Ključ za osnovno razvrstavanje makrozoobentosa po sistematskim skupinama

Glossary

ORIENTATION

Anterior — forward; refers to the head end of the body or that part of a structure located nearest the head of the body
Basal — origin; refers to the origin of a structure, generally closest to the point of attachment to the body
Distal — end; refers to that part of a structure furthermost from its point of attachment to the body
Dorsal — top, upper or back; refers to the upper or top part of the body or structure
Lateral — side; refers to the site of the body or structure
Medial — middle; refers to the longitudinal midline of the body
Posterior — rear; refers to the tail end of the body or that part of a structure located nearest the tail of the body
Ventral — lower, bottom or front; refers to the lower or bottom part of the body or structure

BODY DIVISIONS

Abdomen — the third major body region of an insect, typically divided into 8 to 11 individual segments
Head — the first major body region of an insect, including mouthparts and sensory structures such as the eyes and antennae.
Mesothorax — the second or middle segment of the thorax
Metathorax — the third, most posterior segment of the thorax
Prothorax — the first, most anterior segment of the thorax
Thorax — the second (middle) major body region of an insect, often divided into three parts or segments

BODY STRUCTURES

Antennae — a variously shaped appendage of the head, occurring in pairs, commonly located between the eyes
Beak — hard, cone-shaped mouthparts
Cephalothorax — a single body region consisting of a head and thorax that are little differentiated from each other
Compound eyes — multifaceted eyes, usually situated laterally on the head of some aquatic insects (dragonflies, damselflies,
Mouthparts — any of several various structures which form the mouth of an insect; typical structures include the labrum, labium, madibles, maxilla
Exoskeleton — external, rigid body wall of arthropods
Eyespots — single eye or eye-like structure found on the head
beetles, etc.)
Filaments — slender, finger- or thread-like appendage such as antennae or gills
Gills — structures used for absorption of oxygen from the water
Labium — lower lip or most posterior whole mouthpart of the insect head

Labrum — upper lip or most anterior, unpaired mouthpart of the insect head
Lobe — a rounded projection
Operculum — a covering of a chamber (ex.: the disc-like structure covering the opening of the shell in an operculate snail)
Plate-like gills — broad, flattened gills
Prolegs — a fleshy, unsegmented, leglike or lobelike structure; usually occurring in pairs and located on the thorax of some fly larva and on the abdomen of various other insect larva
Protuberance — a projection or bulge; a rounded projection
Simple eyes — non-faceted eyes, usually smaller than compound eyes
Spiracle — an external opening along the body wall of insects used for air intake
Tubules — long, filamentous, tube-shaped structures
Wingpad — a developing wing or sheath of a developing wing

OTHER DESCRIPTIVE TERMS
Apex — tip or point of a structure
Caudal (or Anal) — a structure that is located on the very end, or near the anus of an organism
Elongated — long and thin; extended and lengthened
Membranous — consisting of or resembling a thin, pliable skin-like tissue serving to line or connect various body structures
Operculate — functioning as a covering for other structures (ex.: the triangular, rectangular or oval shaped gill coverings on the abdominal segments of various mayfly larvae)
Segmented — divided into sections, often of similar size, and joined in a linear fashion (ex.: leeches, aquatic worms and the abdominal regions of many aquatic insects)
Terminal — forming or located at the end of a structure

Definitions adapted in part from *Aquatic Entomology: The Fishermen's and Ecologists' Illustrated Guide to Insects and Their Relatives (W. Patrick McCafferty, 1981)*

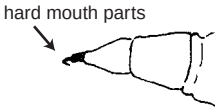
Key prepared by Dr. R. Edward DeWalt and Carolyn Peet Nixon of the Illinois Natural History Survey, 607 E. Peabody Drive, Champaign, Illinois 61820.

