

**EPHEMEROPTERA**  
**REQUIRED TAXA**

I. Suborder Schistonota

A. Superfamily Baetoidea

1. Family Baetidae
2. Family Heptageniidae

B. Superfamily Leptophlebioidea

C. Superfamily Ephemeroidea

1. Family Ephemeridae

II. Suborder Pannota

A. Superfamily Caenoidea

1. Family Caenidae

# EPHEMEROPTERA

Common Name: Mayflies.

Etymology: Ephemero- = for a day; -ptera = wing.

Metamorphosis: Hemimetabolous; immatures called naiads.

## CHARACTERISTICS

Body: Small to medium in size; fragile; soft-bodied.

Head: Prognathous.

Mouthparts: Ectognathous; naiads = chewing; adults = vestigial.

Eyes: Compound eyes; 3 ocelli.

Antennae: Short; setaceous.

Wings: Usually 2 pairs, membranous; forewings larger than hindwings, held vertically at rest; a few species lack the hindwings; typically many-veined.

Legs: Weak clinging legs; 3-5 segmented tarsi; 2 claws.

Abdomen: Pair of long filamentous cerci; a few with a median caudal filament.

Comments: Adults with open tracheal system; important part of the food chain - food for fish, etc.

## FAMILIES

Baetidae: Hind wings reduced, very small or absent; 2 caudal filaments; hind tarsi 3-segmented; 1 or 2 veinlets between major longitudinal veins; bases of  $MA_2$  and  $MP_2$  atrophied [see fig. 10-4D].

Caenidae: Hind wings absent; 3 caudal filaments; fork of MA symmetrical;  $IMP_1$  and  $MP_2$  extending nearly to wing base [see fig. 10-4F].

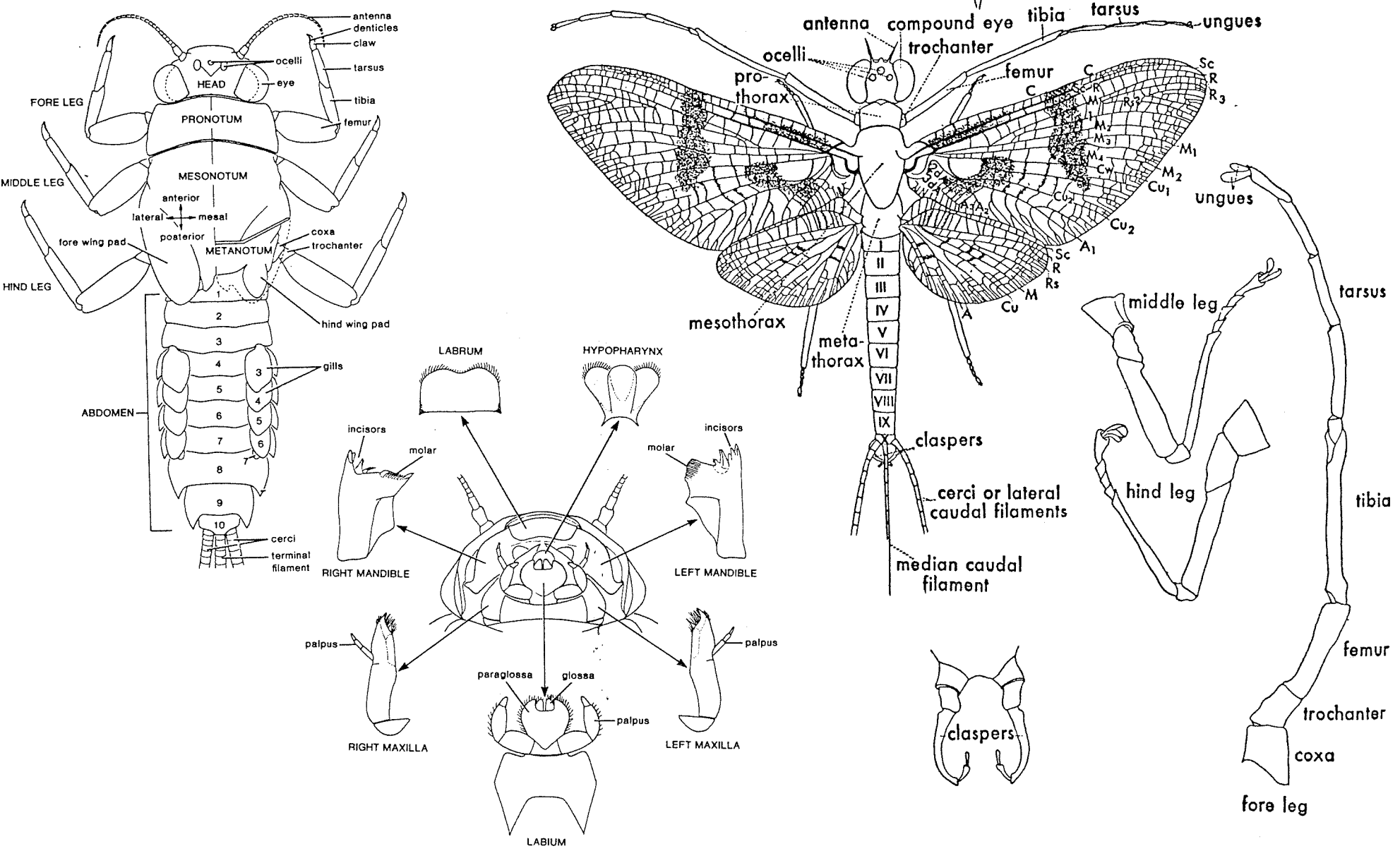
Heptageniidae: Hind wings well-developed; 2 caudal filaments; hind tarsi 5-segmented; 2 pairs of ICu veins that are more or less parallel; MA forked in hind wing [see fig. 10-6C].

