



UNIVERSITY OF
SARGODHA

Insect Orders

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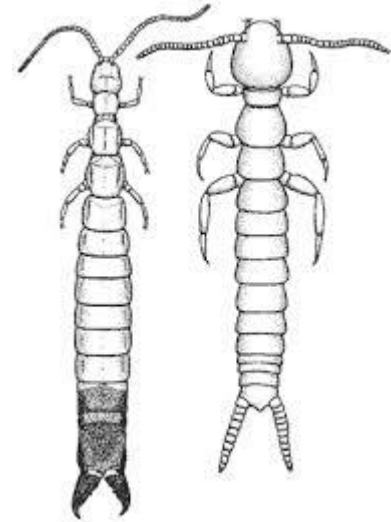
1-Thysanura (Thysan-bristle, ura-tail)

- Example: Bristletails, Silverfish and Firebrats
 1. MP: chewing
 2. Antennae long setaceous
 3. Styli on abdominal segments
 4. 3-caudal filaments



2-Diplura (Diplo-double, ura-tail)

- Example: Doubletails
 1. MP: chewing
 2. Antennae long moniliform
 3. Compound and simple eye absent
 4. Styli on abdominal segments
 5. 2-caudal filaments

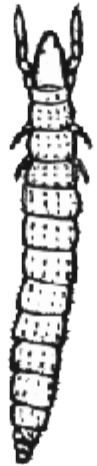


3-Protura



- Example: Tselontails

1. MP: piercing-sucking
2. Minute insects
3. Antennae and eye absent
4. First pair of leg carried forward and perform the function of antennae
5. Telson at the end of abdomen
6. Anamorphosis (addition of 3-abdominal segment during postembryonic development)



4-Collembolla

- Example: Springtails

1. MP: Chewing or piercing-suckin

2. Minute insects

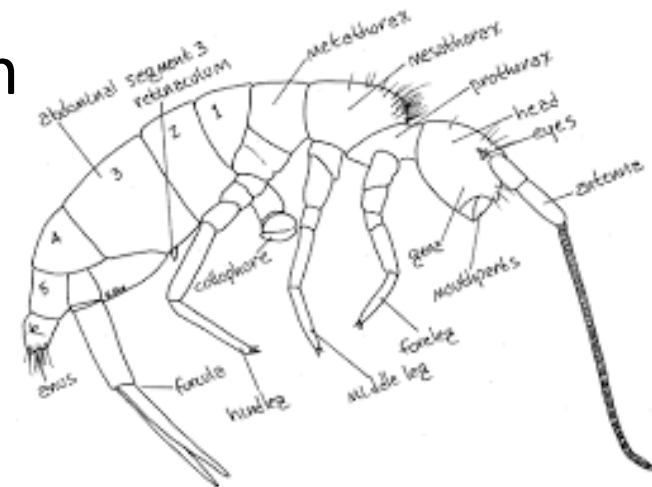
3. Abdomen 6-segmented

4. Abdomen has

1. Collophore on 1st segment

2. Retinaculum on 3rd segment

3. Furcula on 4th segment (for jumping)



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5-Ephemeroptera (Ephemeros-short lived)

- Example: Mayflies

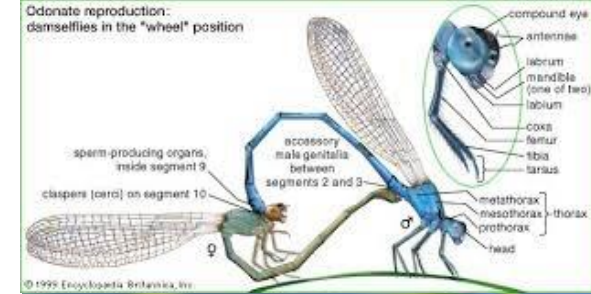
1. MP: Chewing but vestigial (not fully developed or functional)
2. Antennae short and setaceous
3. F.W. large
4. H.W. reduced
5. Abdomen with 2 or 3 long caudal filament
6. Nymphs aquatic