Drawings in the key by C. Nixon or from The Mayflies of Illinois (B.D. Burks, Illinois Natural History Survey); The Caddis Flies, or Trichoptera, of Illinois (Herbert H. Ross, Illinois Natural History Survey); The Taxonmoy and Bionomics of the Aquatic Hermiptera of Illinois (David Robert Lauck, unpublished Masters Thesis from the University of Illinois); or Freshwater Sphaeriacean Clams (Mollusca: Pelecypoda) of North America (J.B. Burch, US EPA)

Aquatic Macroinvertebrates

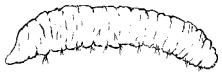
Body **w/out** jointed legs, exoskeleton, **or** hard mouth parts

Body with hard or flexible exoskeleton, jointed legs, **and/or** hard mouth



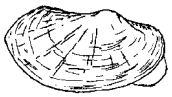
Non-arthropods

Arthropods



Body soft, w/out shells

Body soft, with shells composed of one or more valves



Worms and Leeches

Molluscs

continued on page 2

More than 3 pair jointed legs; body usually in two regions, cephalothorax and abdomen

3 pair jointed legs, **or** no jointed legs; body usually in three regions: head, thorax, and abdomen

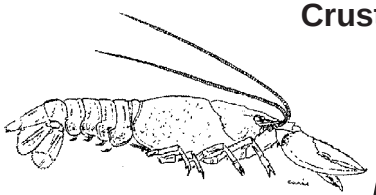
Body cylindrical

Body flattened

Insects

continued on page 3

Crustacea

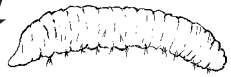


Body segmented; sometimes with bristles.

Body unsegmented, with eyespots on arrowhead shaped head

Body circular, with 5 pair legs, first legs with heavy pinchers, usually more than 1 in. long

Body flattened top-to-bottom or side-to-side; with more than 5 pair legs, no pinchers; usually less than 1 in. long



Aquatic Worm

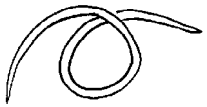
Flatworms

Crayfish

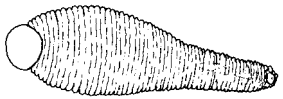
Body flattened top-to-bottom, can roll into a ball

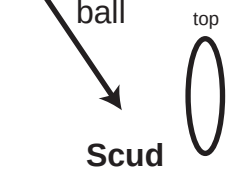
Body flattened side-to-side, cannot roll into ball

Body smooth and outer covering rigid



Body segmented, sucking disc at one or both ends



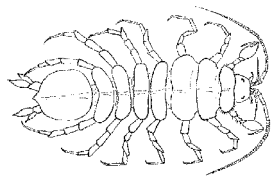


Roundworms, not an indicator taxon

Leeches

Sowbug

Scud



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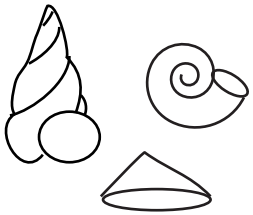
Molluscs (mussels, clams and snails)

continued from page 1



Shell consisting of a single piece; coiled or not

Shell consisting of two hinged parts, not coiled

Snails

Mussels and Clams

Shell a simple cone

Shell coiled

ventral side

Limpet

Shell flattened, coiled atop itself

Shell conical

Planorbid Snail

Shell opening to the right

Shell opening to the left

Left-Handed Snail

Shell w/out operculum

Shell with operculum

Right-Handed Snail

Shell nearly round when viewed laterally, generally small (less than 1 in. length)

Shell usually oblong, but if round, then greater than 1 in. length

Shell with distinct, well-spaced ridges, up to 1 in. length

Shell smooth or with low, closely spaced ridges, less than 0.5 in. length

Fingernail or Pea Clam

Asiatic Clam

Shell up to 2 in. in width or length

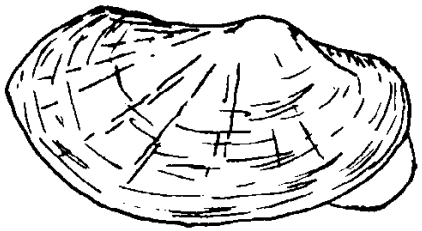
Shell generally less than 1 in. in width

