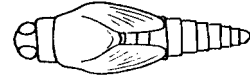


MATURE EPHEMEROPTERA LARVAE

THORAX ROBUST WITH NOTUM FUSED BETWEEN FORE WING PADS FOR AT LEAST HALF LENGTH OF PADS; GILLS ON ABDOMINAL SEGMENT 2 EITHER ABSENT, CONCEALED, OR OPERCULATE
COVERING UNDERLYING GILLS



FORE WING PADS FREE, SEPARATE FOR HALF THEIR LENGTH OR MORE; GILLS ON ABDOMINAL SEGMENT 2 PRESENT, VARIABLE, BUT NEVER COVERING UNDERLYING GILLS



THORACIC NOTUM NOT COVERING MOST OF ABDOMEN

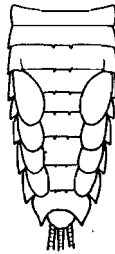
ABDOMINAL GILLS 2-7 DOUBLE, ELONGATE, WITH FRINGED MARGINS



Careful: immature larvae may have fused wing pads which look like drawing on left

ABDOMINAL GILLS 2-7 NEVER DOUBLE, ELONGATE, AND FRINGED IN COMBINATION

GILLS ON ABDOMINAL SEGMENT 2 ABSENT



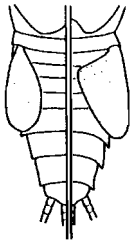
Ephemerellidae



EPHEMERELLIDAE

GILLS ON ABDOMINAL SEGMENT 2 PRESENT AND OPERCULATE

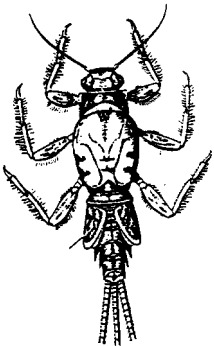
GILLS ON ABDOMINAL SEGMENT 2 ROUNDED OR TRIANGULAR



Tricorythidae

GILLS ON ABDOMINAL SEGMENT 2 QUADRATE

HEAD WITH ANTERIORLY PROJECTING TUSKS



TRICORYTHIDAE

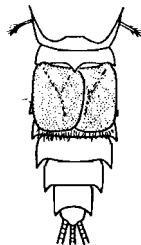
GILLS ON ABDOMINAL SEGMENT 2 NOT FUSED BUT OVERLAPPING

TUSK WITH NO SPINES IN DISTAL HALF

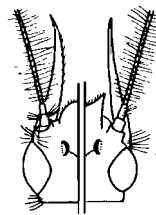
TUSKS WITH DISTAL SPINES



CAENIDAE



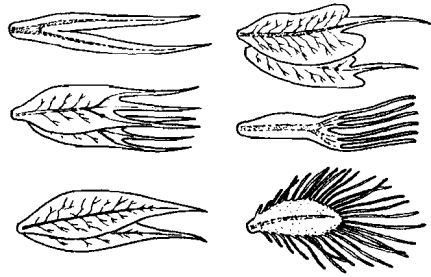
Caenidae



Ephemeridae



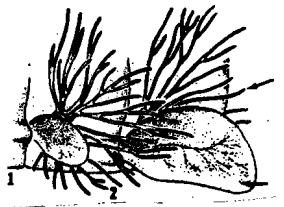
GILLS ON ABDOMINAL SEGMENTS 2-5 FORKED OR DOUBLE AND ELONGATE OR WITH FINGERLIKE PROJECTIONS OR IN CLUSTERS OF FILAMENTS, AND NEVER VENTRAL



Leptophlebiidae

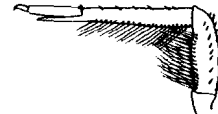


GILLS ON ABDOMINAL SEGMENTS 2-5 USUALLY PLATELIKE AND OFTEN WITH BASAL GILL TUFTS OR FLAPS, ONLY RARELY POINTED



GILL TUFTS

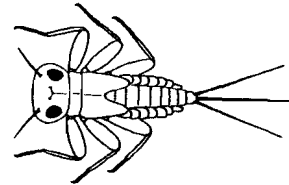
FORE LEGS WITH 2 ROWS OF LONG HAIRS



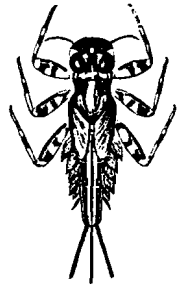
Oligoneuriidae

FORE LEGS WITHOUT 2 ROWS OF LONG HAIRS

DISTINCTLY FLATTENED BODIES WITH HORIZONTAL HEADS AND OUTSPREAD LEGS



Heptageniidae



HEPTAGENIIDAE

BODY ELONGATE, STREAM-LINED; HEAD VERTICAL

FORE LEG CLAWS DIFFERENT FROM MIDDLE AND HIND LEG CLAWS

FORE LEG CLAWS CLEFT

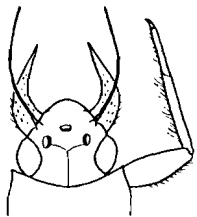


Metretopodidae

CLAWS ON ALL LEGS SIMILAR

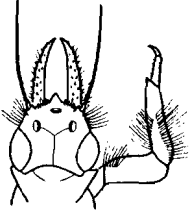
TUSKS WITH SCATTERED OR INNER SPINES AND DOWNWARD-INWARD CURVED TIPS

LEGS AND GILLS OUT-SPREAD LATERALLY



Potamanthidae

LEGS ROBUST; GILLS DORSAL



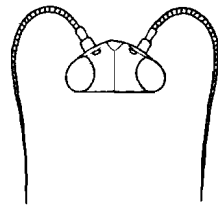
Polymitarcyidae

WITH 2 OR 3 WELL-DEVELOPED TAILS; IF 3 TAILS PRESENT, THEN ANTENNAE 2x TO 3x HEAD WIDTH

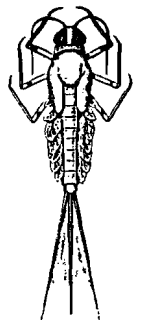
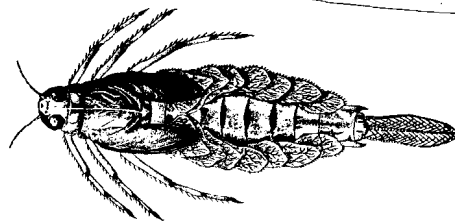
WITH 3 WELL-DEVELOPED TAILS; ANTENNAE SHORTER THAN 2x HEAD WIDTH