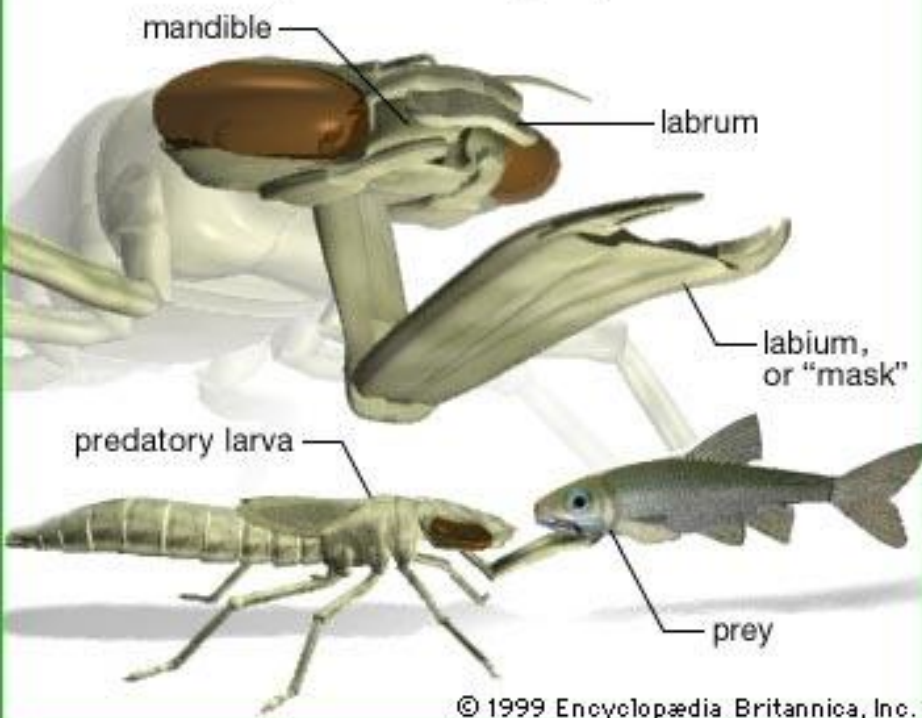
6-Odonata (Odontos-tooth)

- Example: Dragonflies, damselflies

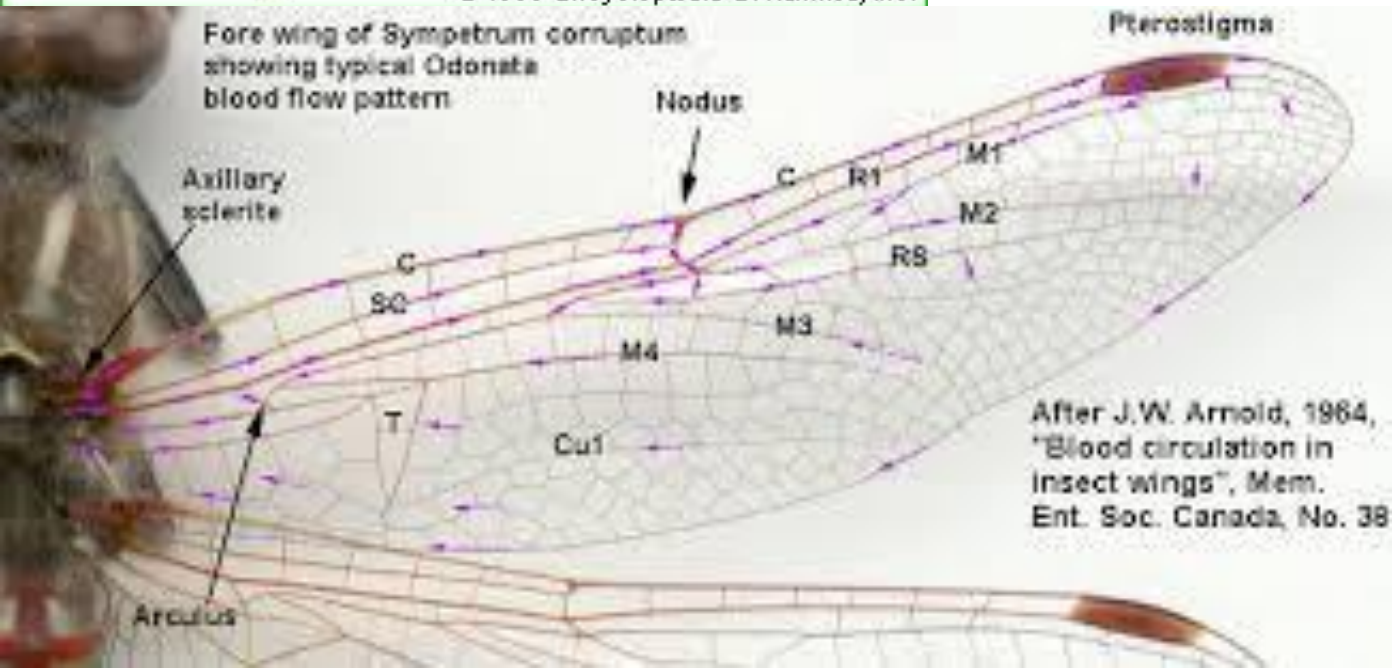
1. MP: Chewing
2. Predaceous insects
3. Antennae very short and setaceous
4. Compound eyes very large
5. F.W. with nodus and stigma
6. Secondary male genitalia on second abdominal sternum
7. Nymphs aquatic
 1. (with spoon-shaped labium)