Operculate Snail

Chinese Mystery Snail

Shell w/out contrasting black and white stripes; no threads; up to 6 in. length

Shell with contrasting black and white stripes, often tied to objects by threads, no more that 1.5 in. length



Freshwater Mussel

Zebra Mussel

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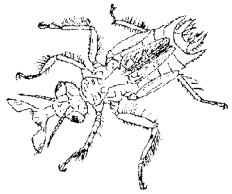
Aquatic Insect Orders

continued from page 1



Thorax with 3 pair jointed legs

Thorax w/out jointed legs; prolegs or protuberances sometimes present

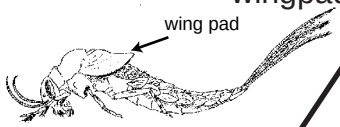
Diptera (true flies, continued on page 8)

Abdomen with forked jumping appendage; total body length up to 3mm

Collembola (springtails, non-indicator)

Abdomen w/out forked jumping appendage

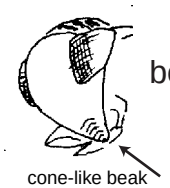
Thorax with hard or leathery wings or developing wingpads

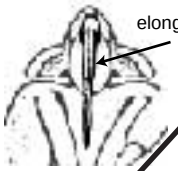


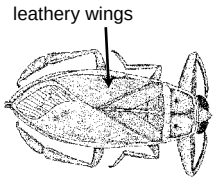
Thorax w/out wings or developing wingpads

continued on page 4

Mouth is an elongate or cone-like beak; adults with leathery wings







Hemiptera (true bugs, non-indicators)

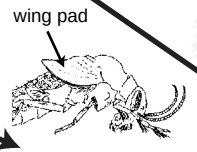
Mouth parts of chewing type; adults may have hard wings

Labium not mask-like

Labium (lower lip) modified as diamond-shaped mask-like structure

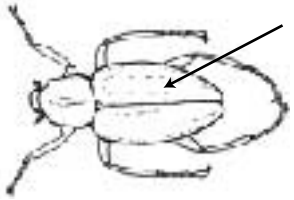
Thorax with hard wings covering at least part of the abodomen

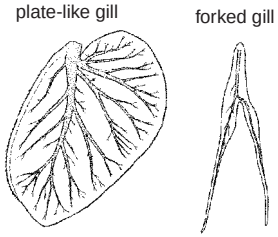
Thorax with soft wingpads



Odonata (damselflies and dragonflies), continued page 5

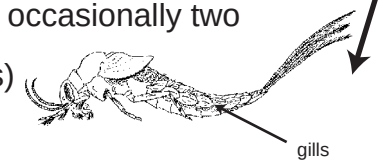
Coleoptera (beetles, in part), continued page 9



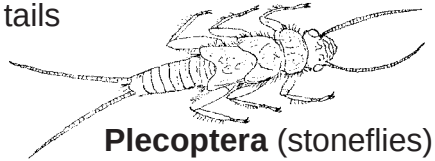


Ephemeroptera (mayflies) continued on page 6

Forked **or** plate-like gills on abdomen; 1 claw per leg; usually three tails, occasionally two



At most one or two abdominal segments with finger-like gills; 2 claws per leg; two tails



Plecoptera (stoneflies)

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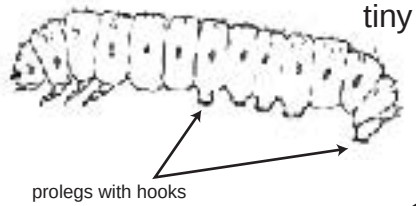
Aquatic Insect Orders, continued

continued from page 3

Abdomen with pairs of short, fleshy, prolegs with ring of tiny hooks at tip

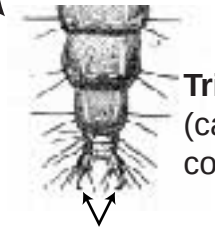


Lepidoptera (aquatic moths, non-indicators)