Siphonuridae

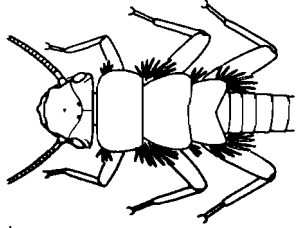


Baetidae

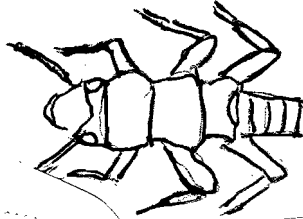


MATURE PLECOPTERA LARVAE

BRANCHING GILLS
BEHIND BASES OF LEGS



NO BRANCHING GILLS
BEHIND BASES OF LEGS



SOME BRANCHING
GILLS ORIGINATING
FROM BASAL
ABDOMINAL SEGMENTS

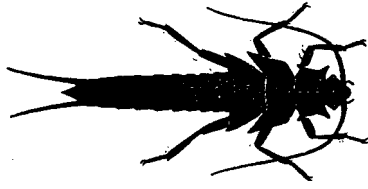


Pteronarcyidae

BRANCHING GILLS
NEVER ORIGINATING
FROM BASAL
ABDOMINAL SEGMENTS



Perlidae

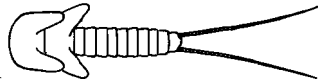


PTERONARCYIDAE



PERLIDAE

WING PADS DIVERGENT;
TAILS LONG

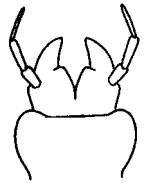


Perlodidae



PERLODIDAE

BODY OF LABIUM DIVIDED
FROM THE OUTER MARGIN
INTO ONLY 2 PARTS,
PALPS SLENDER



WING PADS PARALLEL; TAILS
USUALLY SHORTER THAN ABDOMEN

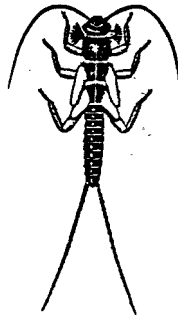


Chloroperlidae

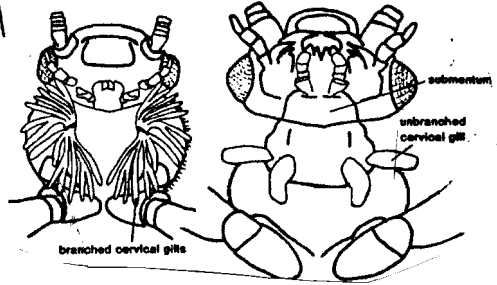


CHLOROPERLIDAE

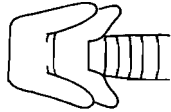
BODY OF LABIUM
COMPACT WITH 3
NOTCHES ALONG OUTER
MARGIN, PALPS THICK



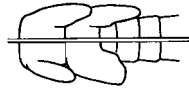
NEMOURIDAE



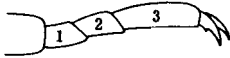
THORAX ROBUST WITH
DIVERGENT WING PADS



THORAX CYLINDRICAL-SLENDER
WITH PARALLEL WING PADS

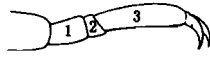


TARSAL SEGMENTS 1 AND 2
ABOUT THE SAME LENGTH



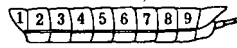
Taeniopterygidae

TARSAL SEGMENT 2
MUCH SHORTER THAN 1



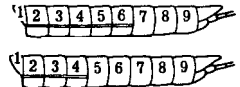
Nemouridae

LATERAL LONGITUDINAL
FOLD OF ABDOMEN EXTENDING
THROUGH SEGMENT 8

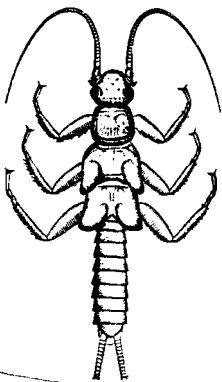


Capniidae

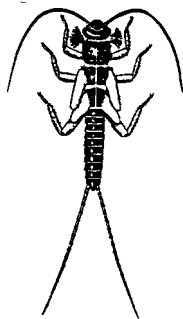
LATERAL LONGITUDINAL
FOLD OF ABDOMEN NOT
EXTENDING BEYOND
