MEDICAL ENTOMOLOGY

Lecturer
M.Sc. Zainab Kh. Abbas

- Medical entomology is a science, which deals with the study of medical important arthropods.

- Members of the phylum arthropod are the most numerous and widely distributed of all animal groups.
- Their medical importance lies in their ability to cause morbidity and mortality, and their extensive distribution over the face of the earth.

- Many, particularly those within the class insecta and arachnida, live in close association with humans; others primarily parasites of animals, will readily attack or feed upon humans and some may specifically adapt as human parasites.

- Arthropods affect the health of man by :
- **(a) Direct agents for disease /discomfort.**
- The following effects may be seen by the direct effect of arthropods
- **Annoyance** – comes from disruptive activities of insects, such as flying around or landing on the head, and from feeding, possibly causing blood loss, though they don't remove sufficient blood to cause a medical problem in humans.
- **Entomophobia** – is an unreasonable fear of insects.
- **Envenomization** – is the introduction of a poison into the body of humans and animals

- **Allergic reactions** – a hypersensitive response to insect proteins

- human deaths from bee and wasp stings usually are associated with a hypersensitive reaction rather than direct effect of a toxin.

- · **Dermatosis and dermatitis** –
- dermatosis is a disease of the skin
- dermatitis is an inflammation of the skin. Both can be caused by arthropod activities.

- **(b) Agents for disease transmission**

Arthropods can carry disease causative agents in the following ways

1-Mechanical carrier

- Here they lodge the disease causative agent without altering its development or multiplication .
- e.g. house fly

