

Arthropods 4: Subphylum Hexapoda - The Insects

I. Introduction

A. Representative taxa

B. Species diversity

II. Features that unite insects

A. Body regions

B. Walking legs

C. Differences between insect and crustacean appendages

D. Features of the head

1. Antennae

2. Compound eyes

3. Ocelli

4. Mouth parts

- a. Grasshoppers

- b. Mosquitoes

- c. Houseflies

- d. Stag beetles

E. Wings

- 1. How derived?

- 2. Differences between groups

F. Specialized structures

- a. Tympanum

- b. Hairs

- c. Structures for stridulation

III. Internal structures

A. Digestive system

B. Circulatory system

C. Respiratory system

a. Tracheae

b. Spiracles

D. Nervous system

a. Brain

b. Ventral nerve cord

E. Excretory structures

F. Reproductive biology

a. Sex organs

b. Hemimetabolous life cycle

c. Holometabolous life cycle

IV. Diversity at level of the order

A. Diptera

B. Orthoptera

C. Lepidoptera

D. Hymenoptera

E. Coleoptera

F. Odonata

G. Ephemeroptera

V. Ecology

A. Dietary preferences

B. Predators

C. Habitat preferences

C. Role as pollinators

VI. Interactions with humans

A. Beneficial

1. Crop pollinators
2. Honey production
3. Pest control

B. Harmful

1. Stingers and biters
2. Disease spreaders
3. Loss of crops
4. Forest destruction

VII. Evolution

A. Monophyletic origins

B. Primitive vs more modern insects

Questions:

1. How is tagmosis expressed in insects? How does it compare to that in the chelicerates? crustaceans?
2. How do mouthparts of different insect groups compare to each other?
3. What is stridulation, and how is it useful to some insects?
4. Compare and contrast the digestive, circulatory, and nervous systems of insects vs chelicerates vs crustaceans.
5. What are the similarities and differences between the hemimetabolous and holometabolous life cycles?
6. Identify and briefly discuss four orders of insects.
7. Do all insects have the same dietary preference? Explain.

8. What are some of the different habitats that insects live in?

9. How are insects indicators of water quality?

10. List and briefly discuss three ways that insects are beneficial to humans.

11. How are insects harmful to people?

12. What is a primary difference between ancestral (primitive) and more derived (advanced) insects?