Department of biology

((Entomology II))

2 stage

المحاضرة الثانية

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Insects are the six legged flying arthropods coming under the phylum Arthropoda
and class Insecta. The widely accepted classification of insects was proposed the eminent
insect taxonomist **A.D.Imms**.

Characters of class Insecta

1. Body is divided into three regions
2. In head a pair of antenna and a pair of compound eyes are usually present.
3. Thorax is the centre of locomotion with, 3 pairs of five jointed legs and two pairs of wings.
4. Excretion is mainly through malpighian tubules.
5. Tracheal system of respiration well developed.
6. Brain is divided into protocerebrum, deutocerebrum and tritocerebrum.

Entognathous Hexapods

1. Order: **Protura** - proturans
2. Order: **Collembola**- springtails
3. Order: **Diplura** - diplurans

Apterygote Hexapods

4. Microcoryphia - bristletail
5. Thysanura – silverfish

Pterygote Hexapods

6. Ephemeroptera : Mayflies
7. Odonata: Dragonflies and Damselflies
8. Orthoptera: Grasshoppers, Crickets and Katydids
9. Phasmatodea: Walkingsticks and leaf insects
10. Grylloblattodea: Rock Crawlers
11. Mantophasmatodea: Gladiators
12. Dermaptera: Earwigs
13. Plecoptera: Stoneflies
14. Embiidina: Web-spinners
15. Zoraptera: Angel insects

16. Isoptera: Termites
17. Mantodea: Mantids
18. Blattodea: Cockroaches
19. Hemiptera: True bugs, cicadas, hoppers, psyllids, whiteflies, aphids and scale insects
20. Thysanoptera: Thrips
21. Psocoptera : Psocids
22. Phthiraptera: Lice
23. Coleoptera : Beetles and weevils
24. Neuroptera: Alderflies, Dobsonflies, Fishflies, Snakeflies, Lacewings, antlions, and
Owlflies
25. Hymenoptera: Sawflies, parasitic wasps, ants, wasps and bees
26. Trichoptera: Caddisflies
27. Lepidoptera: Butterflies and Moths
28. Siphonoptera: Fleas
29. Mecoptera: Scorpionflies and Hangingflies
30. Strepsiptera: Twisted-wing parasites
31. Diptera: Flies

The class Insecta has two subclasses viz., Apterygota and Pterygota.

Apterygota Pterygota

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1. Primarily wingless-evolved Winged or secondarily winglessfrom wingless ancestors. evolved from winged ancestors
e.g. Flea, head louse, bed bug.
2. Metamorphosis is totally Present.
absent or slight.
3. Mandibular articulation in Dicondylic i.e., double.
head is monocondylic i.e. single
4. Pleural sulcus in thorax is absent. Present.
5. Pregenital abdominal appen- Absent.
dages present.

The subclass Apterygota has 4 orders namely

1. Thysanura - Silverfish (Thysan-fringed, Ura-tail)
2. Collembola- Springtail or snowflea (coll-glue; embol-peg)
3. Protura - Proturans or Telsontail (Pro-first, Ura-tail)

4. Diplura - Diplurans or Japygids (Di-two; Ura-tail)

The sub class Pterygota has **two divisions**, namely **exopterygota** and **endopterygota**
based on the wing development.

Character	Exopterygota	Endopterygota
1 .Wing development	External	Internal
2 .Metamorphosis	Incomplete (Hemimetabola) or gradual (Paurametabola)	Complete (Holometabola)
3. Pupal stage	Absent	Present
4. Immature stage	Naiad or Nymph	Larva
5. No. of orders	9	16

The class Insecta is divided in to 29 orders (4 in Apterygota and 25 in Pterygota).

EXOPTERYGOTA GROUPS

01. Ephemeroptera - Mayflies I. **Paleopteran orders** (1,2)
02. Odonata-Dragonfly, Damselfly
03. Plecoptera - Stonefly II. **Orthopteroid orders**(3-11)
04. Grlloblatodia - Rock crawlers
05. Orthoptera-Grasshopper, locust, cricket, mole cricket
06. Phasmida-stick insect, leaf insect
07. Dermaptera-Earwigs
08.Embioptera-Webspinners/Embids
09. Dictyoptera-cockroach, preying mantis
10. Isoptera - Termites
11. Zoraptera - Zorapterans
12. Psocoptera - Book lice III. **Hemipteroid orders**(12-16)
13. Mallophaga - Bird lice
14. Siphonculata - Head and body louse
15. Hemiptera - Bugs
16. Thysanoptera – Thrips

ENDOPTERYGOTA

01. Neuroptera- Antilions, aphidlion, owl flies, mantispid flies.
02. Mecoptera - Scorpionflies.
03. Lepidoptera - Butterflies and moths.
04. Trichoptera - Caddisfly.
05. Diptera - True fly. **Group IV. Panorpoid complex (1-6)**
06. Siphonaptera - Fleas.
07. Hymenoptera - Bees, wasps, ants.
08. Coleoptera - Beetles and weevils.
09. Strepsiptera - Stylopids.

Paleopteran insects cannot flex the wings over the abdomen, i.e., wing flexing
mechanism is absent. The characters of insects belonging to Orthopteroid group include
mandibulate mouth parts, anal area of hind wing well developed, abdomen is always with
cerci, many numbers of malpighian tubules and the ganglia of the ventral nerve cord are
not fused. Hemipteroid insects have the haustellate mouth parts and mainly they feed on
liquid food like plant sap. Panarpoid insects are holometabolous and they have larval and
pupal stage.