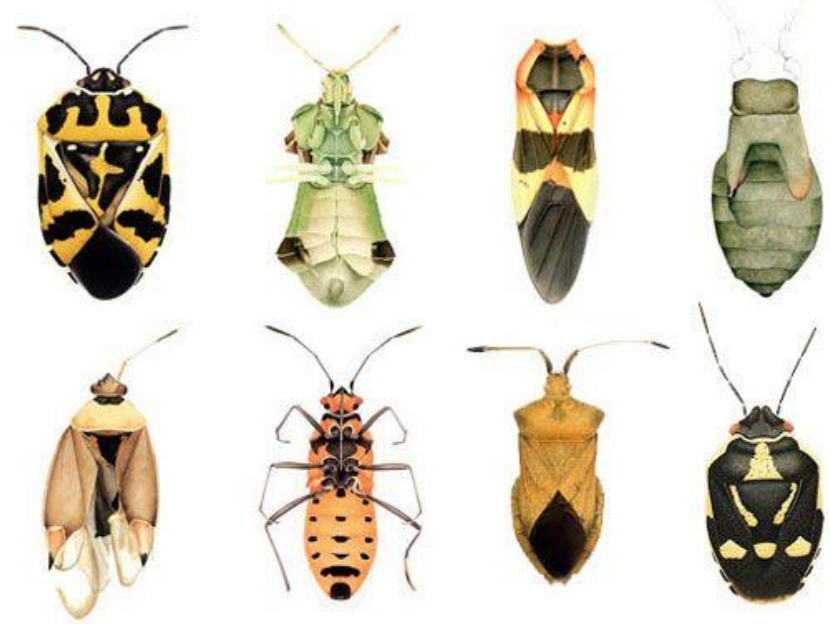


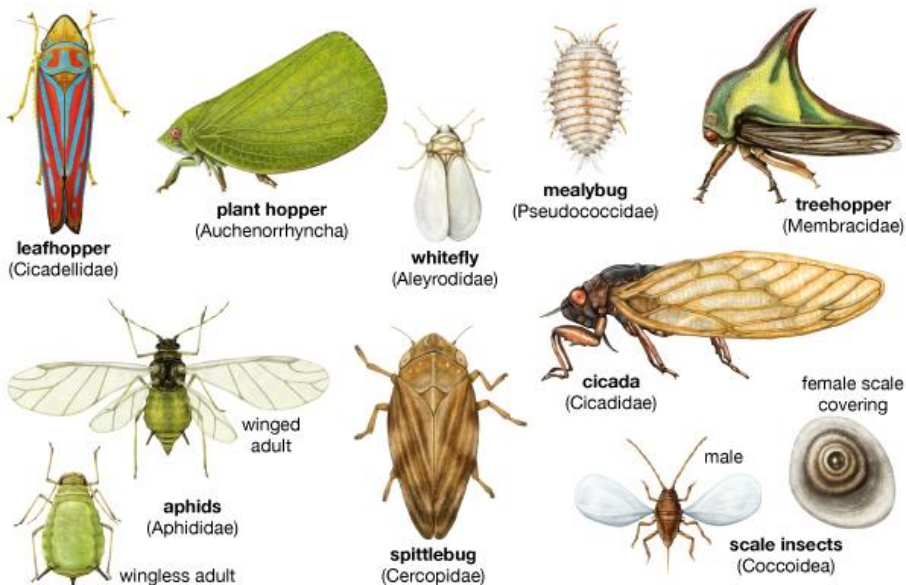
Suborder: Heteroptera

Hetero- variable Ptera-Wings;

includes true bugs



Order Hemiptera



Sub-order: Homoptera Homo: Alike; Pteron:

