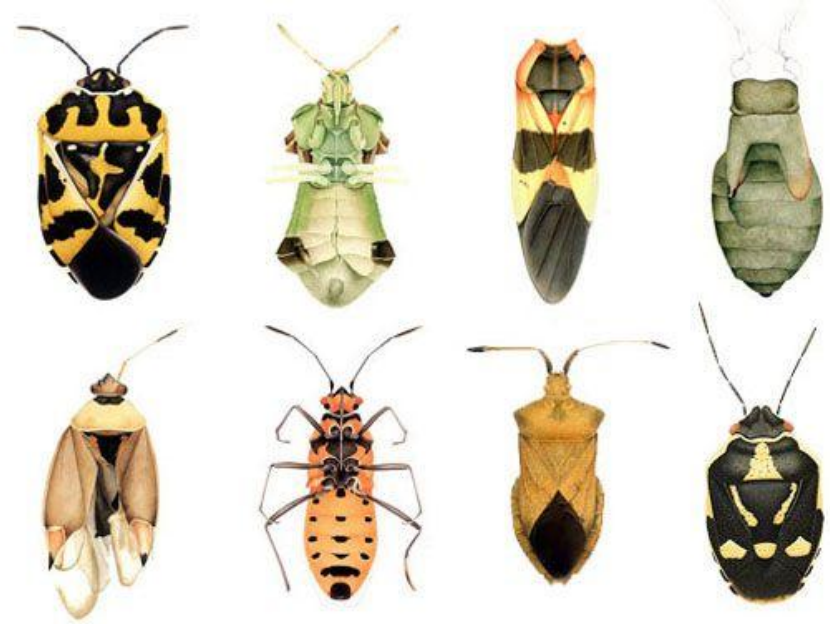


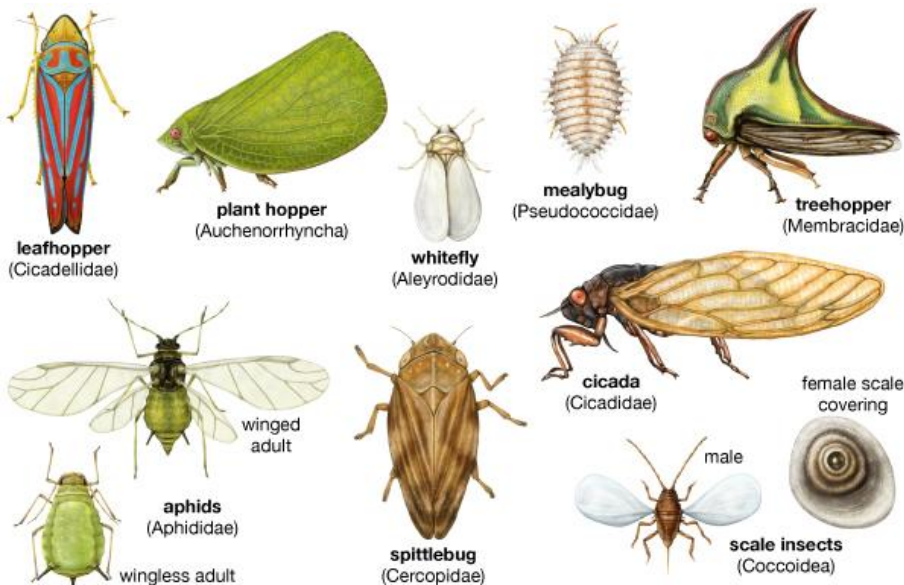
Suborder: Heteroptera

Hetero- variable Ptera-Wings;

includes true bugs



Order Hemiptera



Sub-order: Homoptera Homo: Alike; Pteron:

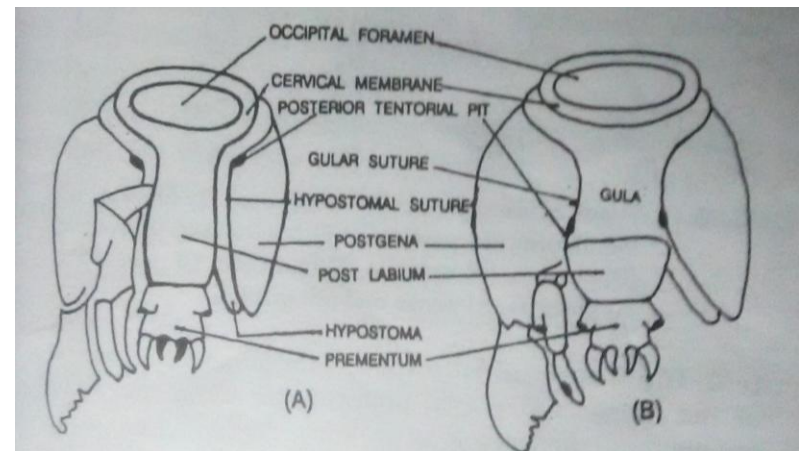
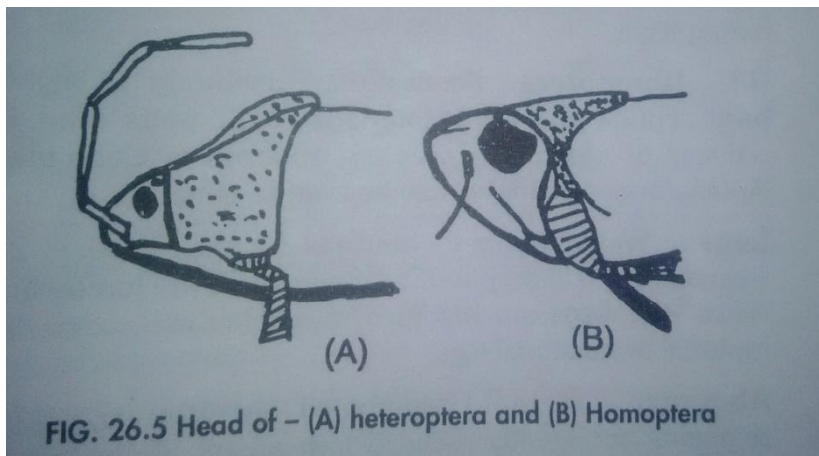
Wings (uniform wings)