Ephemeridae: Hind wings well-developed; 2 or 3 caudal filaments; hind tarsi 4-segmented; 2 pairs of ICu veins, but not parallel; MA not forked in hind wing; bases of  $MP_2$  and CuA bent sharply toward CuP.

# Infraclass Paleoptera

## Order Ephemeroptera

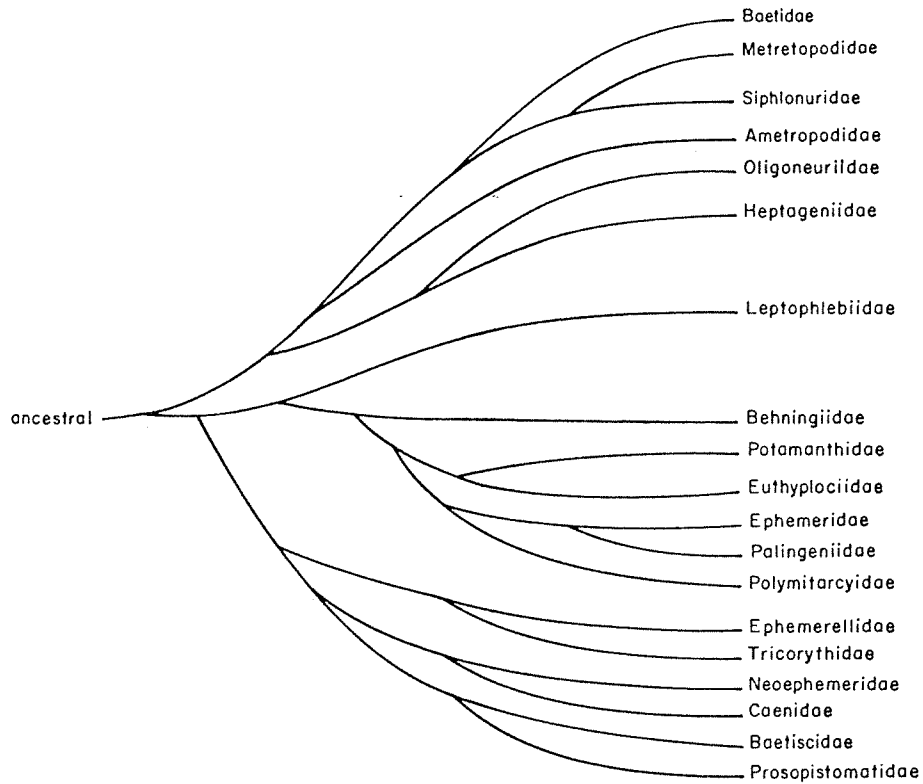
### Mayflies



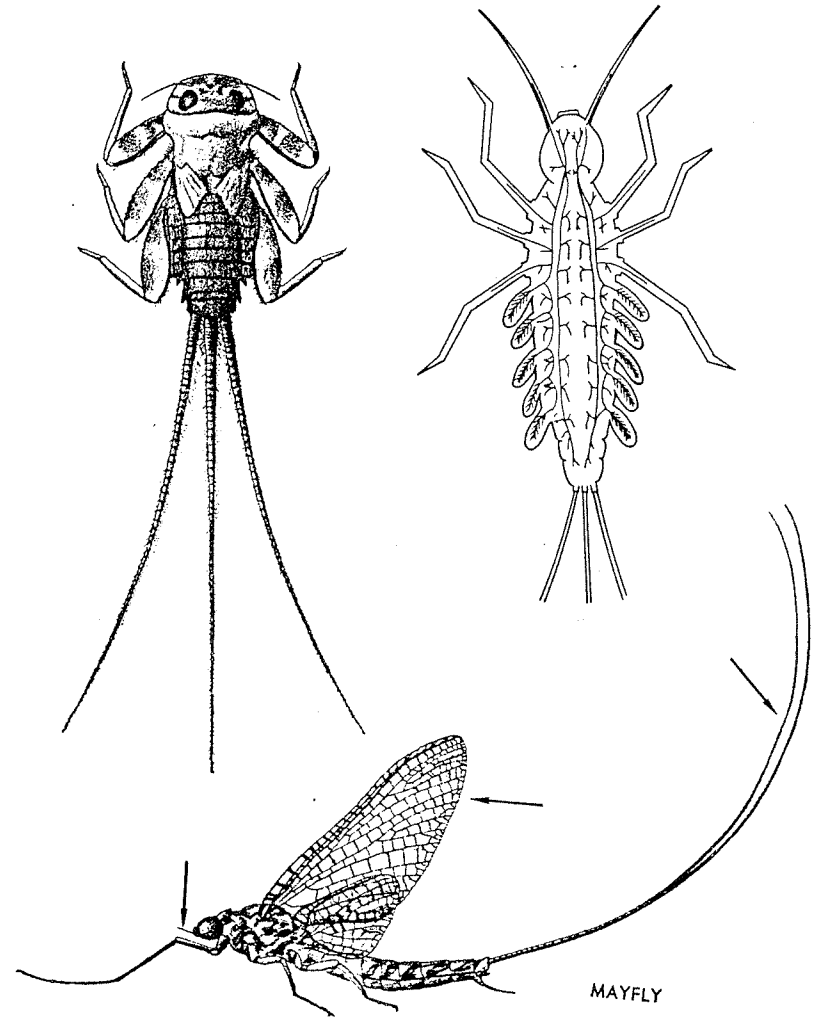
# Infraclass Paleoptera

## Order Ephemeroptera

### Mayflies

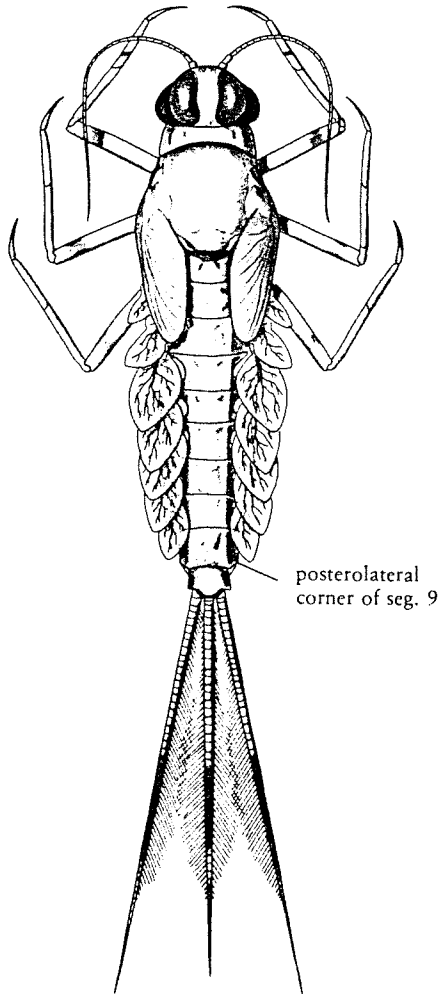