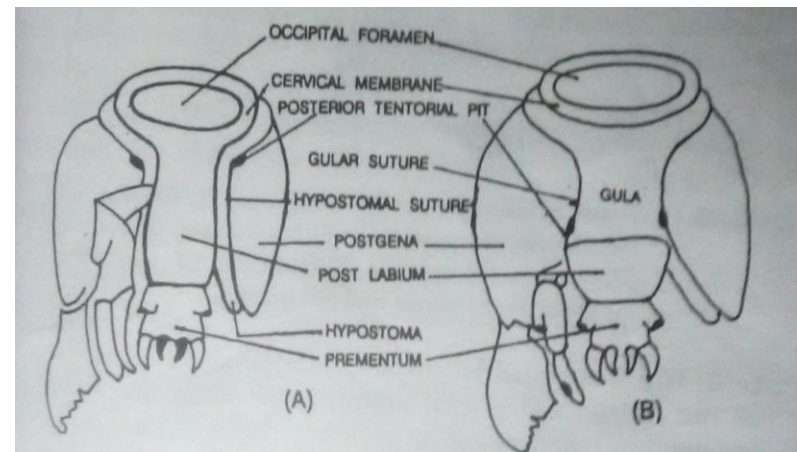
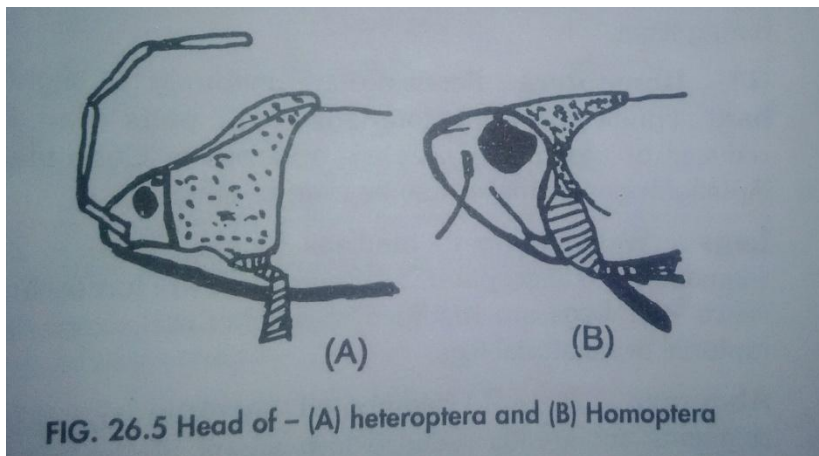
Wings (uniform wings)