Abdomen lacks short, fleshy, structures with ring of hooks

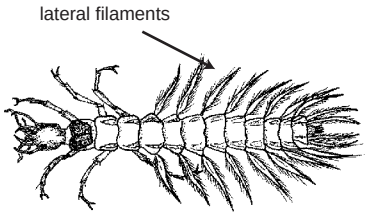
Abdomen ends variously but never in 1 pair of prolegs having a single hook each (if pair of prolegs are present, then 2 hooks

Abdomen ends in 1 pair of short or long prolegs (sometimes fused together) that have a single hook each.

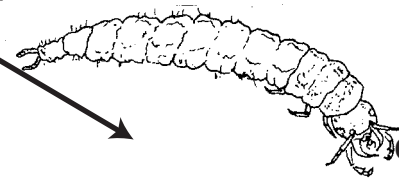


Trichoptera (caddisflies), continued page 7

Abdomen has well-developed lateral filaments



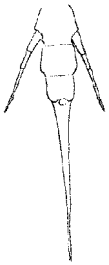
Abdomen lacks well-developed lateral filaments

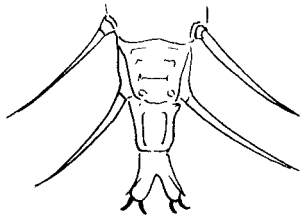


Coleoptera (beetles, in part), continued page 9

End of abdomen with single, unforked filament **or** 1 pair prolegs, each with 2 hooks

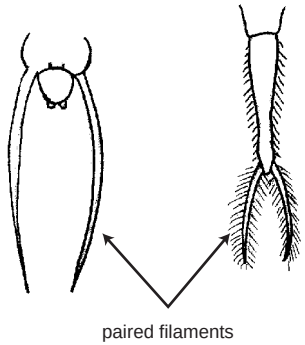
If filaments at end of abdomen, then paired or forked, **or** if proleg, then single proleg with 4 hooks





Megaloptera hellgrammites and alderflies), continued page 5

Coleoptera (beetles, in part) continued page 9



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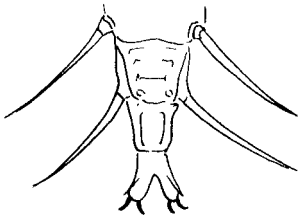
Megaloptera (dobson flies and alderflies)

continued from page 4

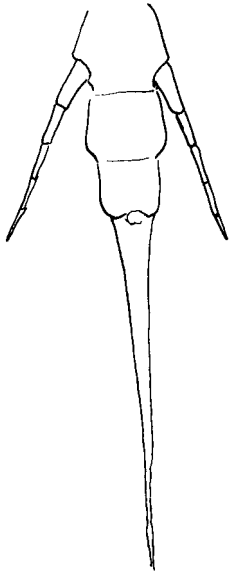
Tip of abdomen with pair of prolegs armed with 2 claws

Corydalinae
Hellgrammite
(dobsonfly larvae)



Tip of abdomen with single long filament

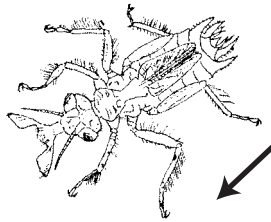
Alderfly
Sialidae



Odonata (dragonflies and damselflies)

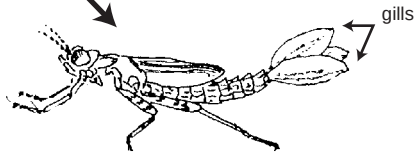
continued from page 3

Abdomen w/out external gills



Dragonflies
Anisoptera

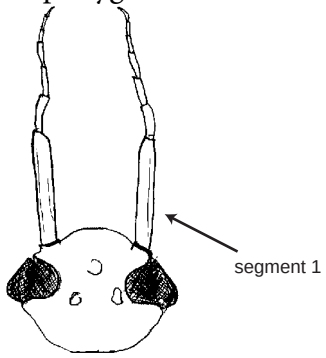
Abdomen with external gills oar-like – careful, sometimes these are knocked off