Geneological tree of Ephemeroptera (after Koss 1970).

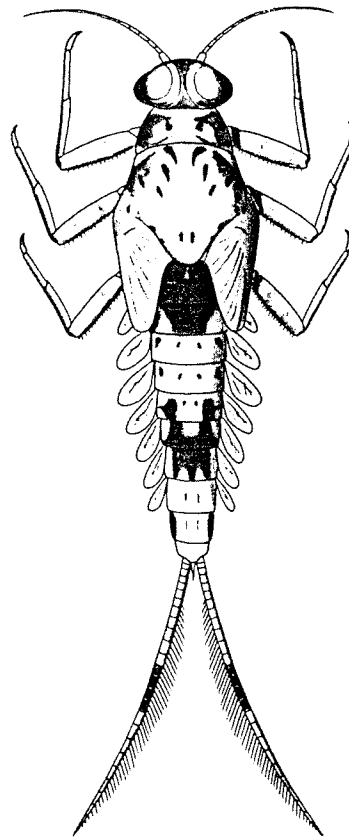


**Order Ephemeroptera:  
Suborder Schistonota**

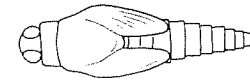
**Family Baetidae**  
Small minnow mayflies



posterolateral  
corner of seg. 9

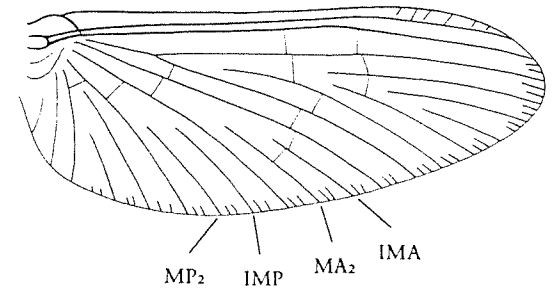
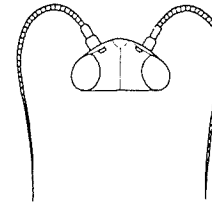


FORE WING PADS FREE, SEPARATE  
FOR HALF THEIR LENGTH OR  
MORE; GILLS ON ABDOMINAL  
SEGMENT 2 PRESENT, VARIABLE, BUT  
NEVER OPERCULATE