SEGMENT 7



Leuctridae



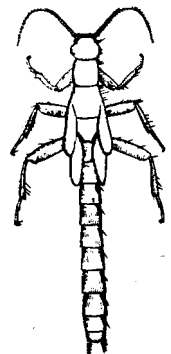
Taeniopterygidae



NEMOURIDAE

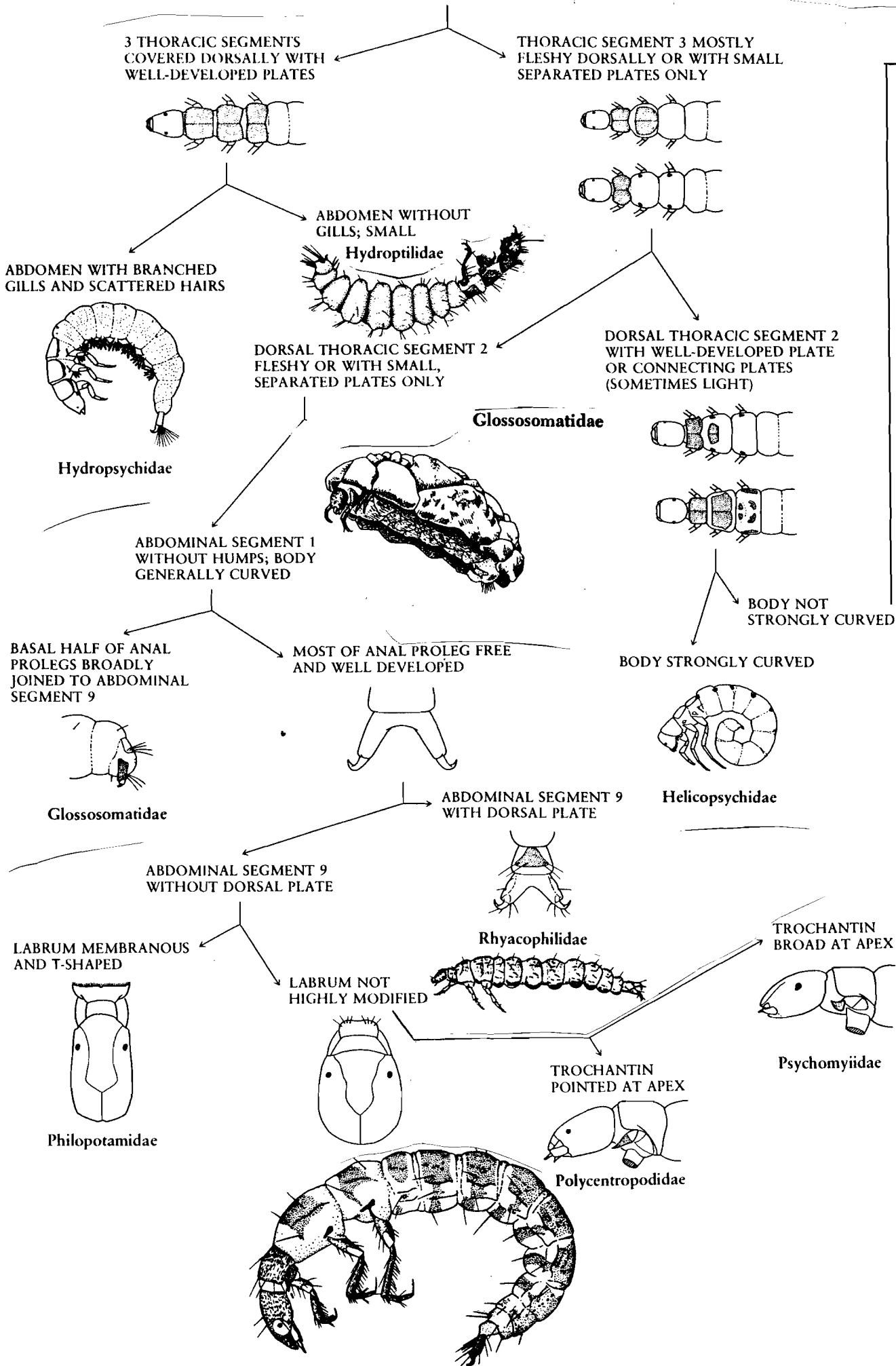


CAPNIIDAE



Leuctridae

MATURE TRICHOPTERA LARVÆ

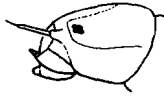


ANTENNAE SHORT AND INCONSPICUOUS

ABDOMINAL SEGMENT 1 WITH DORSAL HUMP AND DORSOLATERAL BRISTLES VARIABLE (see below)

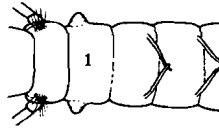
ABDOMINAL SEGMENT 1 WITH NO DORSAL HUMP AND NEVER WITH MANY DORSOLATERAL BRISTLES

ANTENNAE RELATIVELY LONG AND CONSPICUOUS, AT LEAST 6x WIDTH



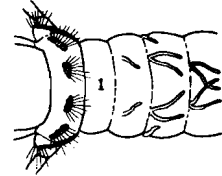
Leptoceridae

LATERAL HUMPS PRESENT ON SEGMENT 1



Lepidostomatidae

NO LATERAL HUMPS ON ABDOMINAL SEGMENT 1



Brachycentridae

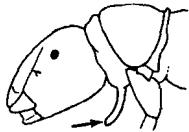
ABDOMINAL SEGMENT 1 WITH SEVERAL DORSOLATERAL BRISTLES

ABDOMINAL SEGMENT 1 WITH FEWER THAN 5 DORSOLATERAL BRISTLES



BRACHYCENTRIDAE

PROSTERNAL HORN PRESENT (SOMETIMES SMALL); ANTENNAE HALFWAY BETWEEN EYE AND ANTERIOR MARGIN OF HEAD

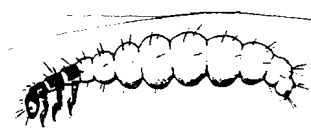


Limnephilidae

PRONOTUM WITHOUT HIGHLY CURVED RIDGE

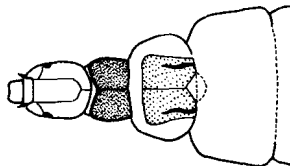
CLAW OF HIND LEG NOT HIGHLY MODIFIED

EACH ANAL PROLEG WITH LESS THAN 10 LONG HAIRS



HYDOPTILIDAE

DORSAL THORACIC SEGMENT 2 WITH PAIR OF DARK, CURVED LINES



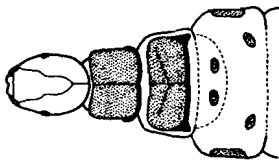
Leptoceridae

DORSAL THORACIC SEGMENT 2 WITHOUT PAIRED DARK LINES

LABRUM WITH FEW BRISTLES

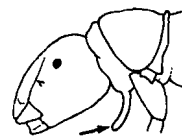
PROSTERNAL HORN ABSENT
Odontoceridae

SOME SMALL MEDIAL PLATES ON DORSAL THORACIC SEGMENT 3



Limnephilidae

PROSTERNAL HORN PRESENT (SOMETIMES SMALL)