Damselflies
Zygoptera

First antennal segment very long

Broadwinged Damselflies
Calopterygidae



All antennal segments same length

Narrow-winged Damselflies Coenagrionidae

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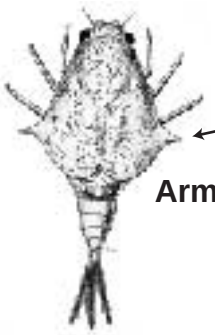
Ephemeroptera (mayflies)

continued from page 3

Thorax covering much of abdomen, with prominent spines

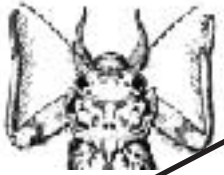


Armored Mayflies

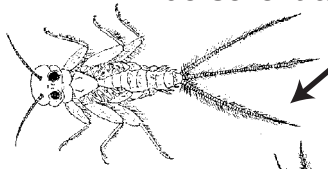
Thorax not enlarged, no prominent spines laterally

Mouthparts facing downward (not visible from above)

Facial plate facing forward (visible from above)

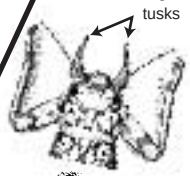


Gills not forked; head w/out tusks; head broad and extremely flattened dorsoventrally



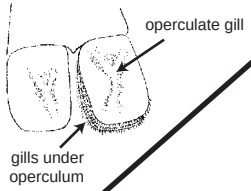
Clinging Mayflies
Heptageniidae

Gills forked; head with tusks; head usually rounded

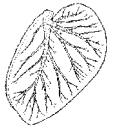


Burrowing Mayflies
Ephemeridae

Gills on second abdominal segment either operculate, forked, or lacking



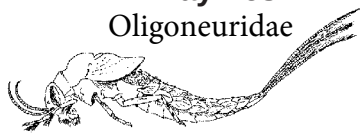
Gills on second abdominal segment normal platelike gills



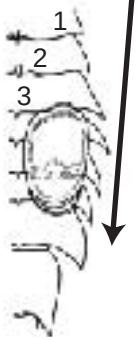
Forelegs w/out rows of long stiff hairs

Forelegs with double row of long, stiff hairs

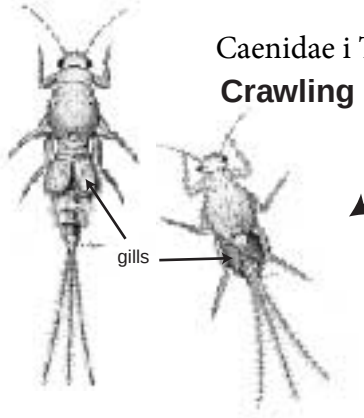
Torpedo Mayflies
Oligoneuridae



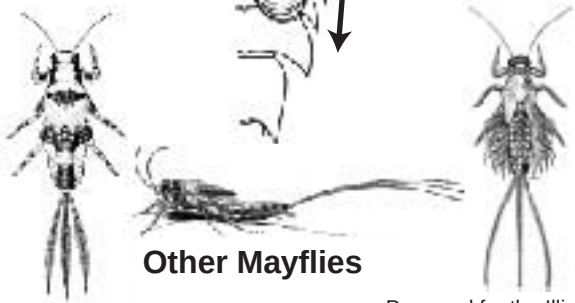
Gills on segment 2 operculate (may be rectangular, triangular or oval)



Gills on segment 2 not operculate, although those on segment 3 or 4 may be operculate; otherwise gills are platelike or forked