Odonate mouthparts: the dragonfly larva



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7-Plecoptera (Plecos-to fold)

- Example: stoneflies
 1. MP: Chewing but vestigial
 2. Antennae long and setaceous
 3. H.W. larger than F.W
 4. H.W with well-developed foldable anal lobes
 5. Cerci long
 6. Nymphs aquatic



8-Grylloblattodea (cricket-cockroach)



- Example Rock crawlers
 1. MP: chewing
 2. Antennae long filiform
 3. Apterous (wingless)
 4. Cricket like insect
 5. Legs similar
 6. Cerci long 8-segmented
 7. Male genitalia asymmetrical
 8. Live on rock and ice (1-4 °C)
 9. Omnivorous,
 - feed on plant and arthropod carcasses

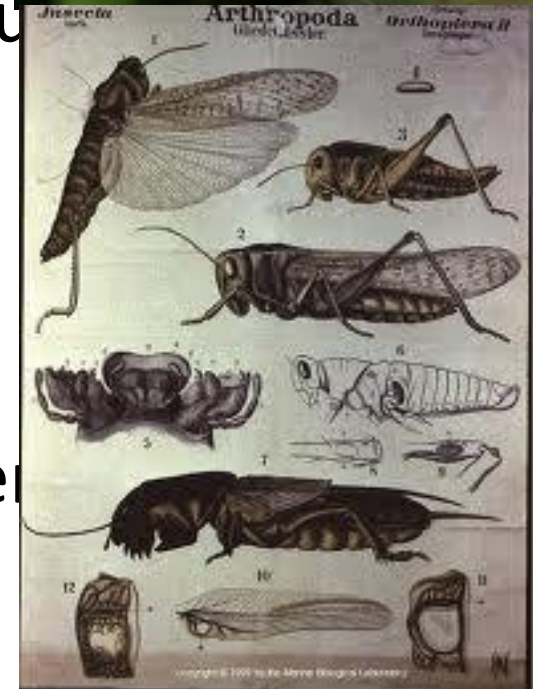




9-Orthoptera (straight wing)



- Examples: grasshoppers, crickets, locusts
- MP: chewing
- Winged or wingless
- Fore wing, Tegmina
- Hind wing, Membranous folded under
- Hind leg modified for jumping
- Cerci short and unsegmented





Locust



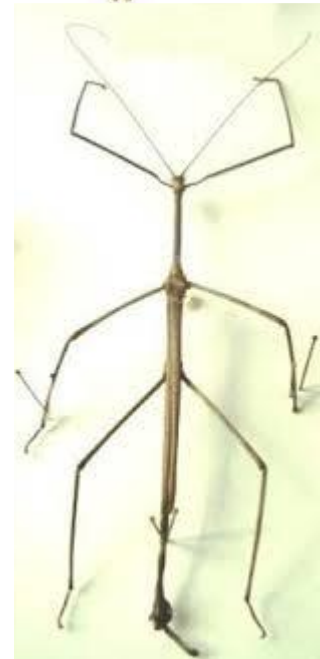
Ak-grasshopper



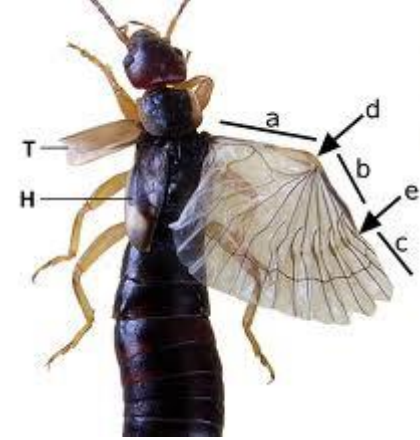
Field grasshopper

10-Phasmida (Phasma-ghos

- e.g., Stick and Leaf Insects
- Winged or wingless
- Body thin and elongate or depressed and leaf like
- Legs similar
- Male genitalia asyssmetrical



11-Dermaptera (Derma-Skin)