Jassids, Aphids, mealy bugs, whiteflies,

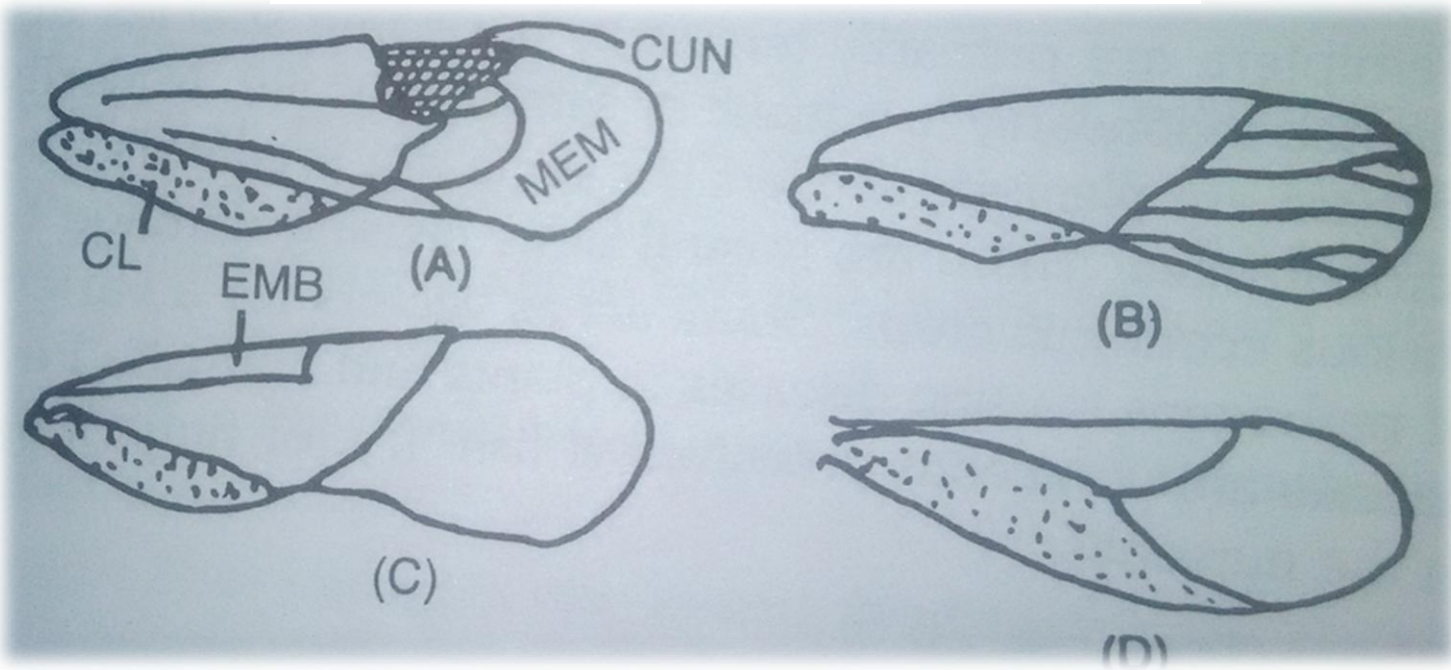
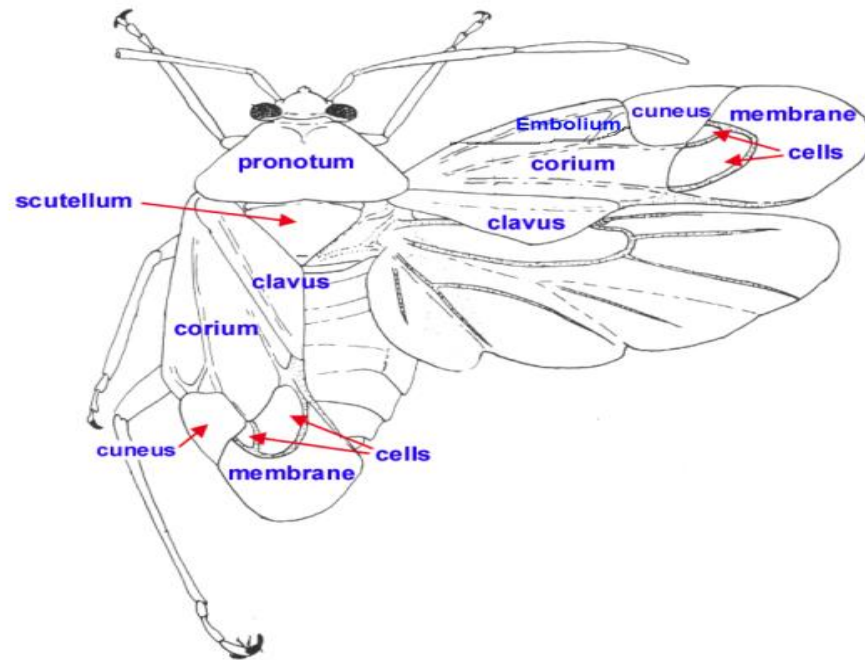
Planthoppers, Scales etc

Hemiptera is again divided into 2 Sub orders **Homoptera** and **heteroptera**

| Sub order | Heteroptera | Homoptera |
|------------|--------------------------------|------------------------------|
| Head | Porroct | Deflexed |
| Gula | Sclerotized, large | Small, membranous or wanting |
| Rostrum | Never extend upto fore coxae | Extends between forecoxae |
| Pronotum | Large | Small |
| Trochantin | Small | Large |
| Wings | Folded flat over abdomen | Held like roof over abdomen |
| Forewings | Hemelytra | Elytra or thin |
| Glands | Odoriferous glands are present | Wax glands are present |