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

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



MP<sub>2</sub> IMP MA<sub>2</sub> IMA

**Order Ephemeroptera:  
Suborder Schistonota**

**Family Heptageniidae**  
Flat-headed mayflies

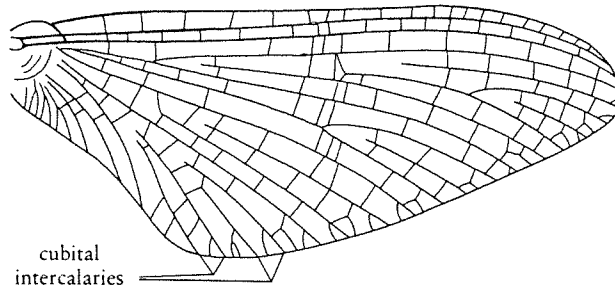
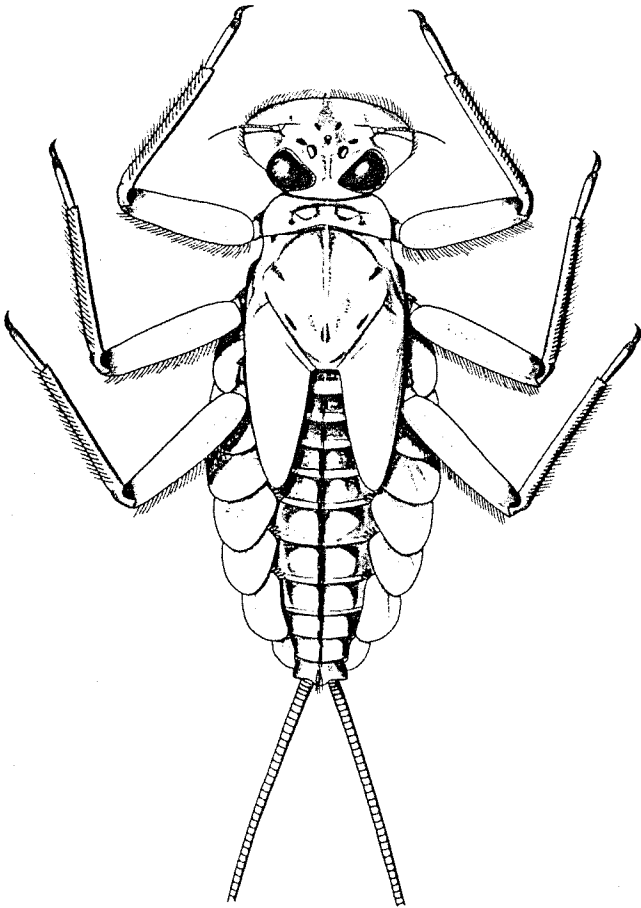
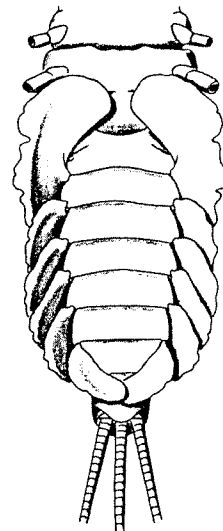
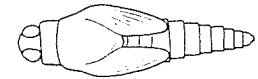


Figure 7.21. Fore wing

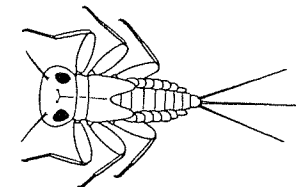


FORE WING PADS FREE, SEPARATE FOR HALF THEIR LENGTH OR MORE; GILLS ON ABDOMINAL SEGMENT 2 PRESENT, VARIABLE, BUT NEVER OPERCULATE



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

DISTINCTLY FLATTENED BODIES WITH HORIZONTAL HEADS AND OUTSPREAD LEGS



**Order Ephemeroptera:  
Suborder Schistonota**

**Family Ephemeridae**  
Common burrowing mayflies



*Hexagenia* larva

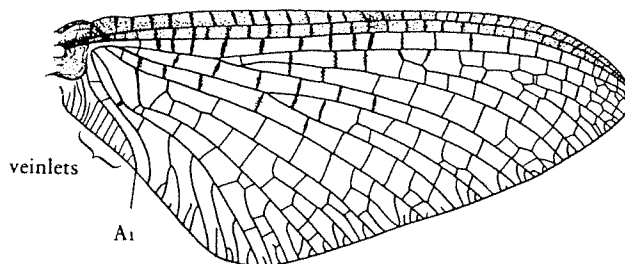


Figure 7.51. Fore wing

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



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



TUSK WITH NO SPINES IN DISTAL HALF

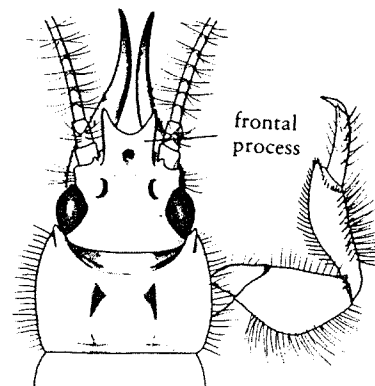
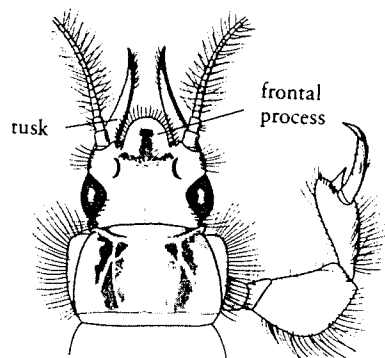
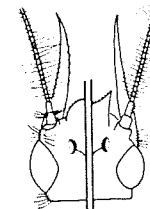
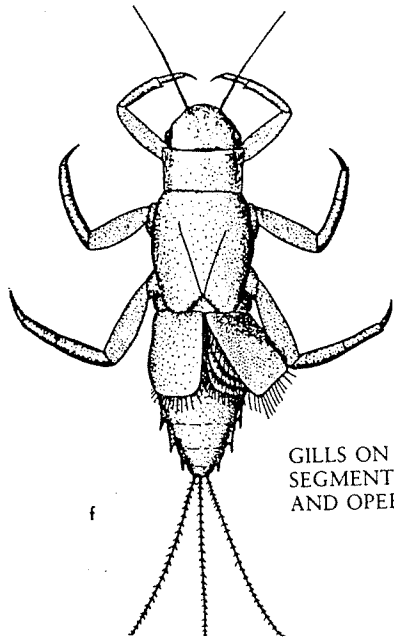


Figure 7.50. *Ephemerella* larva

**Order Ephemeroptera:  
Suborder Pannota**

**Family Caenidae**  
Small square-gills



GILLS ON ABDOMINAL  
SEGMENT 2 PRESENT  
AND OPERCULATE

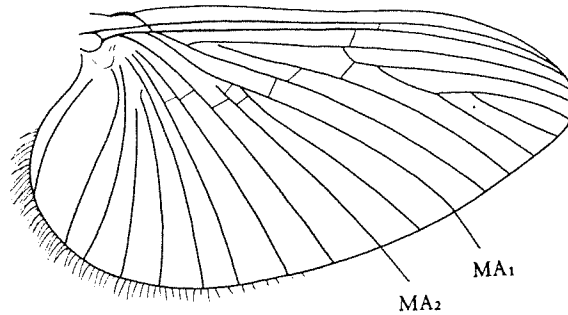
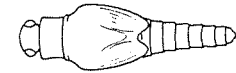


