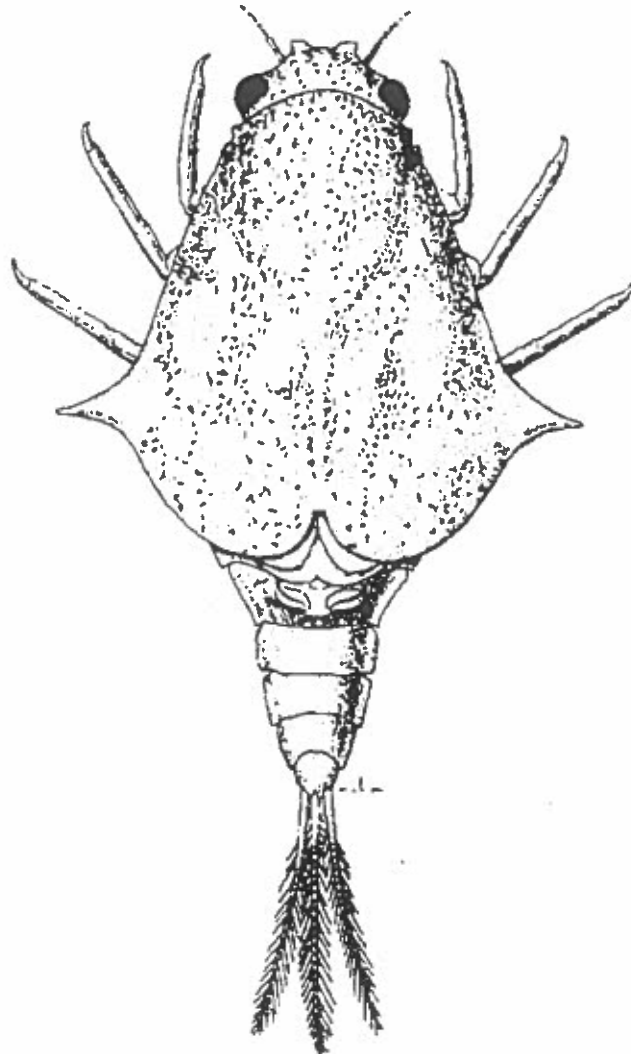


# INTRODUCTORY GUIDE TO COMMON FRESHWATER INVERTEBRATES OF FLORIDA

A pictorial with identifying characteristics



G.L. Warren and D.A. Hohlt  
Freshwater Invertebrate Resources Unit  
Florida Fish and Wildlife Conservation Commission

## The Role and Importance of Invertebrates in Freshwater Ecosystems

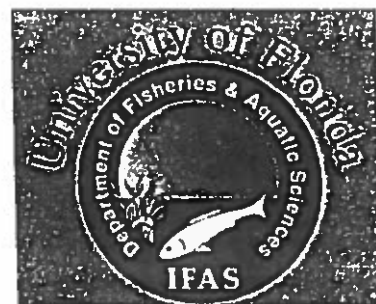
There are over 3,000 species of aquatic invertebrates (animals that live in water and do not have internal skeletons) inhabiting streams, springs, lakes and ponds throughout Florida. The distributions of these species are dependent upon type and quality of habitat. Most are never seen by casual observers because of their small size, secretive lifestyles and close associations with dense vegetation or sediments. Major groups of invertebrates that have aquatic species include sponges, flatworms, roundworms, segmented worms, snails, mussels, crustaceans, mites, and insects.

Invertebrates are an integral component of healthy aquatic ecosystems. Their roles as primary consumers (consumers of living and dead plant material) and secondary producers (producers of carbohydrates and protein for consumption by animals higher in the food chain) make them critical to the success of food webs. The feeding and digestive activities of invertebrates are vital to decomposition and nutrient cycling in aquatic ecosystems.

Aquatic invertebrates also serve as valuable indicators of the health of aquatic systems. Communities of invertebrates are relatively stationary, hence, they are affected by, and are products of, the environmental conditions in which they develop. Many species are intolerant of low dissolved oxygen levels, organic pollution, toxic spills, and sedimentation. Biologists are able to use the species composition, distribution, and abundance of invertebrate communities as tools to measure the overall health of aquatic ecosystems.

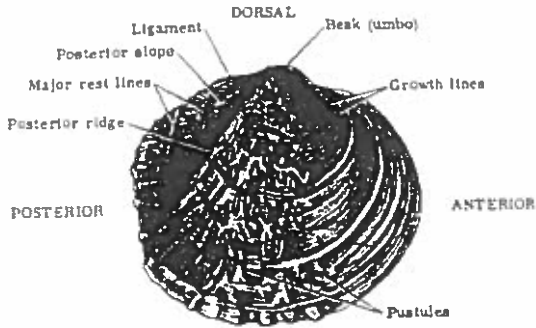
The intent of this pictorial guide is to provide an introduction to the major groups of Florida aquatic invertebrates to anyone interested in aquatic ecology and to students and laboratory technicians. It is by no means a comprehensive treatment of all freshwater invertebrate groups. For additional and/or more detailed information contact:

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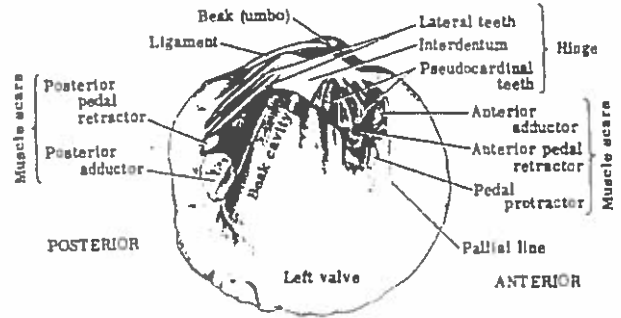