Casebuilders



DORSAL HUMP



LIMNEPHILIDAE



LEPIDOSTOMATIDAE

AQUATIC DIPTERA IMMATURES

BODY WITHOUT 3 PAIRS OF THORACIC LEGS AND WITHOUT DEVELOPING WINGS (ALL AQUATIC FLY LARVAE AND PUPARIA)

BODY DORSOVENTRALLY FLATTENED WITH 6 DEEP LATERAL CONSTRICTIONS; 6 REGIONS WITH VENTRAL ATTACHMENT DISCS



Blephariceridae

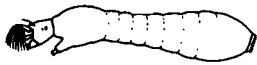
BODY NOT DIVIDED INTO 6 OR 7 DEEPLY CONSTRICTED REGIONS AND WITHOUT VENTRAL ATTACHMENT DISCS

HEAD FULLY FORMED, HEADLIKE, AND DISTINCT FROM THORAX

PROTHORAX WITH PROLEG(S)

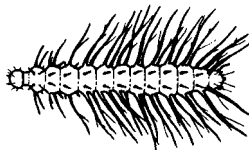


DISTAL THIRD OF ABDOMEN SWOLLEN



Simuliidae

DISTAL THIRD OF ABDOMEN NOT SWOLLEN



Ceratopogonidae

BODY WITHOUT FLESHY PROCESSES, SOME HAIRS AT MOST

PROLEGS PAIRED (IF ONLY SLIGHTLY AT TIP)



Chironomidae

HEAD INCONSPICUOUS, INCOMPLETELY FORMED, OFTEN REPRESENTED BY A MERE TIP OF ANTERIORLY TAPERED BODY, AND/OR RETRACTED INTO THORAX