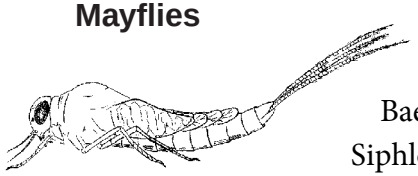


Caenidae i Tricorythidae
Crawling Mayflies



Other Mayflies

Swimming Mayflies



Baetidae i Siphlonuridae

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Trichoptera (caddisflies)

continued from page 4

thoracic segments

All three thoracic segments hardened

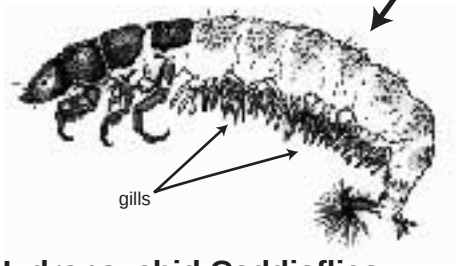
One or more thoracic segments membranous

Abdomen without filamentous gills

(Microcaddisflies, always less than 6mm, often only 2 or 3 mm long)

Other Caddisflies Hydroptilidae

Abdomen with conspicuous bundles of filamentous gills



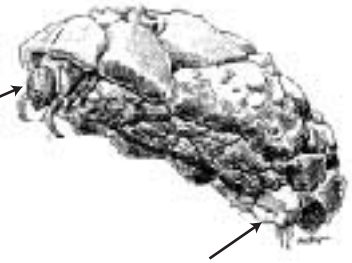
Hydropsychid Caddisflies

Caddis with sand case either domed top with flattened bottom, **or** coiled like a snail case

Caddis either free living, **or** case variable (made of sand, silk, or plant material), but not domed or coiled

Other Caddisflies

Caddis with domed case



Caddis with coiled case

Snail-case Caddisflies

Saddle-case caddisfly out of case

Saddle-case Caddisflies Glossosomatidae

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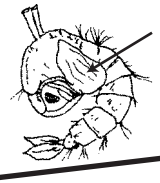
Diptera (true flies)

continued from page 3

If branched gill, then less than 1/4 length; if case, not slipper-shaped



Body with developing wingpads

Body w/out developing wingpads

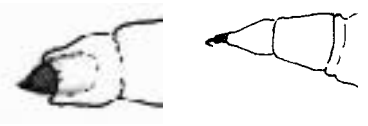
Fly Pupae, non-indicators

Pair of highly branched gills on thorax about 1/2 length of body; slipper-shaped case

Blackfly Pupae Simuliidae

Head fully formed and distinct from thorax

Head inconspicuous, sometimes with only hard mouthparts and slender rods; often retracted into body

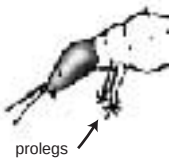


Several abdominal segments with prolegs; abdominal tip with feathery pointed lobes; lateral lobes on other abdominal segments

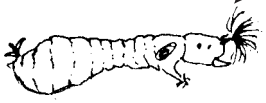
Snipe Fly Rhagionidae

Abdomen variable, but not with the **combination** of abdominal prolegs, feathery lobe at tip and lateral abdominal lobes

First thoracic segment with fleshy prolegs with hooks



Lower third of abdomen swollen; head usually with fans for feeding

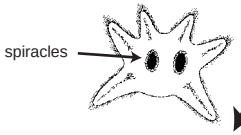


Black Fly Simuliidae

Lower third of abdomen not swollen

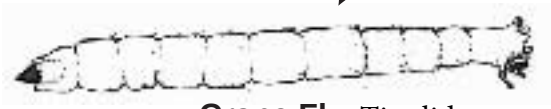
First thoracic segment w/out fleshy prolegs

Abdominal tip with disc containing dark spiracles surrounded by 2-8 lobes (most commonly 6)



Abdominal tip w/out disc, spiracles, and lobes

Other Fly



Crane Fly Tipulidae

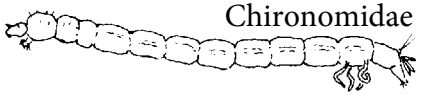
Last abdominal segments with tubules; body blood red in life