# AQUATIC INVERTEBRATE MORPHOLOGY

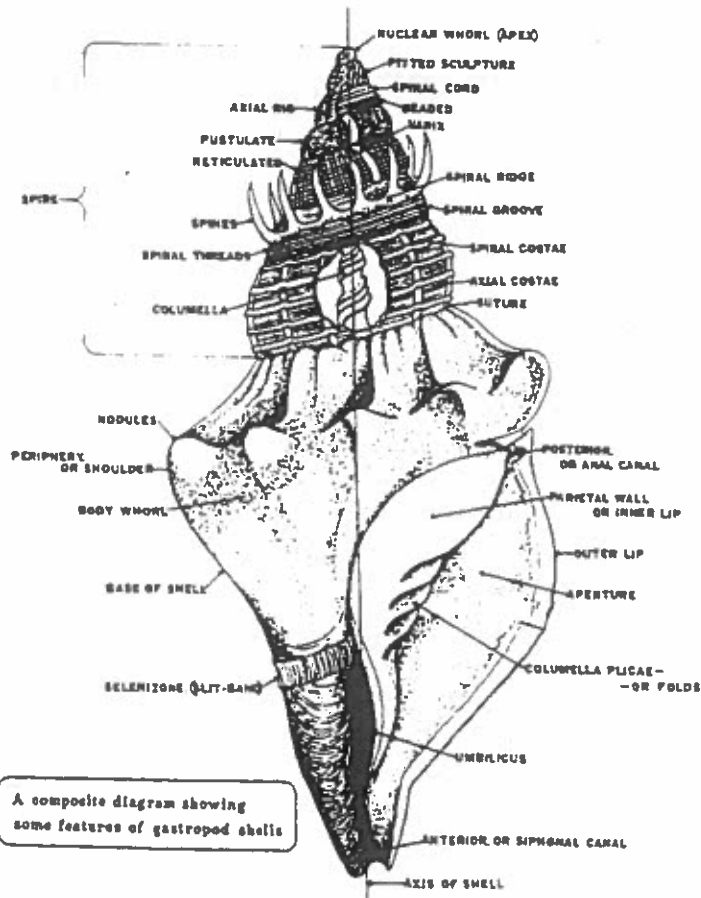
## Molluscan Shell Structure



Pelecypoda exterior



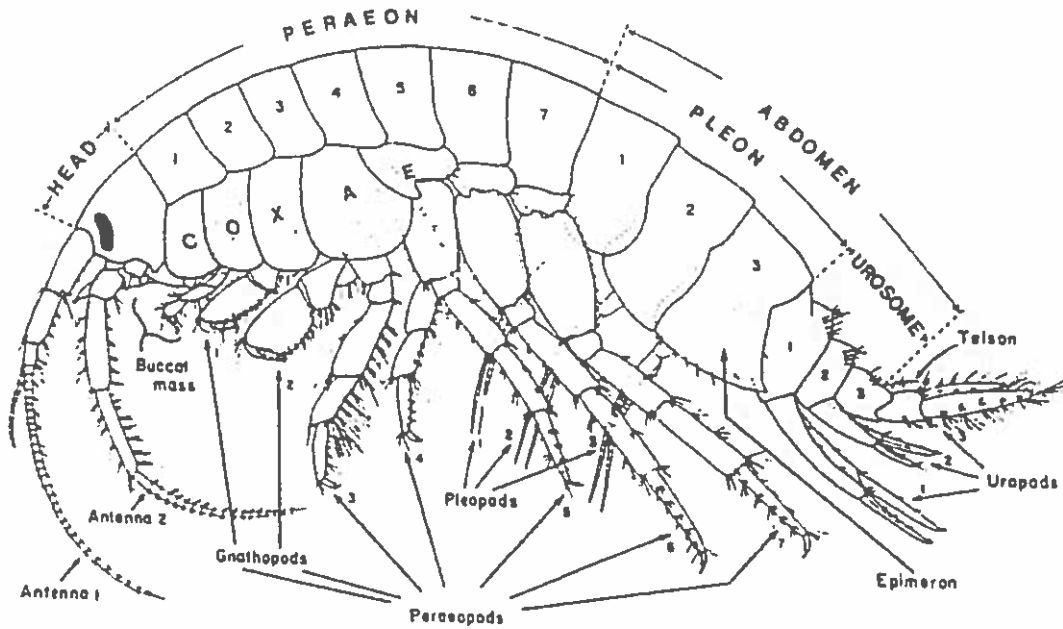
Pelecypoda interior



A composite diagram showing some features of gastropod shells

Gastropoda

# Crustacean Anatomy



# Insect Mouthpart and Leg Anatomy

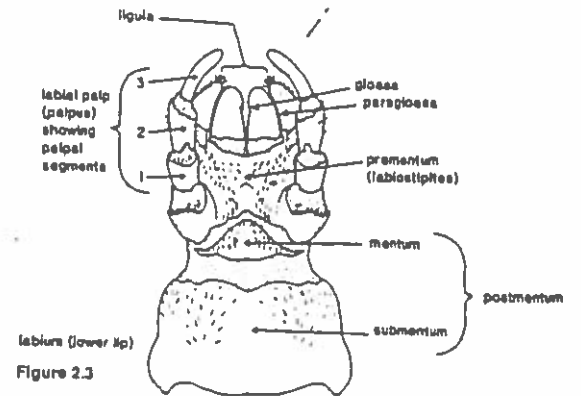
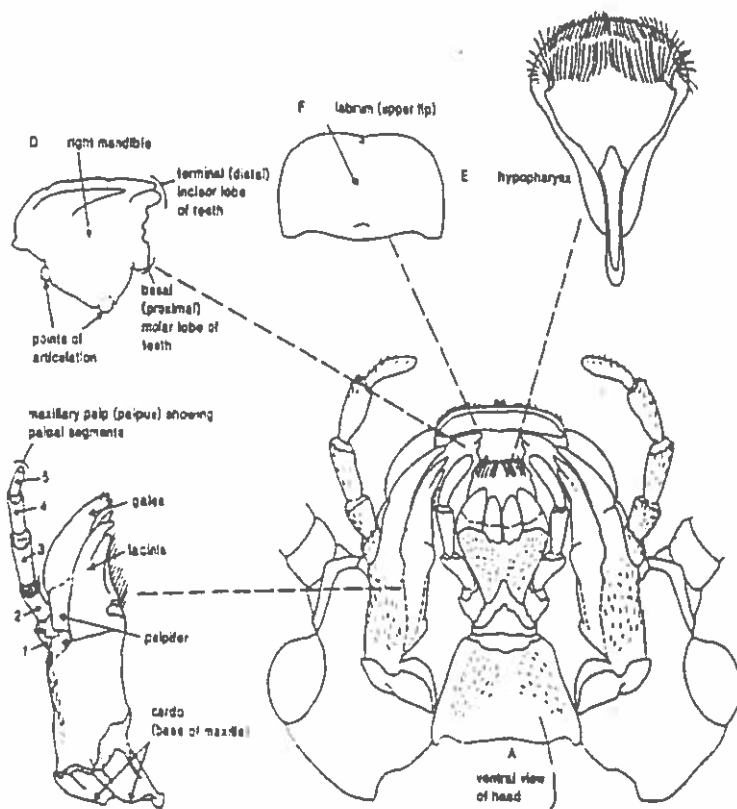