BODY MORE-OR-LESS CYLINDRICAL, NOT LEATHERY

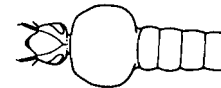
BODY SOMEWHAT DORSOVENTRALLY FLATTENED AND LEATHERY



Stratiomyidae

THORACIC SEGMENTS DISTINCT, NOT BROADER THAN ABDOMEN

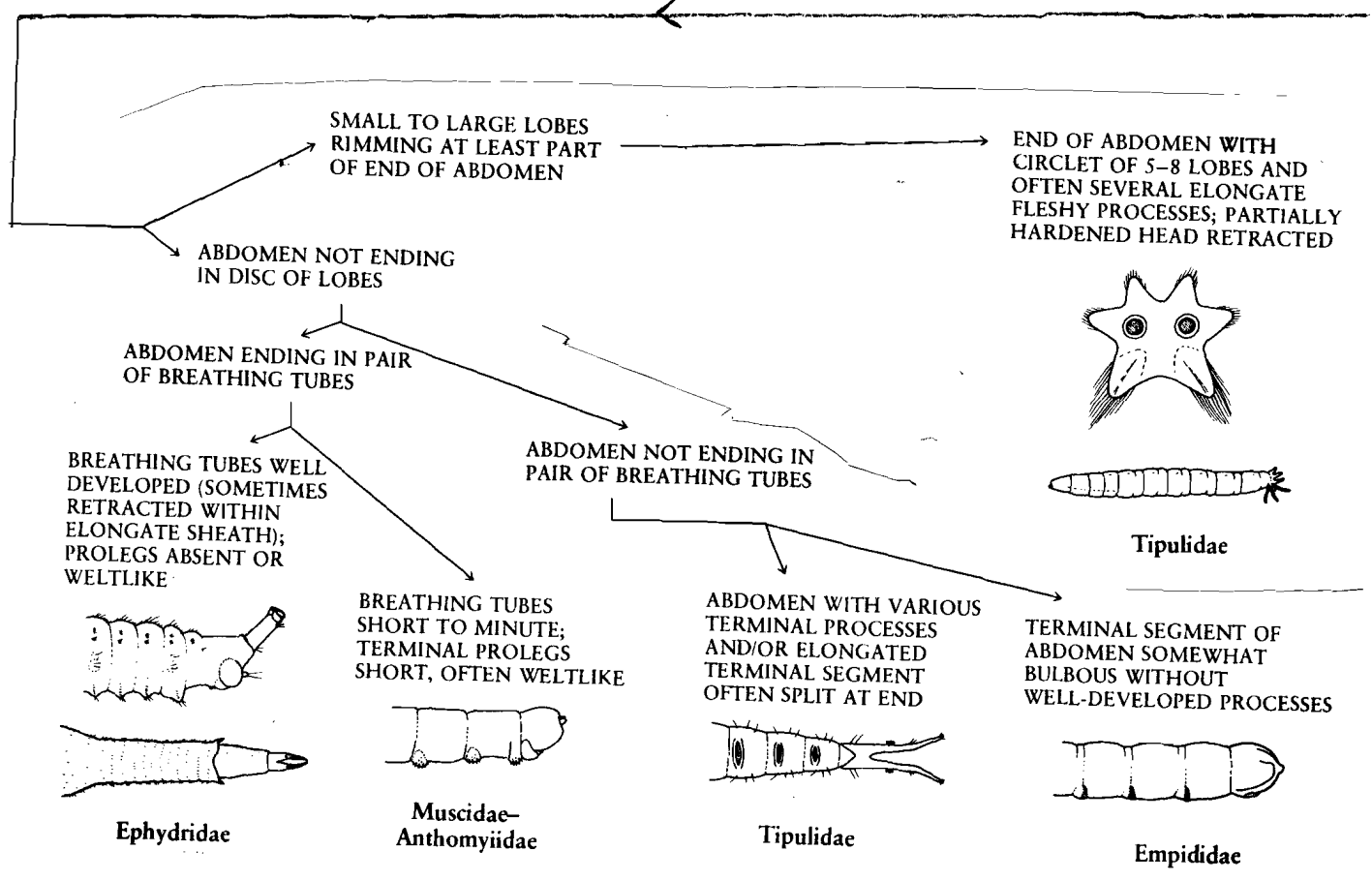
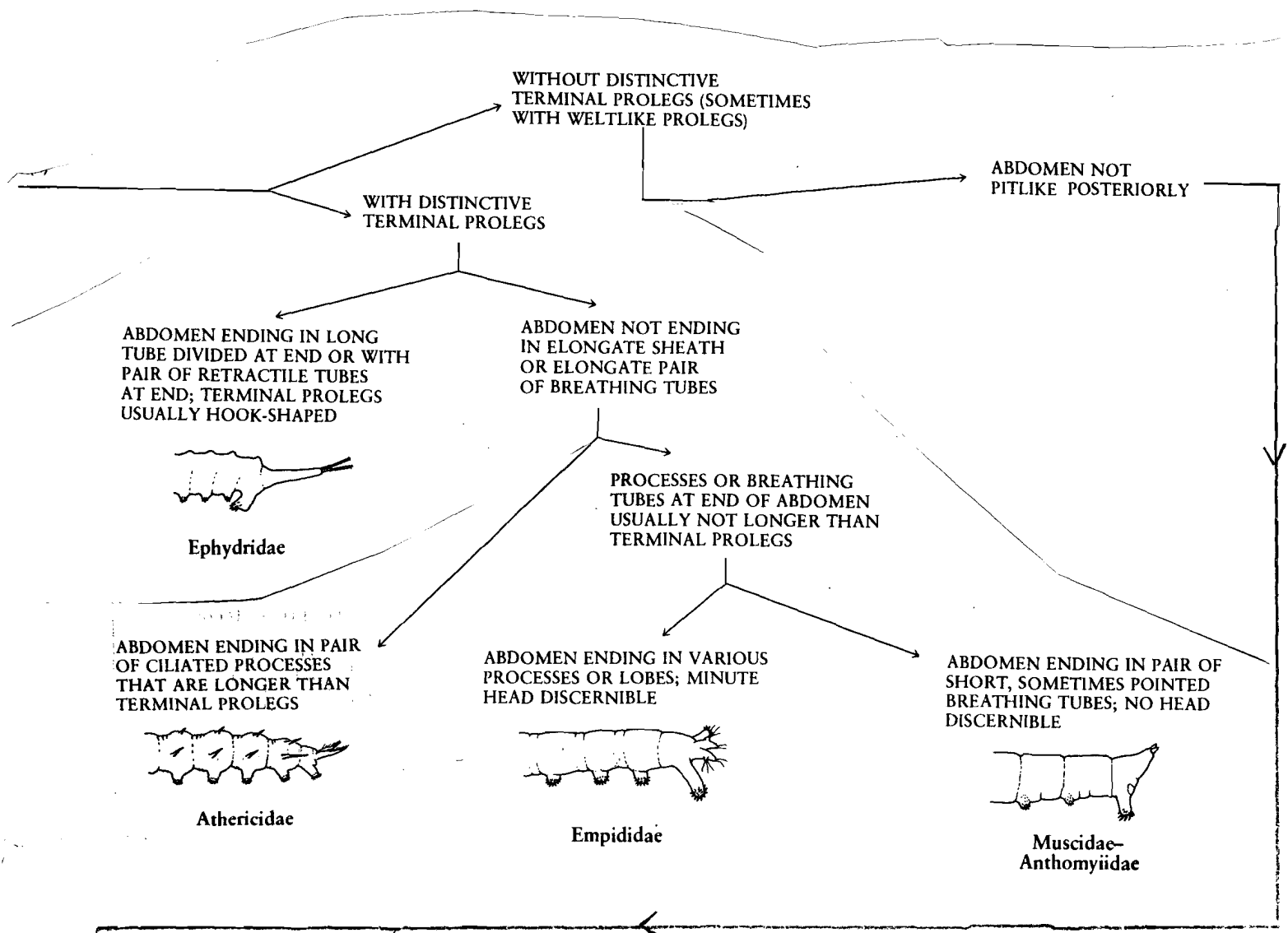
THORACIC SEGMENTS FUSED, USUALLY SWOLLEN BUT NOT ALWAYS



ANTENNAE WITH SHORT HAIRS ONLY



Culicidae



BODY WITH TAIL-LIKE PROCESSES, ELONGATE
TERMINAL SEGMENT, TERMINAL PROLEGS,
BLUNT OR BULBOUS ENDS, OR ANY
COMBINATION OF THE ABOVE CHARACTERS

BODY SPINDLE-SHAPED, TAPERING
AT BOTH ENDS; WITHOUT TAIL-LIKE
PROCESSES OR TERMINAL PROLEGS



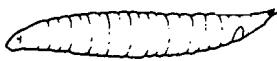
BODY NOT ENDING POSTERIORLY
IN A SINGLE BREATHING TUBE,
NEVER TAIL-LIKE AT END

BODY ENDING POSTERIORLY
IN A SINGLE BREATHING TUBE

BREATHING TUBE TAIL-LIKE,
ALTHOUGH SOMETIMES SHORT

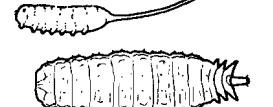
BODY WITHOUT 2 MINUTE
SHARP SPINES POSTERIORLY