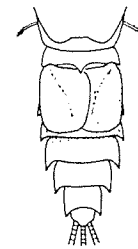
Figure 7.63. Fore wing

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



GILLS ON ABDOMINAL  
SEGMENT 2 QUADRATE

GILLS ON ABDOMINAL  
SEGMENT 2 NOT FUSED  
BUT OVERLAPPING





**Order Ephemeroptera:  
Suborder Schistonota**

**Family Leptophlebiidae**  
Prong-gilled mayflies

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

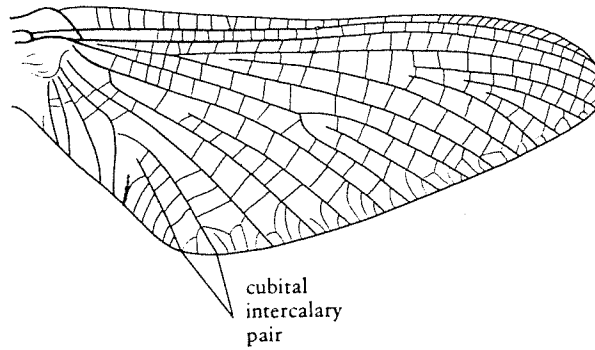
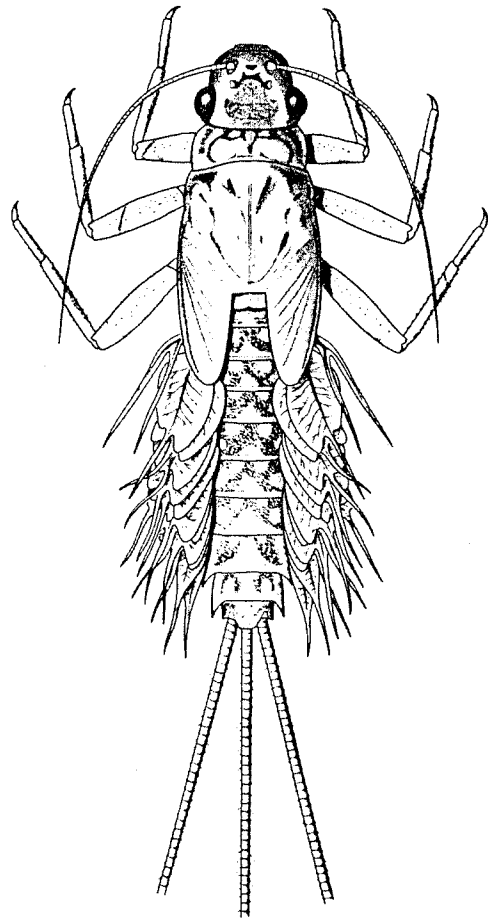
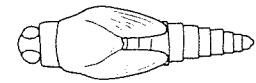
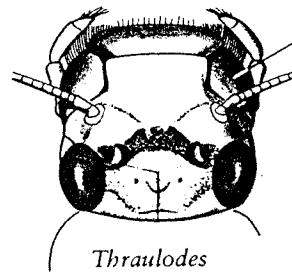
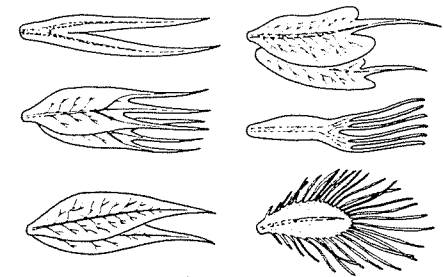


Figure 7.34. Fore wing



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



*Thraulodes*

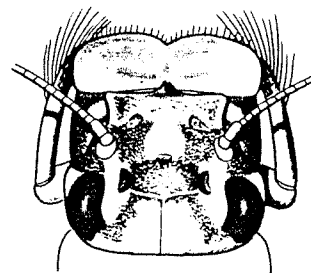


Figure 7.37. *Traverella*

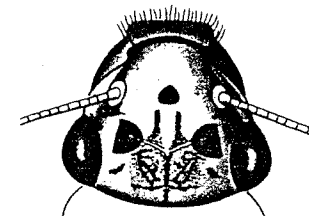
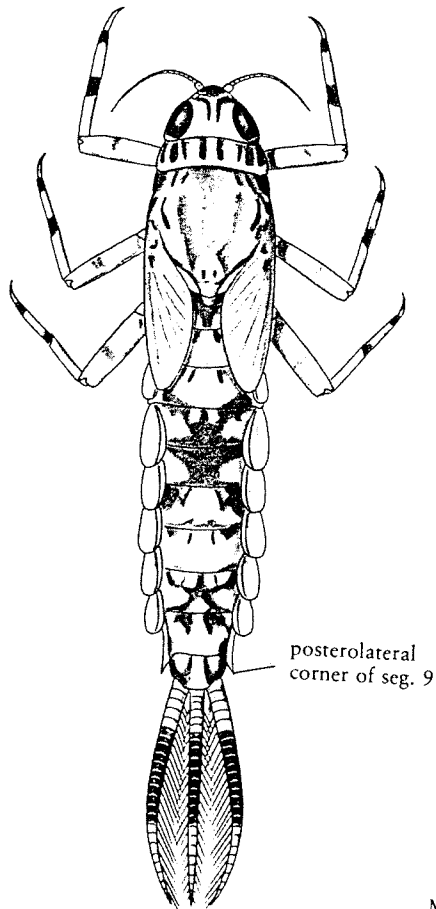