Figure 2.3

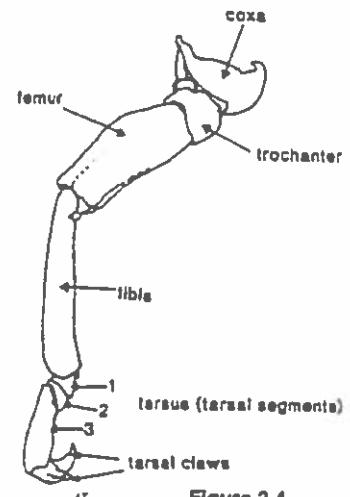
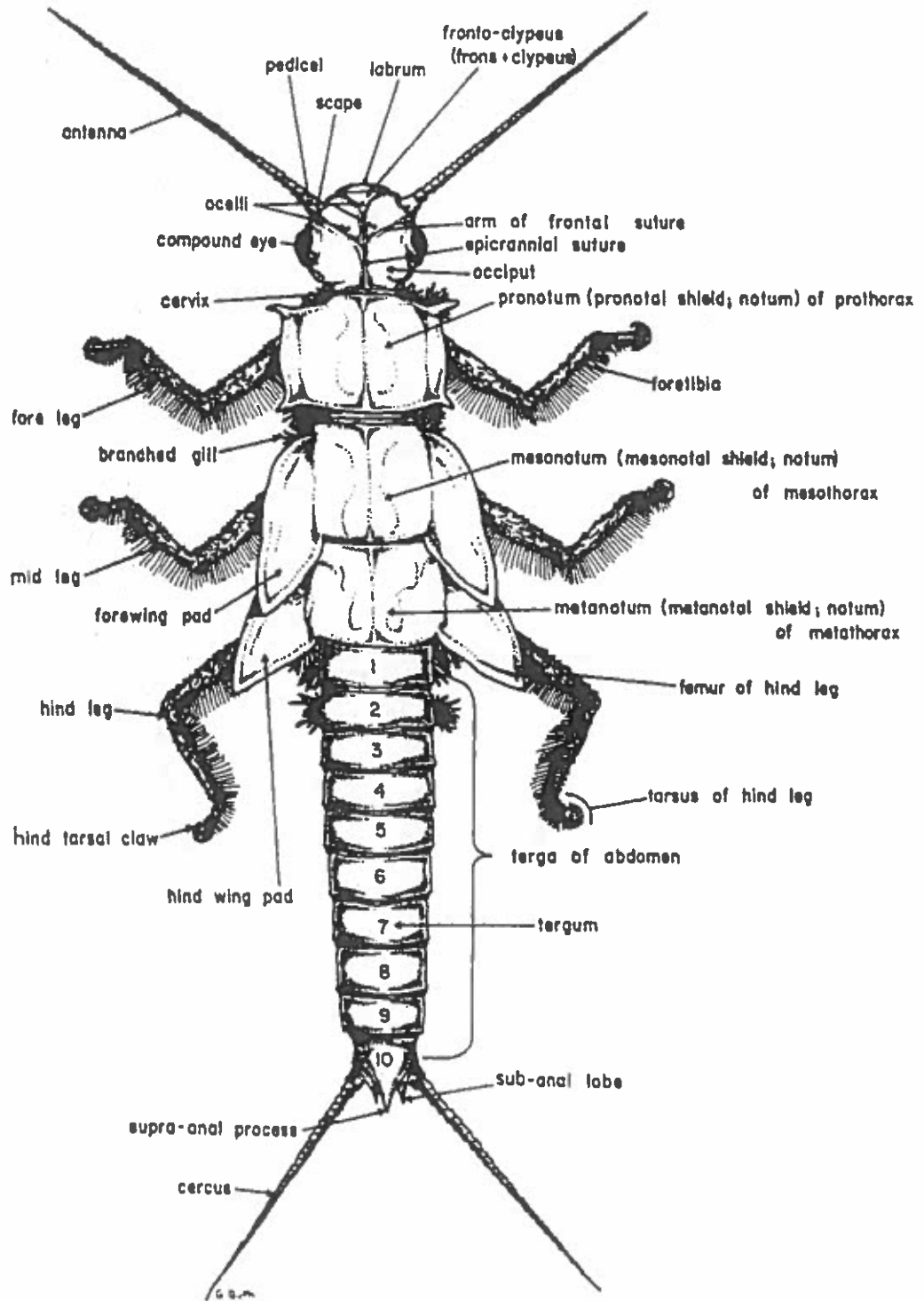
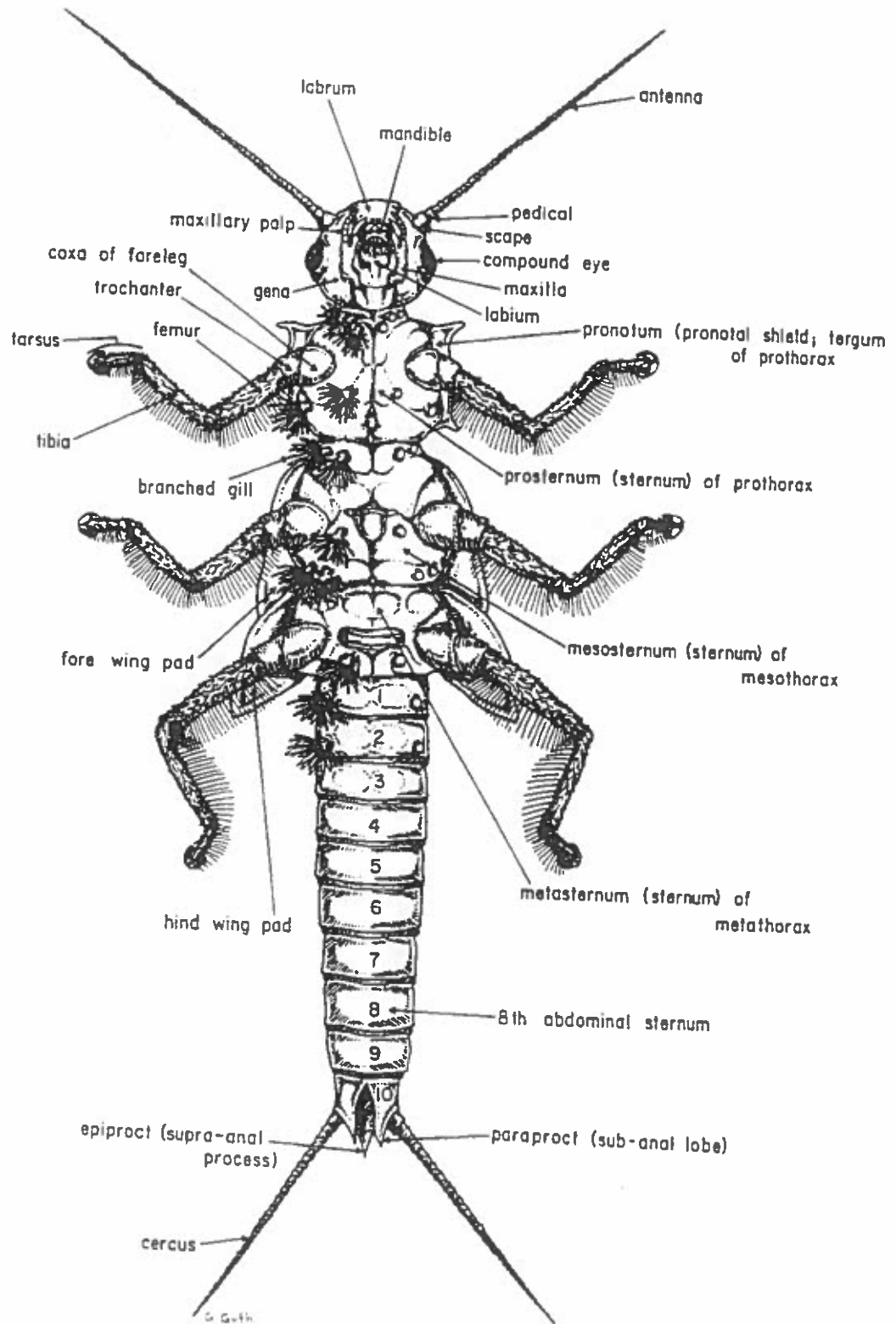


Figure 2.4

# Insect Anatomy - Dorsal



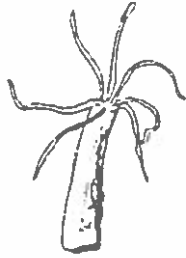
# Insect Anatomy - Ventral



# Cnidaria (Hydroids and Jellyfish)

## Hydra

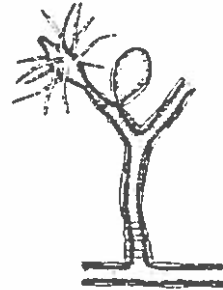
- Preserved specimens are fleshy and barrel-shaped with 4 to 8 tentacles.