BODY WITH 2 MINUTE
SPINES POSTERIORLY



Ephyridae

BODY STRONGLY
BLUNTED ANTERIORLY;
TAIL NEVER DIVIDED



Syrphidae

BODY WITH SERIES OF FLESHY
RINGS ENCIRCLING BODY;
POSTERIOR END POINTED



Tabanidae

BODY NOT STRONGLY BLUNTED
AT ANTERIOR END; TAIL
SOMETIMES WITH 2 EXTENSIBLE
BREATHING TUBES WITHIN IT



Ephyridae

BASAL ABDOMINAL SEGMENTS
WITHOUT PROLEGS

BODY SEGMENTS WITH 2
OR 3 SECONDARY DIVISIONS

BODY SEGMENTS
NOT SUBDIVIDED



Psychodidae

TERMINAL
PROLEGS PRESENT

TERMINAL
PROLEGS ABSENT

BODY VERY SLENDER

TERMINAL PROCESSES
SHORT OR ABSENT

Ceratopogonidae



Ceratopogonidae

BODY BROAD,
BROADER THAN HEAD



Stratiomyidae

DAMSELFLY LARVA
(Order ODONATA, Suborder ZYGOPTERA)
Large eyes

Three pairs of segmented legs on the middle part of the body



Three leaf-like tails at end of abdomen



Lower lip is large and covers the other mouthparts from below

DRAGONFLY LARVA
(Order ODONATA, Suborder ANISOPTERA)
Large eyes

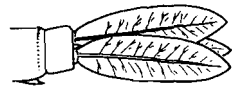
Three pairs of segmented legs on the middle part of the body



Lower lip is large and covers the other mouthparts from below

MATURE ODONATA LARVAE

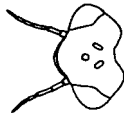
ABDOMEN ENDING IN CAUDAL LAMELLAE



ABDOMEN WITHOUT CAUDAL LAMELLAE



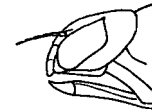
ALL SEGMENTS OF ANTENNAE ABOUT EQUAL



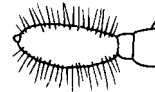
LABIUM SPOON-SHAPED



LABIUM FLAT



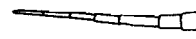
ANTENNAE 4-SEGMENTED, SEGMENT 3 VERY LARGE



Gomphidae

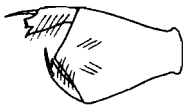
ANTENNAE WITH 6 OR 7 SHORT SEGMENTS

TERMINAL ANTENNAL SEGMENTS SLENDER



Aeshnidae

LABIUM WITHOUT A LONG, NARROW BASE



CAUDAL LAMELLAE LEAFLIKE, NEVER STRONGLY DIVIDED

Coenagrionidae

LATERAL LOBES OF LABIUM WITHOUT LARGE AND JAGGED TEETH

LATERAL LOBES OF LABIUM WITH LARGE, IRREGULAR, JAGGED TEETH



Cordulegastridae

HEAD WITHOUT AN ERECT FRONTAL HORN, RARELY WITH A FLAT TRIANGULAR PROCESS

LATERAL LOBES OF LABIUM WITH VERY SLIGHT INDENTATIONS

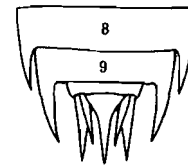


Libellulidae

LATERAL LOBES OF LABIUM WITH MODERATE INDENTATIONS



LATERAL SPINES OF ABDOMINAL SEGMENT 8 AS LONG OR LONGER THAN MIDLENGTH OF SEGMENT 9

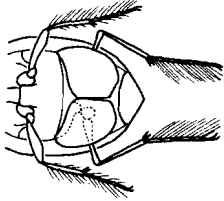


Libellulidae

Beetles

AQUATIC COLEOPTERA ADULTS

WITH LARGE COXAL PLATES COVERING BASES OF HIND LEGS AND ABDOMEN



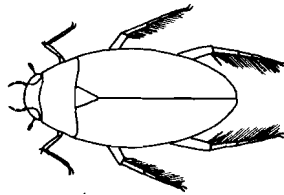
Haliplidae

WITHOUT LARGE HIND COXAL PLATES

WITH ONE PAIR OF UNDIVIDED EYES

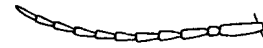
HEAD WITHOUT SNOOT

BODY STREAMLINED; DORSAL AND LATERAL LINE OF PRONOTUM AND ELYTRA USUALLY FORMING SIMILAR CONTINUOUS CURVE; HIND LEGS WITH SWIMMING HAIRS

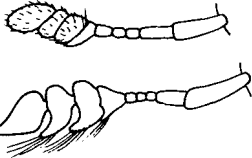


BODY NOT ESPECIALLY STREAMLINED; HIND LEGS WITHOUT SWIMMING HAIRS (NONSWIMMING)

ANTENNAE NOT CLUBBED

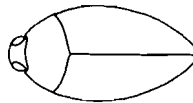


ANTENNAE CLUBBED

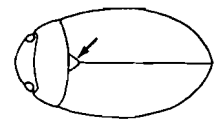


Hydrophilidae

SCUTELLUM CONCEALED



SCUTELLUM EXPOSED



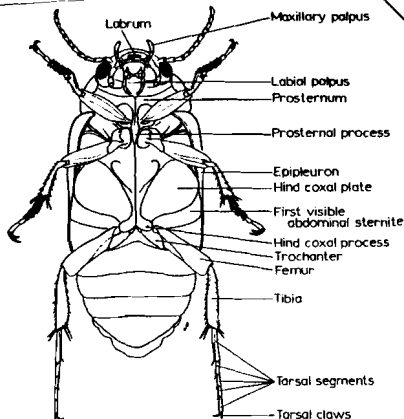
Dytiscidae

SIZE VARIABLE, WITH SWIMMING HAIRS ON HIND LEGS

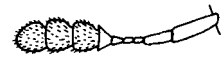
FORE TIBIA WITHOUT CURVED PROJECTION OR SPUR AT TIP; SIZE VARIABLE

Dytiscidae

Ventral view of adult *Agabus sericeus* (Coleoptera: Dytiscidae) (11 mm).