Jassids, Aphids, mealy bugs, whiteflies,

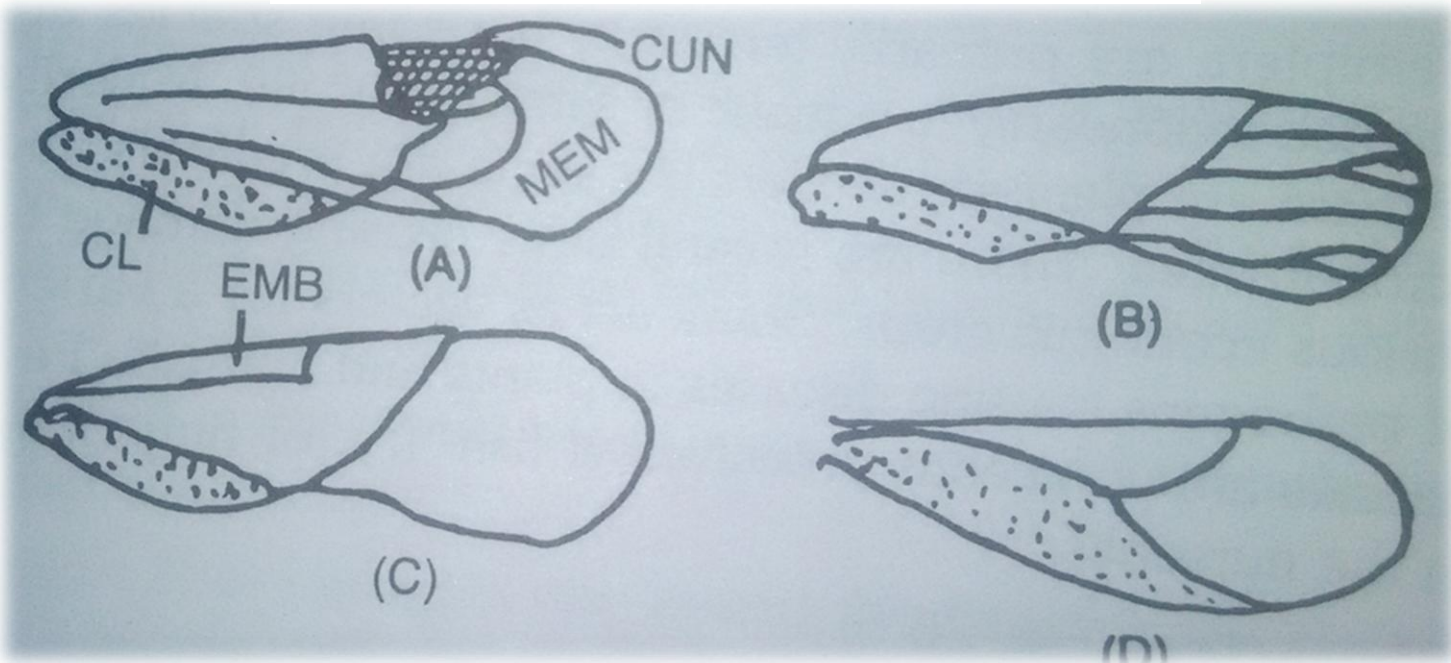
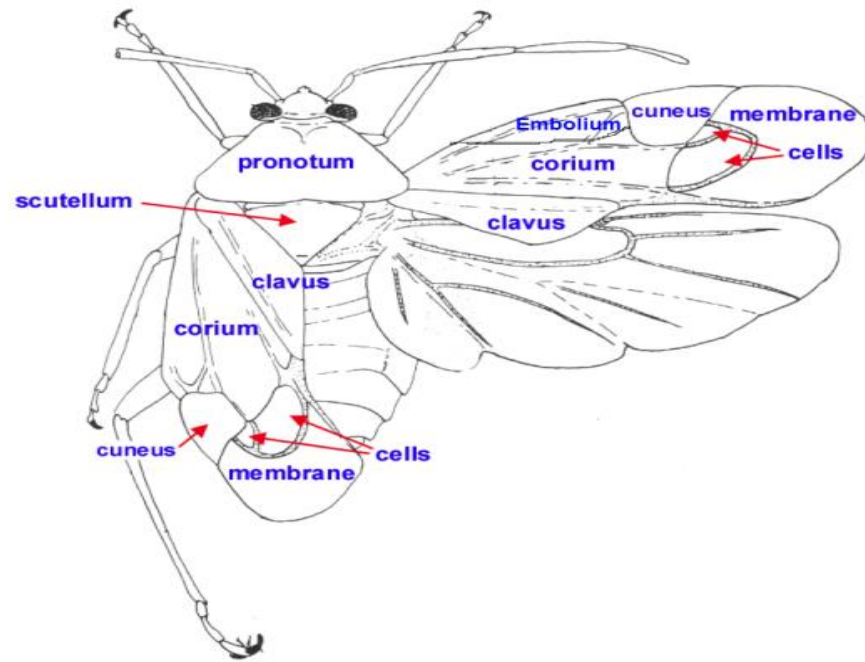
Planthoppers, Scales etc

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	extend upto hind 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 preceding 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*