Hydra sp  
Cordylophora lacustris colony

## Cordylophora

- Preserved specimens are portions of branched colonies with 10 to 20 tentacles on each polyp.



portion of

# Turbellaria (Flatworms or planarians)

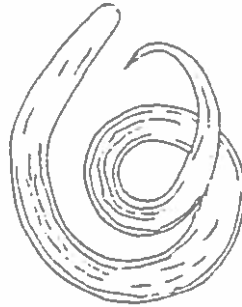
- Preserved specimens are fleshy and circular or ovoid.
- Unsegmented.
- Eyes sometimes visible as small black spots.
- Protrusible pharynx located mid-ventrally.



Planariidae

## Nematoda (Roundworms)

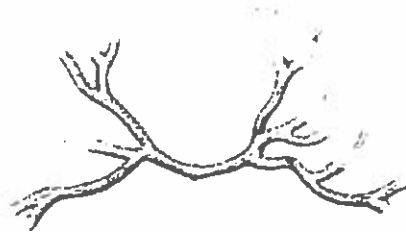
- Small, unsegmented, opaque white or yellow worms.
- Both anterior and posterior ends taper to a point and may be hook-like.
- Exterior covered by a shiny cuticle.



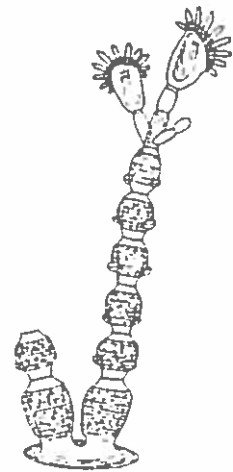
Nematoda

## Bryozoa (Moss Animals)

- Preserved specimens are tubular, branched portions of colonies with soft tissue covered by a hardened cuticle.



Entoprocta



Ectoprocta

(Urnatella gracilis)



## Oligochaeta (aquatic earthworms)

- Round, segmented worms.
- Bundles of chaete (hairs) usually present on some segments (may not be visible under dissecting scope).
- Often fragmented in samples.



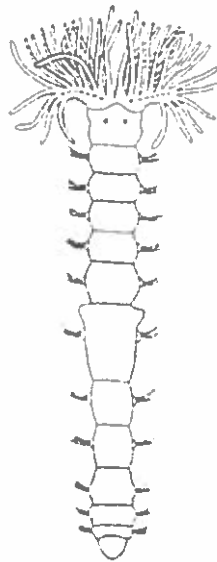
Branchiura sowerbyi



Dero floridana

## Polychaeta (Marine segmented worms)

- Segmented, with setose paired lateral projections (parapodia) on each segment.
- Much structural diversity, especially near anterior end.



Manayunkia speciosa

## Hirudinea (Leaches)

- Flattened segmented worms.
- Setae absent.
- Anterior and posterior suckers present.

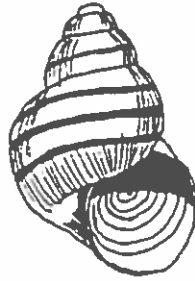


Hirudinea

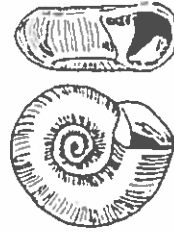
# Mollusca (Snails, mussels, clams)

## Gastropoda (snails and limpets)

- Single external shell.
- Coiled or open.
- Spired or flat.



Viviparus georgianus



Planorbidae



Ancyliidae

## Pelecypoda (clams and mussels)

- External shell comprised of two valves.



fluminea

Corbicula

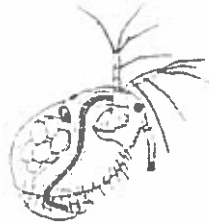


Elliptio sp.

# Micro-Crustacea

## Cladocera (water fleas)

- Abdomen, thorax, and legs covered by a carapace (shell).
- Head usually with prominent eyes and antennae.



Cladocera

## Copepoda

- Carapace absent.
- Four to 5 pair of legs on the thorax.
- Abdomen without appendages.



Copepoda

## Ostracoda (seed shrimp)

- Carapace encloses entire body.
- Legs present and may be visible.

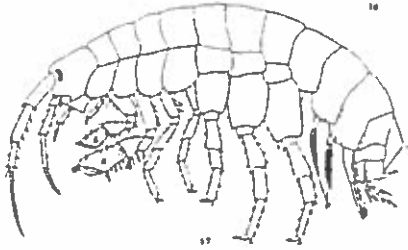


Ostracoda

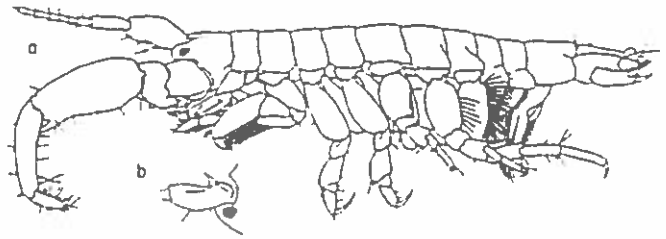
# Macro-Crustacea

## Amphipoda (scuds)

- Segmented body, usually laterally compressed.
- Carapace absent.
- Segmented appendages on each body segment.