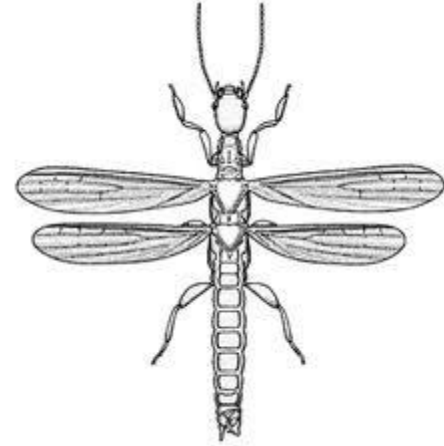
- e.g., Earwigs
- F.W. short, thick tegmina
- H.W. membranous, semi-circular with **diverging veins** and folded under forewing during rest
- **Cerci large, forceps-like**



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12-Embioptera (Embios-lively)



- e.g., web-spinner
- Sexual dimorphism
- Wings similar
- R-vein thickened to form broad black stripe
- Tarsi 3-segmented
- **1st segment of front tarsi greatly swollen to contain silk gland**
- Cerci 2-segmented (asymmetrical in male)



13-Dictyoptera

- e.g., cockroaches, Mantids
- **Prothorax long neck (mantid)**
 - Leg raptorial
- **Flattened with head concealed under pronotal shield (Cockroaches)**
- **F.W. tegmina, H.W. membranous**
- Male genitalia asymmetrical
- Cerci short and unsegmented



14-Isoptera (Iso-same)

- e.g., termites or white ants
- Polymorphic
- Antennae long moniliform
- **Wings similar, shed after swarming**
- **Veins close and thickened along the anterior border**
- Cerci short and segmented



15-Zoraptera (purely wingless)

- e.g., Zorapterans
- Minute, winged or wingless insects
- **Antennae moniliform 9-segmented**
- **Cerci short, unsegmented or terminating in a long style**



Zorotypus guineensis

16-Psocoptera (psoco-to rub)

- e.g., Psocids or book lice
- Minute
- **Winged or wingless**
- **Antennae filiform, very long**
- Cerci absent



17-Mallophaga (mallo-hair; phaga-eat)

- e.g., bird lice
- Minute,
- Wingless
- Ectoparasite of birds
- **Head broader than thorax**
- Prothorax free
- **Thoracic spiracles ventral**
- Leg clinging
- Cerci absent



Swift Bird Louse

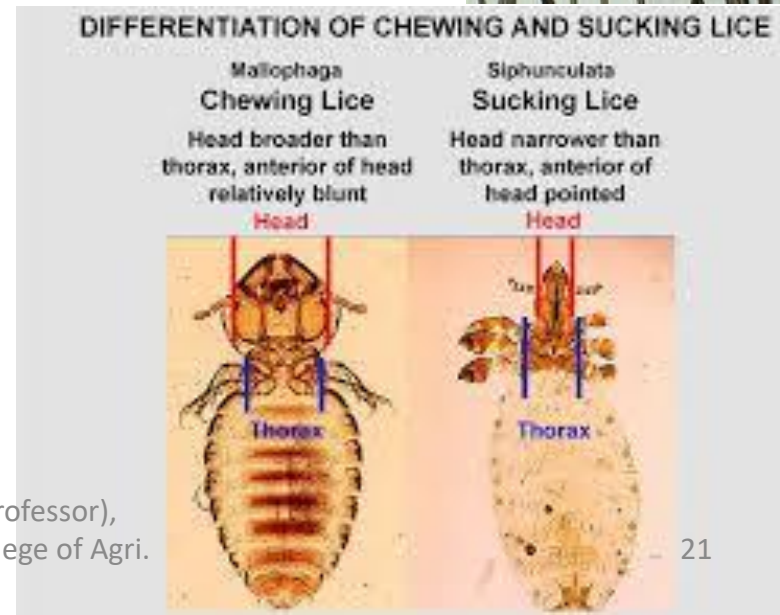


Pigeon Louse



18-Siphunculata (Siphunos-thin tube)

- e.g., minutes, wingless, flattened
- Ectoparasite of mammals
- **Head narrower than thorax**
- All thoracic segments fused
- **Thoracic spiracles dorsal**
- Leg clinging
- Cerci absent



19-Hemiptera (Hemi-half)

- e.g., bugs (painted bug, rice bug, dusky cotton bug, Red cotton bug, bed bug, assassin bug, lace bug, giant water bug, water scorpion, back swimmer)
- MP: piercing-sucking
- Antennae long generally filiform
- FW hemelytra
- HW membranous
- Labium modified into sucking proboscis



Rainbow bug





Stink bug



Bed bug



Assassin bug



Giant water bug



Water scorpion

20-Homoptera (Homo-uniform)