- **Suborder: Heteroptera includes true bugs Hetero- variable Ptera-Wings**
- Mouthparts **piercing and sucking type** with slender segmented **beak (modified labium)**
- usually extends back along the ventral side, sometimes as far as the **bases of hind coxae**
- **There are no palpi**
- Pronotum large, the mesonotum exhibits fivefold division and **scutellum** is prominent
- When winged, the fore wings are basally thickened and membranous apically, **Hemelytra**
- It has 3 regions i.e. **corium, clavus and membrane**
- Narrow strip of corium along costal margin is separated by a suture, **embolium**
- In a few hemiptera, a **cuneus** is set off by a suture from the apical part of corium
- Hind wings are entirely **membranous** and are slightly shorter than forewings
- At rest the wings are **held flat on the body**
- **Alary polymorphism** is seen
- **Odoriferous glands or repugnatorial glands or scent glands or stink glands** are present
- Open **near hind coxae** on the sides by **ventral pores** giving out unpleasant odour
- Ovipositor small with 2 pairs of valves or well developed to **insert eggs in plant tissues**



Heteropteran families:

Family: Pentatomidae (Stink bugs or shield bugs)

Broad shield like bugs that produce **disagreeable odour**

- Scutellum is large **triangular extends posteriorly** to the extent of covering wings entirely
- In hemelytron, **corium large extending to anal margin**
- Membrane has **many longitudinal veins**, from a vein parallel to apical margin of corium
- **4 pairs of odoriferous glands** are present on **dorsum of abdomen of the nymphs**
- eggs are **barrel shaped with spines on the upper end**

Eg: Green (stink) bug – **Nezara viridula**

Red pumpkin bug -**Aspongopus janus**

Cabbage painted bug – **Bagrada cruciferarum**



Family: Lygaeidae Seed bugs or Chinch bugs

Small bugs, hard bodied

- 4 to 5 unbranched simple veins in the membrane
- Cuneus is lacking, clavus is elongate
- Metathoracic gland openings are present
- Front femora moderately swollen with 2 rows of teeth

Eg. Dusky cotton bug –*Oxycarenushyalinipennis*
Groundnut pod bug –*Aphanus sorididus*



Family: Miridae (Capscidae) Mirid bugs

- Cuneus is present
- Embolium is indistinct
- Majority live on plant juices, some prey on small arthropods

Eg. *Calocoris Angustatus*-Sorghum ear bug
Pachypeltis politus- Betel vine bug
Helopeltis antonii- Guava & cashew T mosquito bug
Psallus sps. is a predator of thrips
Cyrtorhynus lividipennis- Predator on BPH



Family: Pyrrhocoreidae (Pyrrhocoreids), red cotton bugs or cotton strainers

- They exhibit red and black colorations
- More branched veins present in hemelytra
- Coxa is rotatory

Eg. *Dysdercus cingulatus* – red cotton bug



Family : Coreidae Leaf footed bugs long and narrow bugs

- Head narrower, shorter than pronotum, scutellum smaller
- In hemelytra, richly branched veins are present
- **either or both hind femora and tibiae have leaf like dilations**
- Metathoracic gland openings present

Eg Rice gundhi bug- *Leptocorisa varicornis*

Pod bugs :*Clavigralla gibbosa* on pulses

- **Characters of the suborder: Homoptera**
- Head is **deflexed** and not generally constricted behind to form a neck
- Mouth parts piercing and sucking type
- Stylets often **exceedingly long, retractile**, rostrum arising from the back of the head
- In some cases appearing to arise between **anterior coxae**
- In some adults like **male coccids the mouth parts are vestigial or absent**
- Pronotum small and collar like
- When winged the **four wings are uniform in consistency**
- Wings are held roof like over the body at rest
- **Alary polymorphism** is prevalent
- In **male coccids only one pair i.e forewings** are present
- **Wax glands or honey tubes** usually well developed in most of the members
- In most of the species, the life history is very complex involving **sexual and parthenogenetic generations winged and wingless individuals**
- In some species, the **last nymphal instar is quiescent and pupa like**