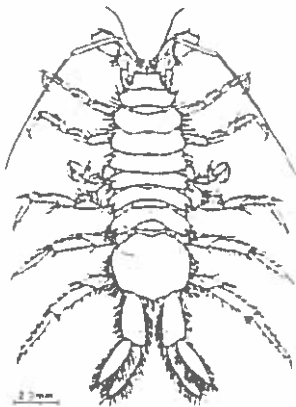
Gammarus sp



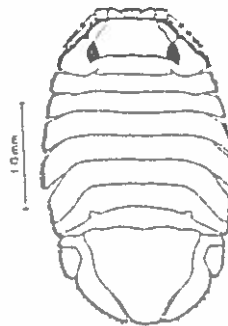
Corophium louisianum

## Isopoda (sow bugs)

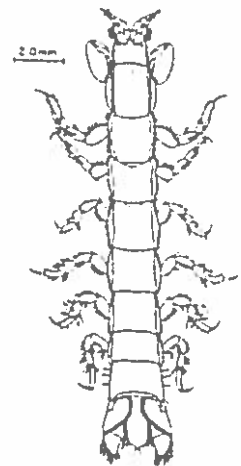
- Carapace absent
- Body dorsoventrally flattened
- Segmented appendages on each body segment



Caecidotea sp



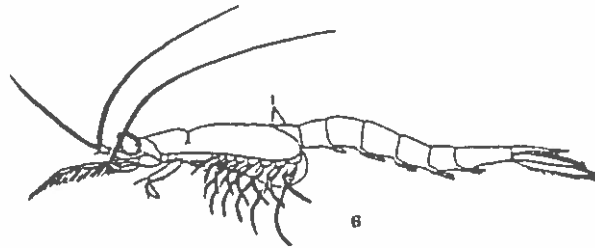
Cassidinidea ovalis



Cyathura polita

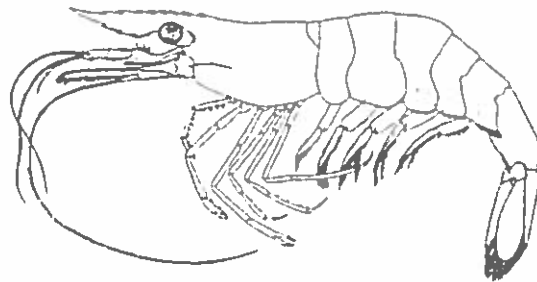
## Mysidacea (opossum shrimps)

- Segmented appendages on each segment.
- All pereopods long, thin, setose, biramous, and many segmented.
- Pleopods reduced, especially when compared to Decapoda.



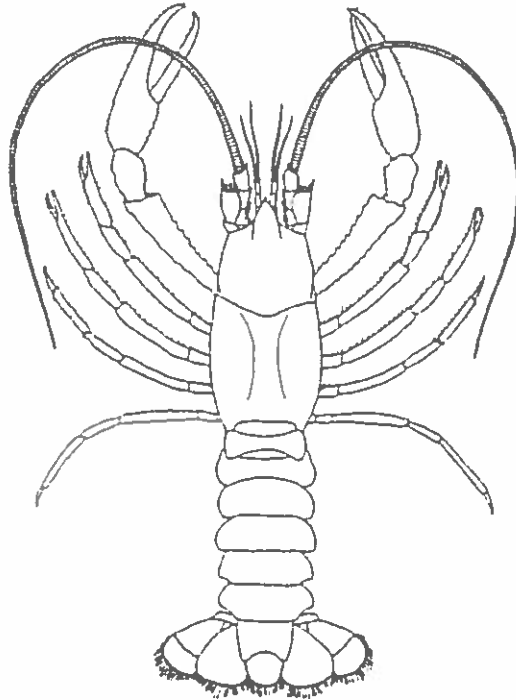
## Palaemonidae (grass shrimp)

- First two pairs of legs chelate.
- Cephalothorax and abdomen laterally compressed.
- Long, pointed rostrum



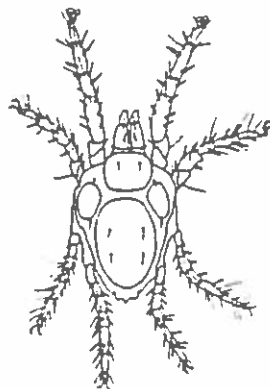
## Cambaridae (crayfish)

- First three pairs of legs chelate.
- Cephalothorax cylindrical, abdomen dorsoventrally compressed.



## Aquatic Acari - Hydracarina and Oribatidae (water mites)

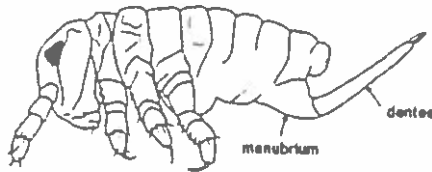
- Four pairs of segmented legs.
- May resemble small spiders, but head and thorax are fused into one unit (cephalothorax).



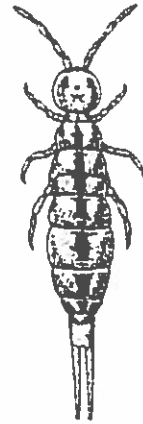
# AQUATIC INSECTS

## Collembola (springtails)

- Small - less than 5 mm in length.
- Abdomen with 6 or fewer segments.
- Furcula (springtail) present on ventral abdomen.



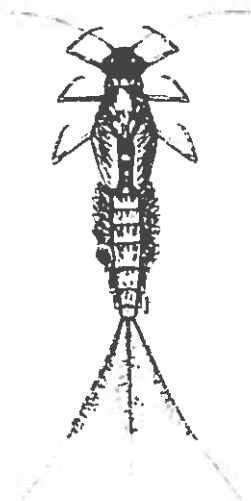
Podura sp



Isotomurus sp

## Ephemeroptera (mayflies)

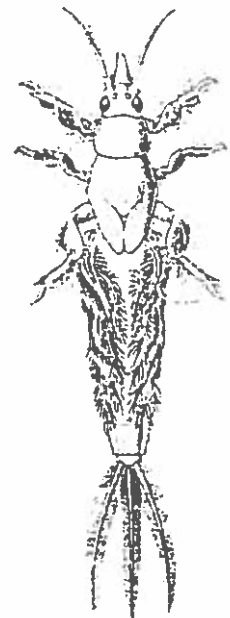
- Thorax with 3 pairs of segmented legs.
- External wing pads present.
- Abdominal gills present.
- Usually 3 tail filaments.