Aphid

- e.g., cicadas, hoppers, Psyllids, whiteflies, Aphids, and Scale insects, mealy bugs
- MP piercing-sucking
- **Antennae short generally setaceous**
- **FW and HW membranous**
- Labium modified into sucking proboscis
 - Proboscis arise from postero-ventral side of head and between the base of front legs



Cicada



Whitefly

21-Thysanoptera



- e.g., Thrips
- MP piercing-sucking type but asymmetrical
- Minute, slender
- Winged or wingless
- Antennae short
- **Wings strippy**
- **Abdomen end in a cone or long tubular structure**
- Cerci absent



Endopterygota (wings developing internally)

22-Neuroptera



- e.g., lacewings, mantidflies, antlion and owlflies
- MP chewing
- **Predaceous insects**
- Long antennae
- **Wings similar with many cross-veins between costa and subcosta to form a distinct border stripe**
- Cerci absent



Antlion

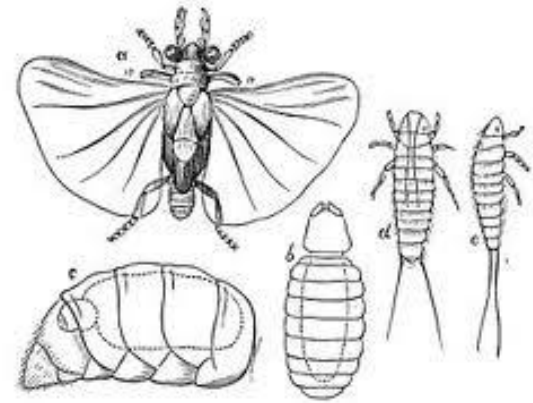
23-Coleoptera

- e.g., beetles and weevils
- Largest order
- MP chewing
- **FW elytra**
- **HW membranous folded under FW**



Weevil

24-Strepsiptera (twisted wing)



- e.g., stylopids (parasite)
- MP chewing but vestigial
- **Minute, endoparasite**
- **Protruded compound eyes**
- **Antennae flabellate**
- **FW pseudohalteres**
- **HW large like a folding-fan, without cross veins**
- Cerci absent
- Female without eyes, antennae and legs,
- Larviform and with cephalothroax



25-Mecoptera



- e.g., scorpionflies
- MP chewing
- **Head prolonged to form beak-like structure**
- Antennae long filiform
- Wings long, narrow and similar
- Cerci short
- **Tip of abdomen of male swollen and carried upward like sting of scorpion**

26-Siphonaptera



- e.g., fleas
- MP piercing-sucking
- Small, wingless, ectoparasites of birds and mammals
- Antennae short, lying in grooves on head
- **Body strongly compressed, with many rows of back wardly directed spines**
- **Legs long with coxae greatly enlarged (for jumping)**
- Spread plaq (Taoon) from rat to human

27-Diptera (two wings)

- e.g., flies (mosquitoes, robber fly, house fly, horse fly, syrphid fly, leaf miner)
- **MP Sponging and Piercing-sucking type**
- **One pair of wing**
- **HW halteres**

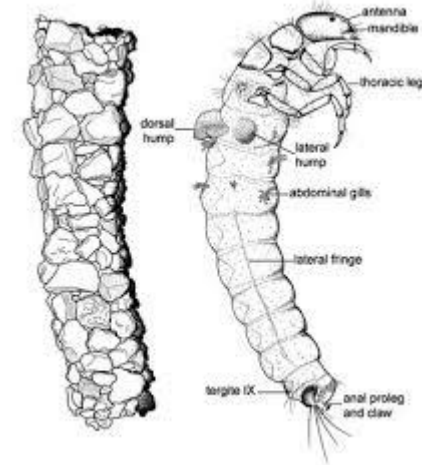
28-Lepidoptera

- e.g., butterflies and moths, epiphytopes (parasite of pyrilla)
- **MP siphoning type**
- **Body wings and legs covered with scales**
- **Long coiled proboscis below head (formed by galeae of maxillae)**
- Wings membranous with few cross veins

29-Trichoptera



- e.g., caddisflies
- MP chewing
- **Moth-like insects**
- Antennae long setaceous
- **Wings hairy with few cross veins**
- **Larvae aquatic and living in case**



30-Hymenoptera

- e.g., honey bees, wasps, ants, sawflies
- **MP chewing and lapping (licking) or sucking**
- Wings membranous
- **Antennae geniculate**
- HW with coupling hooks on anterior margin
- **Abdomen constricted at base**
- Ovipositor well-developed