Figure 7.39. *Paraleptophlebia*

**Order Ephemeroptera:  
Suborder Schistonota**

**Family Siphonuridae**  
Primitive minnow mayflies



posterolateral  
corner of seg. 9

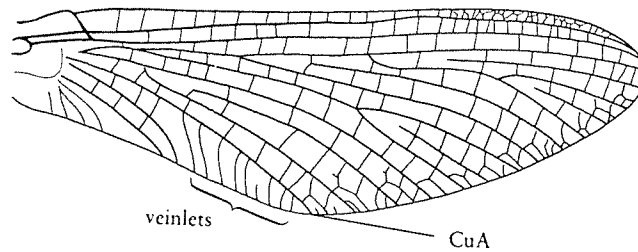
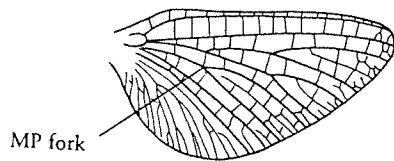
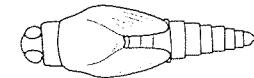


Figure 7.7. Fore Wing



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



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

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



**Order Ephemeroptera:  
Suborder Schistonota**

**Family Oligoneuriidae  
Brush-legged mayflies**

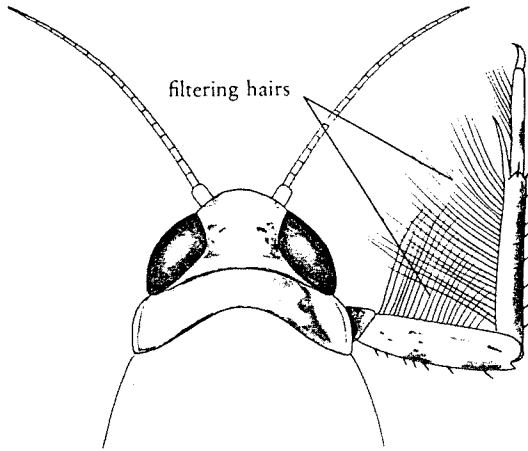


Figure 7.16. *Isonychia* larva

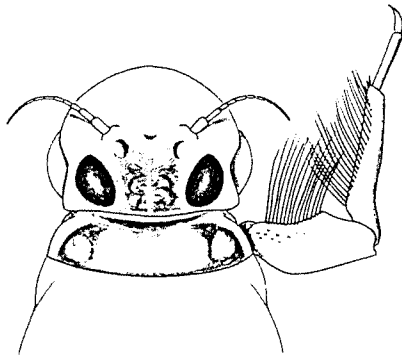


Figure 7.18. *Lachlania* larva

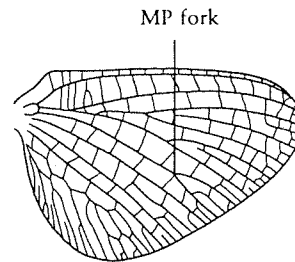


Figure 7.17. *Isonychia* hind wing

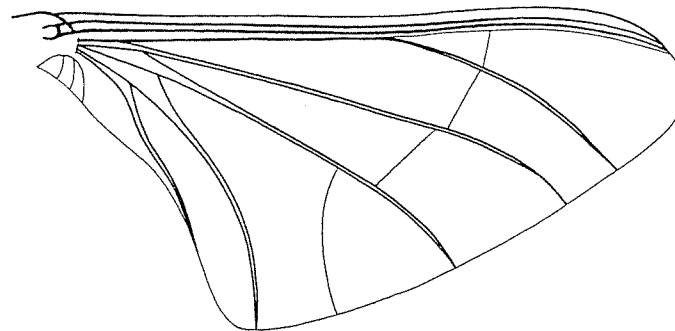
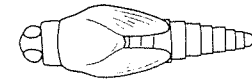


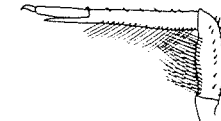
Figure 7.19. *Lachlania* fore wing

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



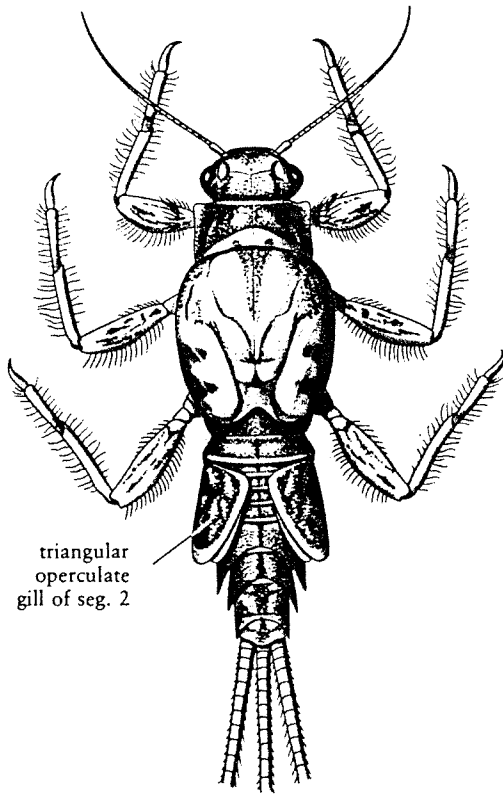
GILLS ON ABDOMINAL SEGMENTS 2-5 USUALLY PLATELIKE AND OFTEN WITH BASAL GILL TUFTS OR FLAPS, ONLY RARELY POINTED