Callibaetis sp



Caenis sp.

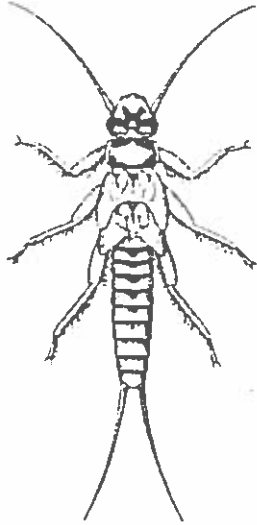


Hexagenia sp.

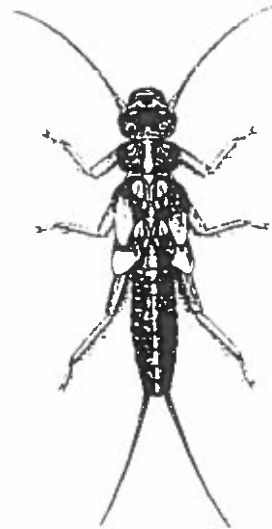


## Plecoptera (stoneflies)

- Thorax with three pairs of segmented legs.
- External wing pads present.
- Abdominal gills not present.
- 2 tail filaments present.



Isoagenoides sp.

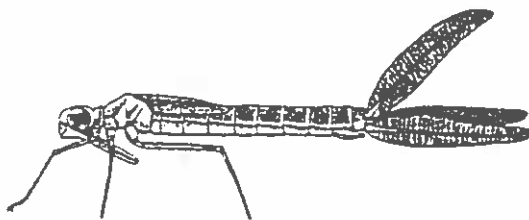


Isoperla sp.

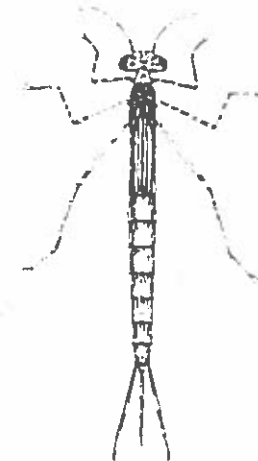
## Odonata (damselflies and dragonflies)

### Zygoptera (damselflies)

- Thorax with 3 pairs of segmented legs.
- External wing pads present.
- Abdominal gills absent.
- Labium is a jointed, extendable, grasping organ.
- Abdomen terminating in 3 caudal lamellae.



Lestes sp.



Lestes sp.

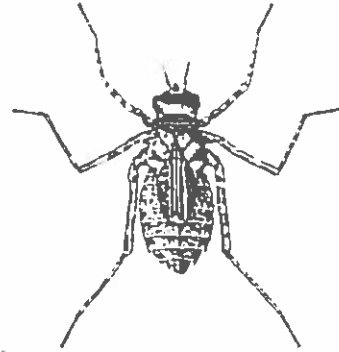
## Odonata (continued)

### Anisoptera (dragonflies)

- Thorax with 3 pairs of segmented legs.
- External wing pads present.
- Abdominal gills absent.
- Labium is a jointed, segmented, grasping organ.
- Abdomen terminates in 3 short, stiff, pointed valves.



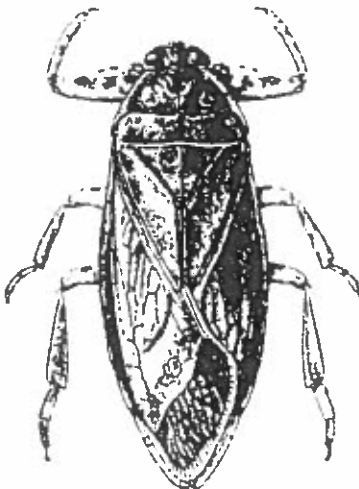
Macromia sp.



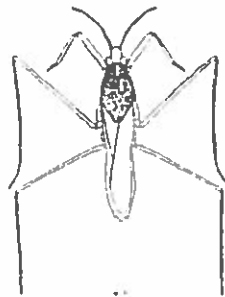
Macromia sp.

### Hemiptera (true bugs)

- Thorax with 3 pairs of segmented legs.
- Wings or wing pads present.
- Anterior half of front wings hardened; posterior half mostly membranous with conspicuous venation.



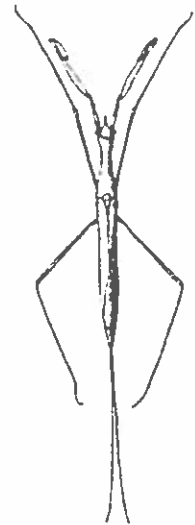
Lethocerus sp.



Gerris sp.



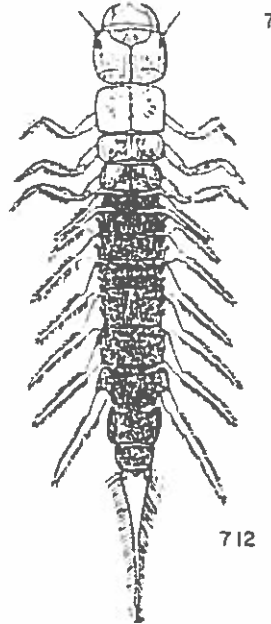
Sigara sp.



Ranatra sp.