Family Cicadellidae : (Jassidae) : Jassids or leaf hoppers

- **wedge shaped** insects usually rest in a position ready for jumping
- **One or two rows of small spines** are present on hind tibia
- Both young ones and adults **running sideward or diagonally**
- very important vectors of viral diseases
- Ovipositor adopted for lacerating plant tissues for egg laying
- Many excrete honeydew through anus
- 8. Forewings are thickened and brightly coloured
- Anal veins 1A and 2A do not unite to form 'Y' shaped vein

Eg: Cotton leafhopper - *Amrasca biguttula biguttula*

Paddy leafhopper - *Nephotettix virescens*

Mango hoppers - *Amritodes atkinsoni*, *Ideoscopus clypealis*



Family: Delphacide Plant hoppers

- Most of the species are small with **reduced wings**
- presence of **large mobile apical spur** on hind tibiae
- **Costal cell is absent** in the winged forms
- **Alary polymorphism** -winged, wingless and brachypterous forms occur

Eg: Brown plant hopper of paddy (BPH)- *Nilaparvata lugens*

White backed plant hopper on rice (WBPH) -*Sogatella furcifera*



Family: Aphididae Aphids or plant lice

- small soft bodied, pear shaped, fragile **phytophagous** insects
- frequently found in large numbers sucking the sap from various parts of plants
- presence of **a pair of cornicles** on the **dorsal surface of 5th or 6th abdominal** segments (It is believed that they produce waxy substances)
- Alary polymorphism is prevalent. When winged, **hind wings are smaller** with fewer veins
- At rest the wings are generally held vertically above the body
- **Nine pairs of lateral spiracles** present
- **Excrete honeydew through anus** (honey dew consists of excess sap, excess sugars and waste materials) to which ants are attracted
- Associated phenomenon in reproduction are parthenogenesis, oviparity and viviparity
- Occurrence of **alternation of generations**
- The sexes are unequally developed, **males often being rare**

Eg: *Myzus persicae* – Tobacco aphid

Aphis gossypii – Cotton aphid

Aphis craccivora – Groundnut aphid



Family: Pseudococcidae Mealy bugs

- Females are wingless, elongate oval with distinct segmentation
- Body covered with **powdery wax or filamentous waxy secretions**
- Legs well developed. **No instar is sessile**
- Eggs are placed in **a loose cottony waxy material**
- Eg: Brinjal mealy bug – *Planococcus insolitus*
Citrus mealy bug - *Planococcus citri*
- Sugarcane mealy bug - *Saccharicoccus sacchari*



Family: Coccidae Scale insects (Soft scales)

- Females are **flattened, elongate oval insects with obscure segmentation**
- hard or smooth exoskeleton or covered with **wax or tough scales**
- wingless, legs present or absent and the **antennae absent** or much reduced
- Males are active, **1st pair of wings well developed, 2nd pair reduced to halteres**
- Metamorphosis complex
- 1st instar nymph has legs & antennae and active known as **crawlers**
- after 1st moult, become **sessile a waxy or scale like covering is secreted**
- In males last instar preceeding adult is **queicent and called pupa**
- Females have **one less instar** than males
- Excrete **honey dew** like aphids

Eg: Pulvinaria psidi – Guava scale

Icerya purchasi - cottony cushion scale



Family: Aleurodidae White flies

- resemble tiny moths with opaque body
- wings covered by a **fine whitish dust or powdery wax** giving white colour
- wing venation is highly reduced
- **vasiform orifice** opens on basal surface of **last abdominal segment** in nymphs and adults
- opening is provided with an **operculum** and beneath it a tongue shaped organ **linguae**
- The anus opens within the orifice at the **base of linguae** and Honey dew is excreted
- Metamorphosis is complex
- 1st instar are active but subsequent immature stages are sessile and **look like scales**
- The scale like covering is a **waxy secretion** of the insect
- The **wings develop internally** during metamorphosis and the early instars are **larvae**
- The next to the last instar is **quiescent and is called pupa**
- The wings are given out at the moult of last larval instar
- The eggs are with a **pedicel**, which sometimes exceeds the length of the egg

Eg: Sugarcane whitefly – *Aleurolobus barodensis*

Cotton whitefly - *Bemisia tabaci*

Castor whitefly - *Trialeurodes ricini*