ANTENNAL CLUB 3-SEGMENTED;
USUALLY OVER 2.5 MM



Hydrophilidae

ANTENNAE CLUBBED WITH
CUPLIKE SEGMENT AT
BASE OF CLUB

ANTENNAE VARIABLE BUT NEVER
WITH A CUPLIKE SEGMENT AT THE
BASE OF A CLUB; IF CLUBBED,
THEN WITH LONG TARSI AND CLAWS

ALL TARSI WITH MORE THAN
3 SEGMENTS; SIZE VARIABLE

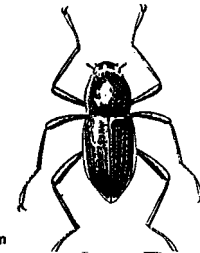
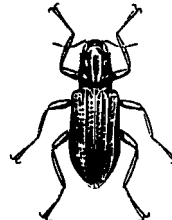
ALL TARSI DISTINCTLY
5-SEGMENTED

LONG LEGS WITH LONG CLAWS,
AND TARSAL SEGMENT 5 USUALLY
ABOUT AS LONG AS BASAL 4
SEGMENTS COMBINED; 1-9 MM

RIFFLE BEETLE adult (Family ELMIDAE)

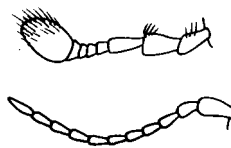
Antennae:
- usually slender,

- sometimes short
and clubbed



Typical Size 1 - 8 mm

ANTENNAE VARIABLE, NOT
WITH PECTINATE CLUB



Elmidae

RIFFLE BEETLE larva (Family ELMIDAE)

Body elongated



Abdominal segment 9 has a notched
chamber with filament-like gills
inside and hooks underneath

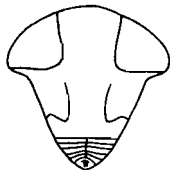
Water Bugs

UNDERWATER AND SURFACE HEMIPTERA

ANTENNAE SHORTER THAN HEAD

ANTENNAE CONSPICUOUS, LONGER THAN HEAD

BEAK SHORT, TRIANGULAR, AND NOT SEGMENTED



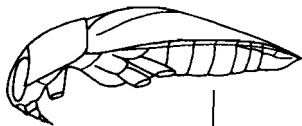
Corixidae

BEAK SEGMENTED AND VARIABLY CYLINDRICAL

HIND LEGS VARIABLY SHAPED, WITH PAIR OF CLAWS

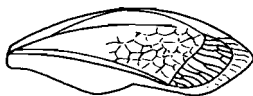
ABDOMEN WITHOUT CYLINDRICAL BREATHING TUBE

BODY SOMEWHAT FLATTENED, USUALLY GREATER THAN 3 MM



WINGS FULLY DEVELOPED

MEMBRANE OF FORE WING VEINED



Belostomatidae

MEMBRANE OF FORE WING NOT VEINED



Naucoridae

WITHOUT PAIR OF DORSAL ABDOMINAL SCENT GLANDS

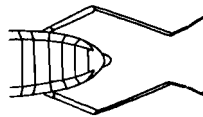
Belostomatidae

HIND LEGS OARLIKE, ELONGATE-FLATTENED, WITHOUT CLAWS



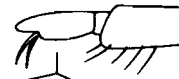
Notonectidae

HIND FEMORA NOT REACHING OR REACHING ONLY SLIGHTLY BEYOND TIP OF ABDOMEN

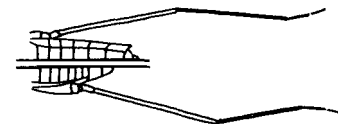


Veliidae

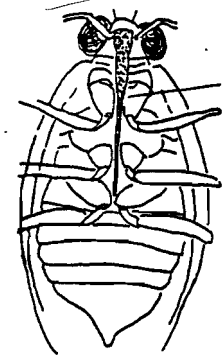
CLAWS OF FORE LEGS PREAPICAL



HIND FEMORA REACHING WELL BEYOND TIP OF ABDOMEN

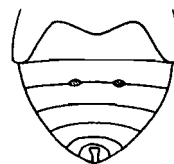


Gerridae



long jointed beak

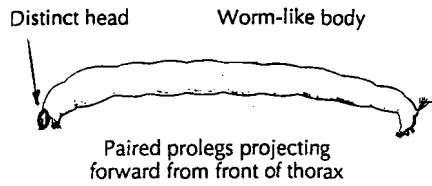
WITH PAIR OF DORSAL ABDOMINAL SCENT GLANDS



Naucoridae

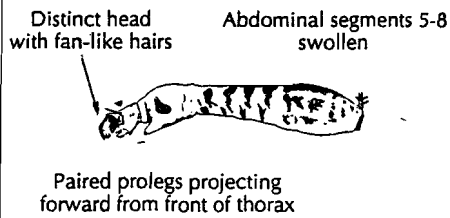
Characteristics/Examples of: Common TRUE FLIES (Order DIPTERA) in Freshwater Rivers

MIDGES (Family CHIRONOMIDAE)



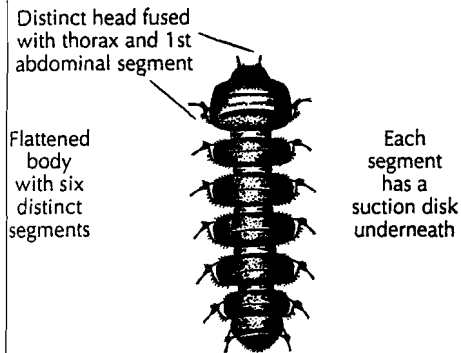
Typical Size 2-20 mm

BLACK FLIES (Family SIMULIIDAE)



Typical Size 2-8 mm

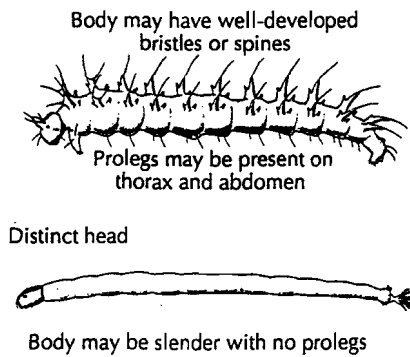
NET-WINGED MIDGES
(Family BLEPHARICERIDAE)