## Megaloptera (hellgrammites, dobsonflies, alderflies)

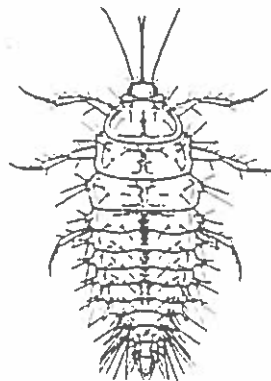
- Thorax with three pairs of segmented legs.
- Wing pads not present.
- Gills present on at least first 7 abdominal segments.
- Abdomen terminating in a single slender filament or in 2 prolegs, each with 2 hooks.



Sialis sp.

## Neuroptera (spongillaflies)

- Thorax with three pairs of segmented legs.
- Wingpads absent.
- Abdominal gills absent.
- Conspicuous setae covering body
- Mouthparts modified into elongate, unsegmented stylets.



Climacea sp.

## Trichoptera (caddisflies)

- Thorax with three pairs of segmented legs.
- Wing pads not present.
- Abdomen terminates in 2 ventral prolegs.
- Antennae inconspicuous, one segmented.
- Often within portable cases constructed of silk, sand, or plant material.



Polycentropus sp.



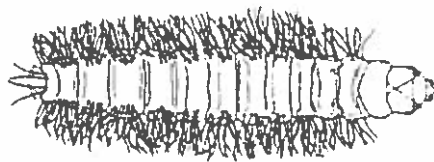
Hydropsyche sp.



Trianodes sp.

## Lepidoptera (moths and butterflies)

- Thorax with three pairs of segmented legs.
- Wing pads absent.
- Abdominal prolegs present, with crochets (small hooks).
- Filamentous gills present or absent.



Petrophila sp.

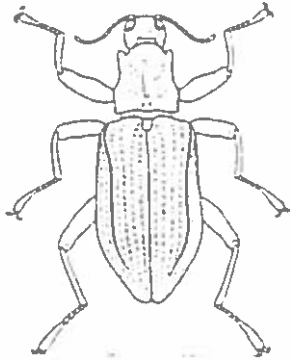


Archanara sp.

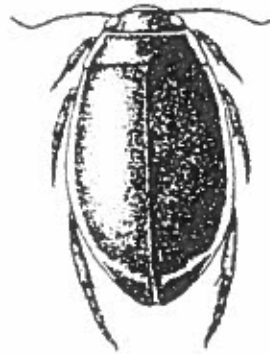
# Coleoptera (beetles)

## Adults

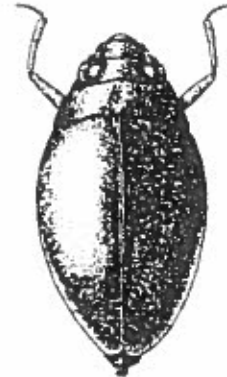
- Thorax with 3 pairs of segmented legs.
- Wings present; front pair hardened, opaque, and without venation.



Stenelmis sp.



Cybister sp.



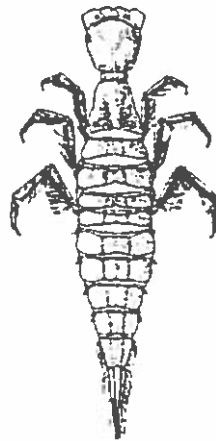
Dineutus sp.

## Larvae

- Thorax with 3 pairs of segmented legs.
- Wings and wing pads absent.
- Antennae conspicuous and elongate, with 3 or more segments.



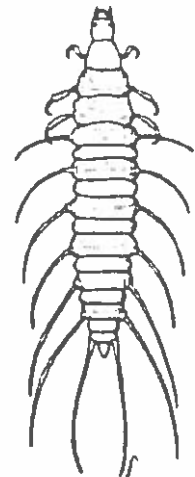
Stenelmis sp.



Cybister sp.



Dineutus sp.

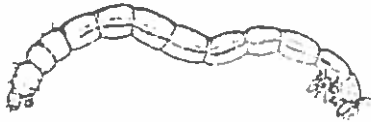


Berosus sp.

# Diptera Larvae (true flies)

- Thorax without segmented legs.
- Wing pads not present.
- Most with thoracic and/or abdominal prolegs.

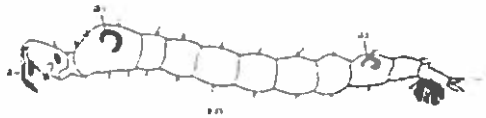
**Chironomidae (chizzywinks)**



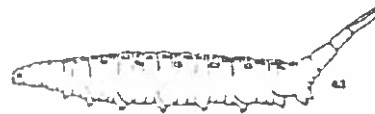
**Ceratopogonidae (no see-ums)**



**Chaoboridae (phantom midges)**



**Ephydridae (shore flies)**



**Tipulidae (crane flies)**



**Culicidae (mosquitoes)**



**Stratiomyidae (soldier flies)**



**Tabanidae (horse flies)**



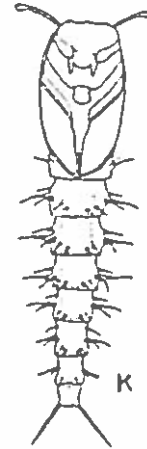
# Diptera Pupae (true flies)

- Developing antennae, legs, and wings contained in translucent sheaths.

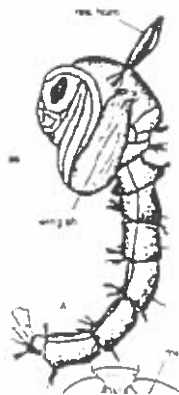
Chironomidae



Ceratopogonidae



Chaoboridae



Tipulidae