FORE LEGS WITH 2 ROWS OF LONG HAIRS

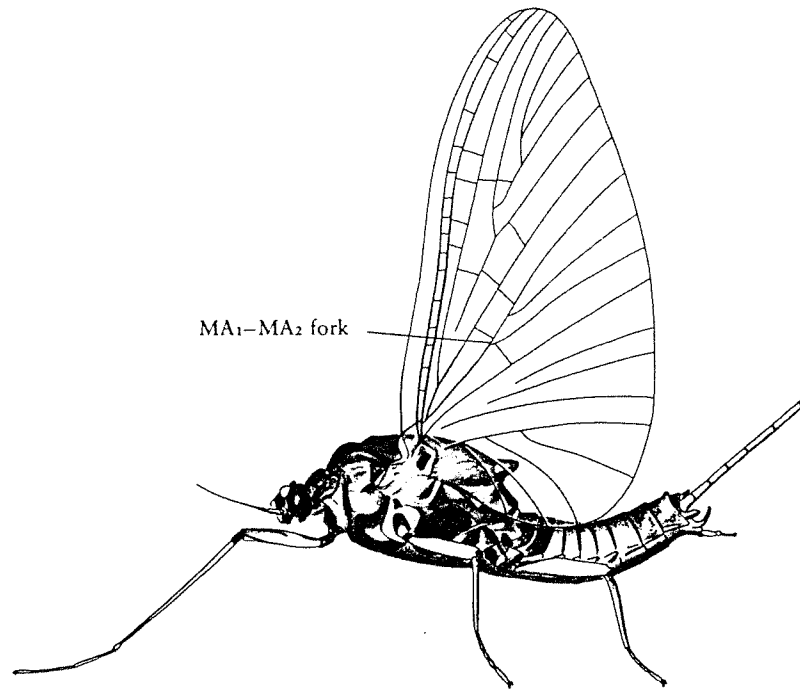


Order Ephemeroptera:  
Suborder Pannota

Family Tricorythidae  
Little stout crawlers

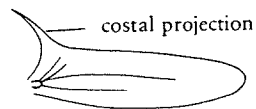


triangular  
operculate  
gill of seg. 2



MA<sub>1</sub>-MA<sub>2</sub> fork

*Tricorythodes* adult ♂

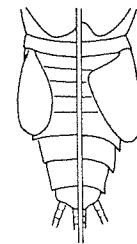


*Leptobryphes* adult ♂, hind wing

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



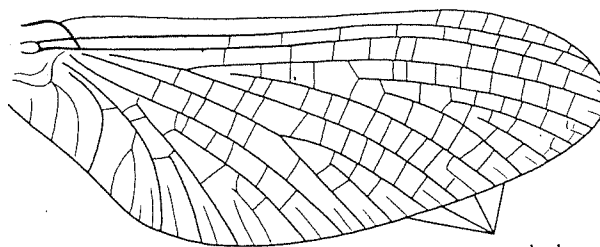
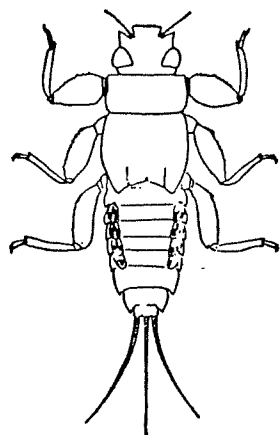
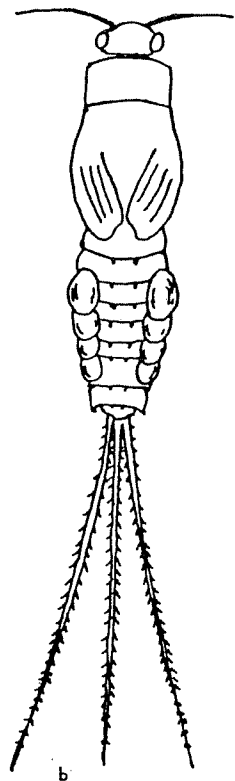
GILLS ON ABDOMINAL  
SEGMENT 2 ROUNDED  
OR TRIANGULAR