Typical Size 4-12 mm

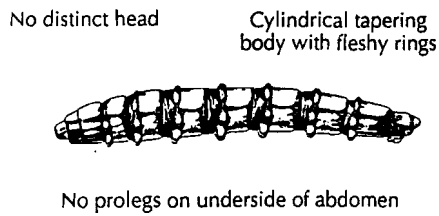
BITING MIDGES

(Family CERATOPOGONIDAE)



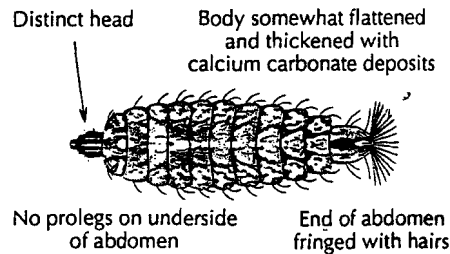
Typical Size 2-15 mm

DEER FLIES (Family TABANIDAE)



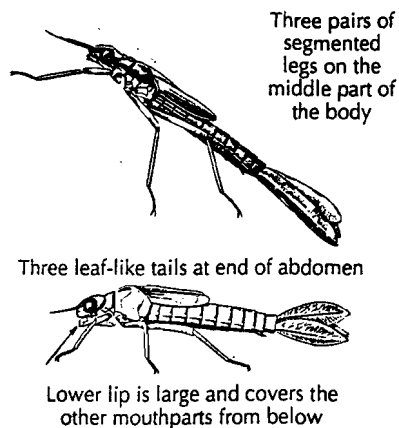
Typical Size 11-55 mm

SOLDIER FLY (Family STRATIOMYIDAE)



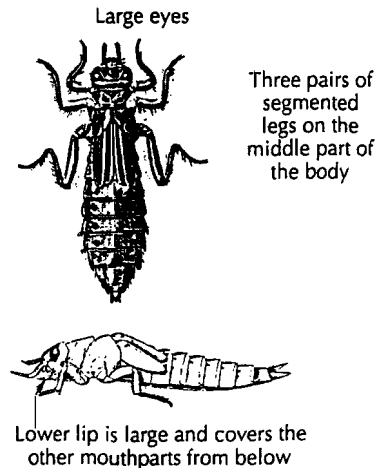
Typical Size 7-30 mm

DAMSELFLY LARVA
(Order ODONATA, Suborder ZYGOPTERA)



Typical Size 13-25 mm

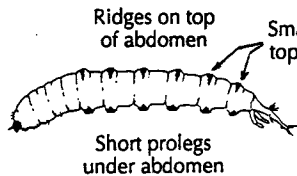
DRAGONFLY LARVA
(Order ODONATA, Suborder ANISOPTERA)



Typical Size 23-40 mm

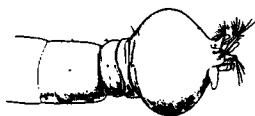
CRANE FLIES (Family TIPULIDAE)

No distinct head. Usually retracted inside body
Cylindrical body
Abdomen may be bulbous or end in fleshy projections



Antocha

Small, dark plates on top of the abdomen



Hexatoma



Tipula



Pseudolimnophila

Typical Size 10-100 mm

RIFFLE BEETLE larva (Family ELMIDAE)

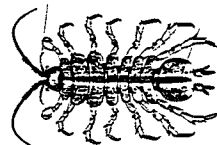
Body elongated



Abdominal segment 9 has a notched chamber with filament-like gills inside and hooks underneath

Typical Size 2 - 10 mm

**SOWBUGS
Order ISOPODA**



Body enclosed in calcium carbonate exoskeleton and flattened viewed from above

WATER PENNY (Family PSEPHENIDAE)

Body disk-like with plates covering head and legs



Typical Size 2 - 10 mm

SNIFE FLIES (Family ATHERICIDAE)

No distinct head

Short filaments on top and side of each abdominal segment

Abdomen ends in two pointed projections longer than prolegs



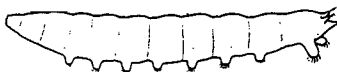
Well-developed prolegs ending in tiny hooks on underside of abdomen

Typical Size 12-18 mm

DANCE FLIES (Family EMPIDIDAE)

No distinct head

Abdomen ends in one to four rounded projections shorter than prolegs



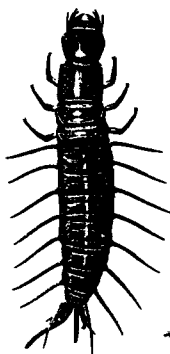
Usually with well-developed prolegs on underside of abdomen

Typical Size 2-7 mm

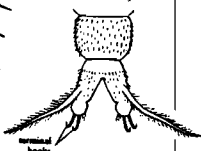
**DOBSONFLY or HELLGRAMMITE
(Order MEGALOPTERA, Family CORYDALIDAE)**

Dark-colored

Filaments on the side of the abdomen



Three pairs of segmented legs on the middle part of the body



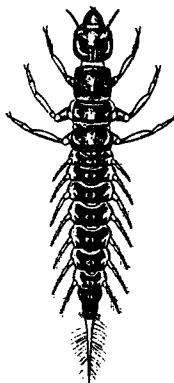
Four terminal hooks on two projections at the end of the abdomen

Typical Size 45-90 mm

**ALDERFLY
(Order MEGALOPTERA, Family SIALIDAE)**

Light-colored

Filaments on the side of the abdomen

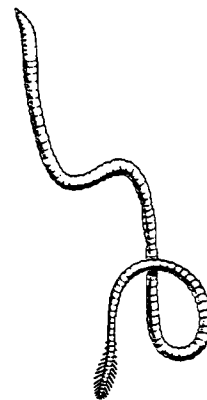


Three pairs of segmented legs on the middle part of the body

Single projection at the end of the abdomen with no hooks

Typical Size 10-25 mm

**AQUATIC EARTHWORMS
(Class OLIGOCHAETA)**



Typical Size 1-30 mm