
17b. Usually has three tail appendages, and with no lateral gills on abdominal segments

18

17c. Tail has no appendages

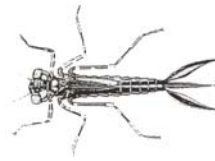
24

18a. Has long, bristle-like tail appendages, sometimes two or three



Mayfly nymph

18b. Lower lip formed into extensible scoop-like structure and has leaf-like tail appendages



Damselfly nymph

19a. Small rounded shell (<2 inches)

20

19b. Small triangular shell with alternating cream and dark brown bands

Zebra mussel (exotic)

20a. Numerous very fine concentric rows of elevated lines, white or cream colored with smooth lateral teeth

Fingernail clam

20b. Numerous concentric elevated ridges, yellowish brown to black shell with serrated lateral teeth



Asiatic clam (exotic)

21a. Head narrower than widest body segments

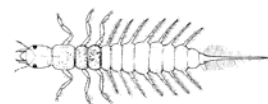


Beetle larva

21b. Head as wide or wider than other body segments

22

22a. Abdomen with single long filament at end



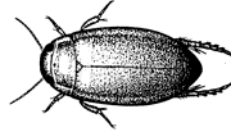
Alderfly

22b. Abdomen ending with a pair of tiny hooked legs, large head with pincer-like jaws



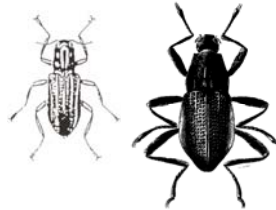
Dobsonfly or fishfly larva

23a. Oval-shaped body, legs with feathery swimming hairs



Adult water bugs and water beetles

23b. All legs smooth, without hairs



Riffle beetle adult

24a. Lower lip formed in scoop-like structure



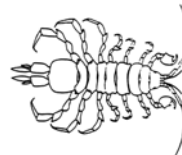
Dragonfly nymph

24b. Looks like tiny millipede



Riffle beetle larva

25a. Flattened top to bottom, crawling looks like roly-poly" or a "pill bug"



Sowbug

25b. Flattened side to side, swimming looks like tiny shrimp



Scud