Bloodworm

Last abdominal segments w/out tubules; body color varies

Midge Chironomidae

crveni Chironomidae



Body very slender; lacking abdominal prolegs or lateral filaments

Biting Midge Ceratopogonidae

Body not slender, possibly thorax or abdominal segments swollen; may have abdominal prolegs; lateral filaments possible

Other Fly

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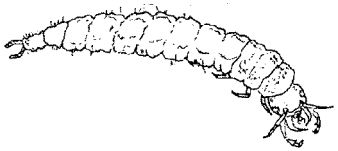
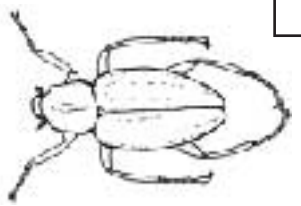
Coleoptera (beetles)

continued from page 3

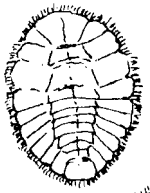


Body w/out wings: larval beetles



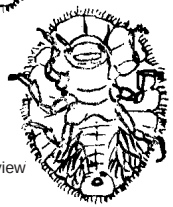
Body with hard wings: adult beetles

dorsal view



Body disc shaped, covering head and legs

Body elongate, head and legs not concealed when present

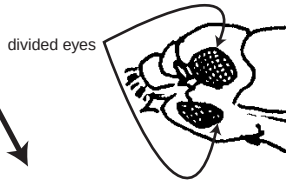


ventral view

Water Penny Psephenidae

Compound eyes undivided

Compound eyes split into dorsal and ventral pairs; back two pair of legs reduced

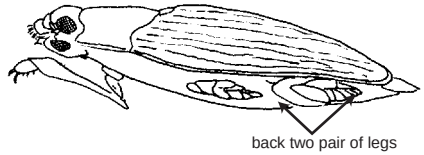


divided eyes

Leg length proportional to body size, clawed segment much shorter than previous segments combined

segment with claw

Other Beetle, a non-indicator

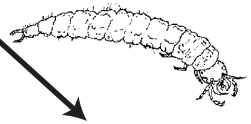


back two pair of legs

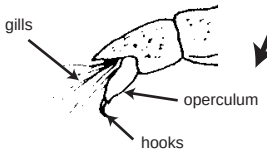
Gyrinidae **Whirligig Beetle**

Body completely hardened; last abdominal segment with operculum (flap) with pair of hooks, often with gills protruding

Body with membranous segments; last abdominal segment w/out operculum

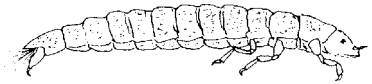


gills



operculum

hooks



Riffle Beetle Elmidae

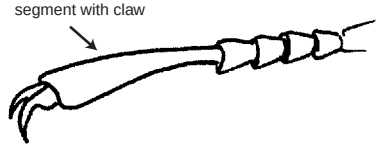
Abdomen with or w/out lateral filaments; tip of abdomen w/out cone-shape projection bearing four hooks

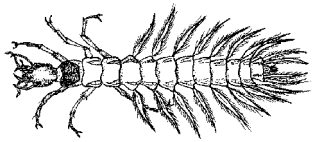
Abdomen with lateral filaments; tip of abdomen with single cone-shape projection with four hooks

hooks

Legs long for body size, clawed segment long, about as long as previous 4 segments

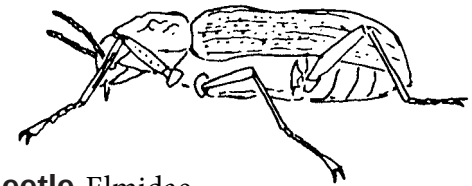
segment with claw





Other Beetle, a non-indicator

Whirligig Beetle Gyrinidae



Riffle Beetle Elmidae

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