**Order Ephemeroptera:  
Suborder Pannota**

**Family Ephemerellidae**  
Spiny crawlers

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



unattached  
intercalaries

Figure 7.58. Fore wing



GILLS ON ABDOMINAL  
SEGMENT 2 ABSENT

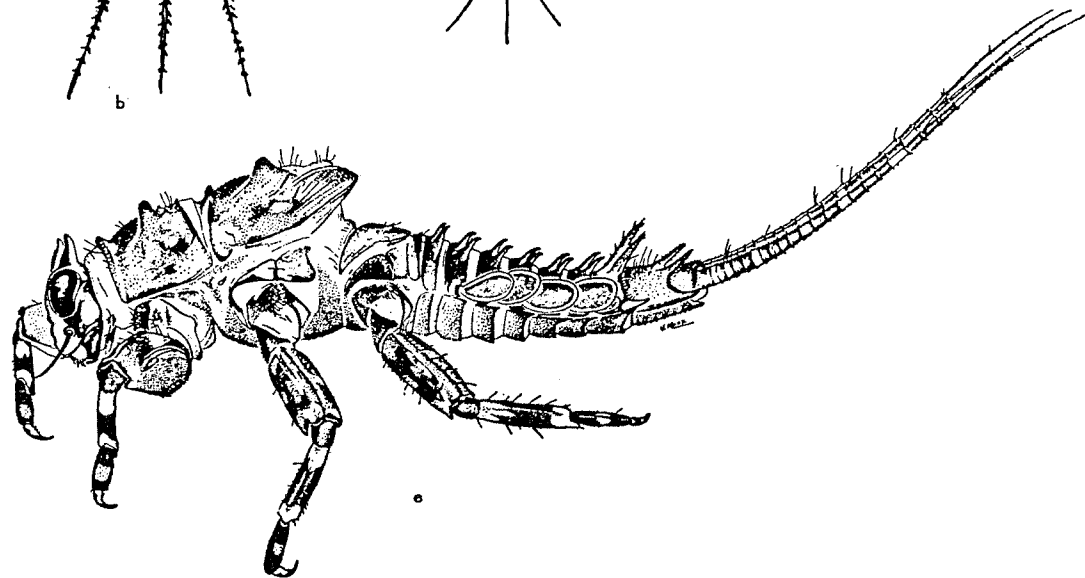
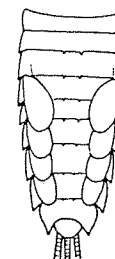
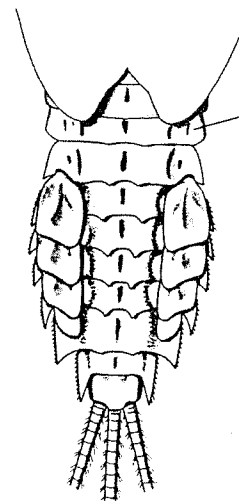
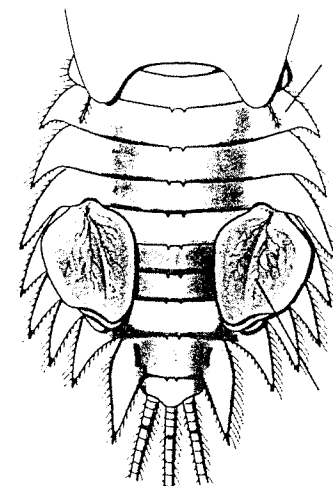


Figure 7.54. *Serratella* larva,  
dorsal abdomen



abdominal  
seg. 2



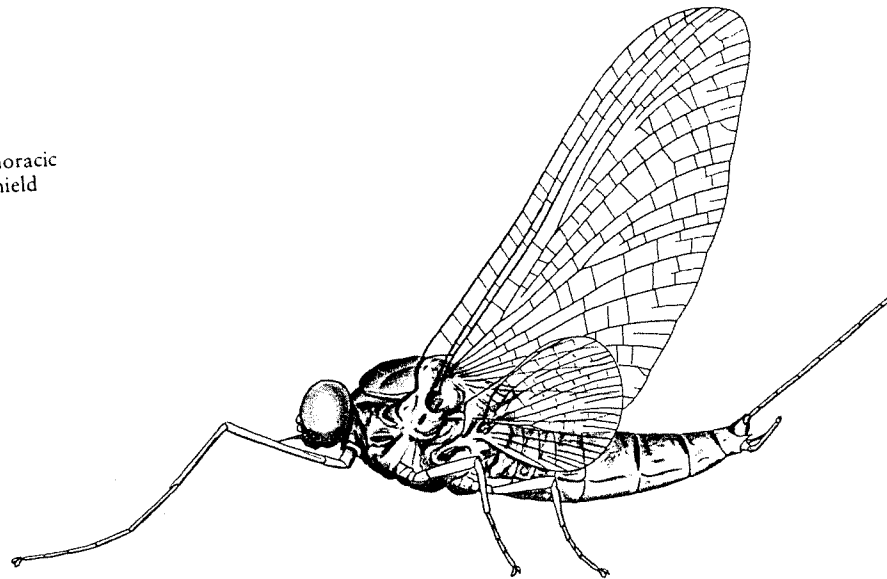
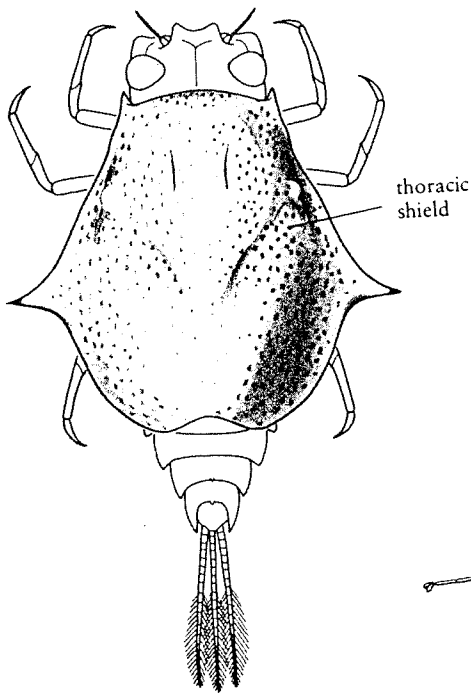
abdominal  
seg. 2

operculate  
gill

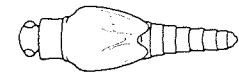
Figure 7.56. *Timpanoga*  
larva, dorsal abdomen

**Order Ephemeroptera:  
Suborder Pannota**

**Family Baetiscidae**  
Armored mayflies



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



THORACIC NOTUM  
CARAPACELIKE AND  
COVERING MUCH  
OF ABDOMEN