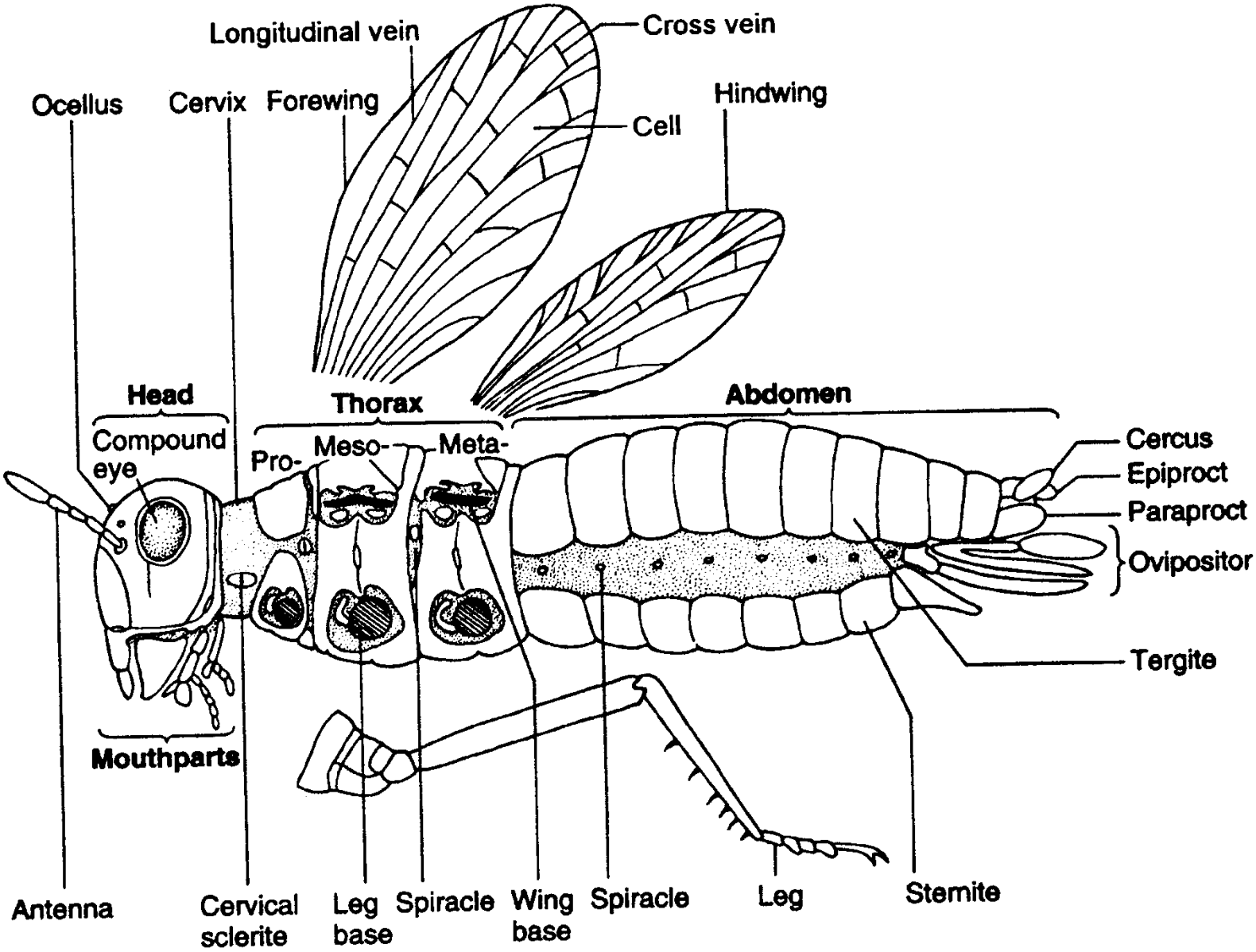
2-Biological carrier

- When arthropods become biological carriers for transmission of disease, it means that certain stages in the life cycle of parasite takes place in the body of the insect.

e.g. Anopheles mosquitoes.

CLASSIFICATION OF ARTHROPODS

- There are three medically important classes of Arthropods:
- 1. **Class Insecta**- consists of mosquitoes, fleas, bugs, lice and flies, etc.
- 2. **Class Arachnida**- consists of ticks, mites and scorpion.
- 3. **Class Crustacea**- consists of cyclops.


Longitudinal vein
Cross vein
Ocellus
Cervix
Forewing
Cell
Hindwing
Head
Thorax
Abdomen
Compound eye
Pro-
Meso-
Meta-
Cercus
Epiproct
Paraproct
Ovipositor
Tergite
Mouthparts
Antenna
Cervical sclerite
Leg base
Spiracle
Wing base
Spiracle
Leg
Sternite

A. FLY RELATED CONDITIONS

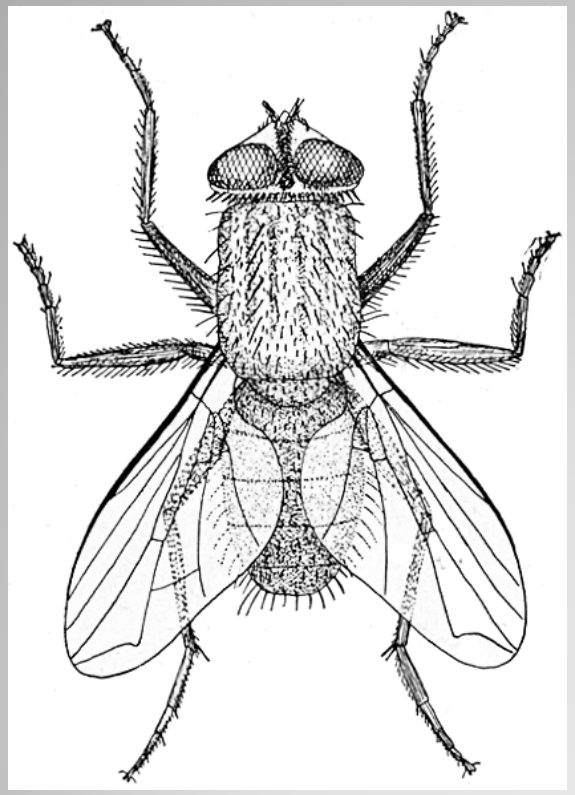
Myiasis :is invasion of tissue of humans and other vertebrate animals with dipterous fly larva, which for at least a period feed upon the living, necrotic or dead tissues of animals.

- houseflies can transmit a number of diseases to humans owing to their habits of visiting almost feces and other unhygienic matter and people's food.

Pathogens can be transmitted by three possible ways:

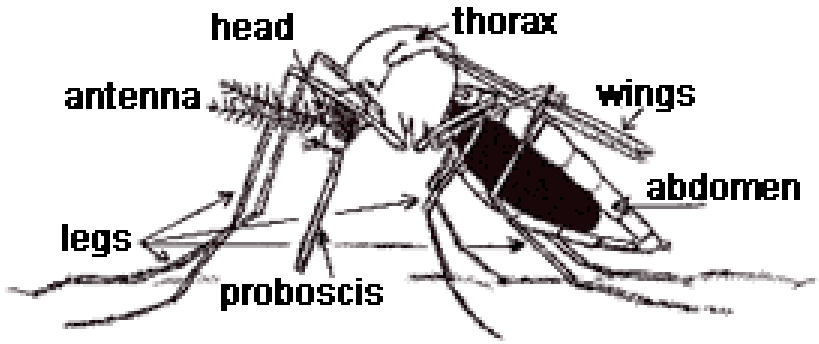
- By contaminated feet, body hairs and mouthparts of flies.
- Flies frequently vomit on food during feeding this can lead to infection.
- Probably the most important method of transmission is defecation, which often occurs on food.

Through the above mechanisms houseflies transmit a number of bacterial, viral, and protozoal diseases, e.g. sand flies transmit leishmaniasis, tsetse flies transmit trypanosomes.

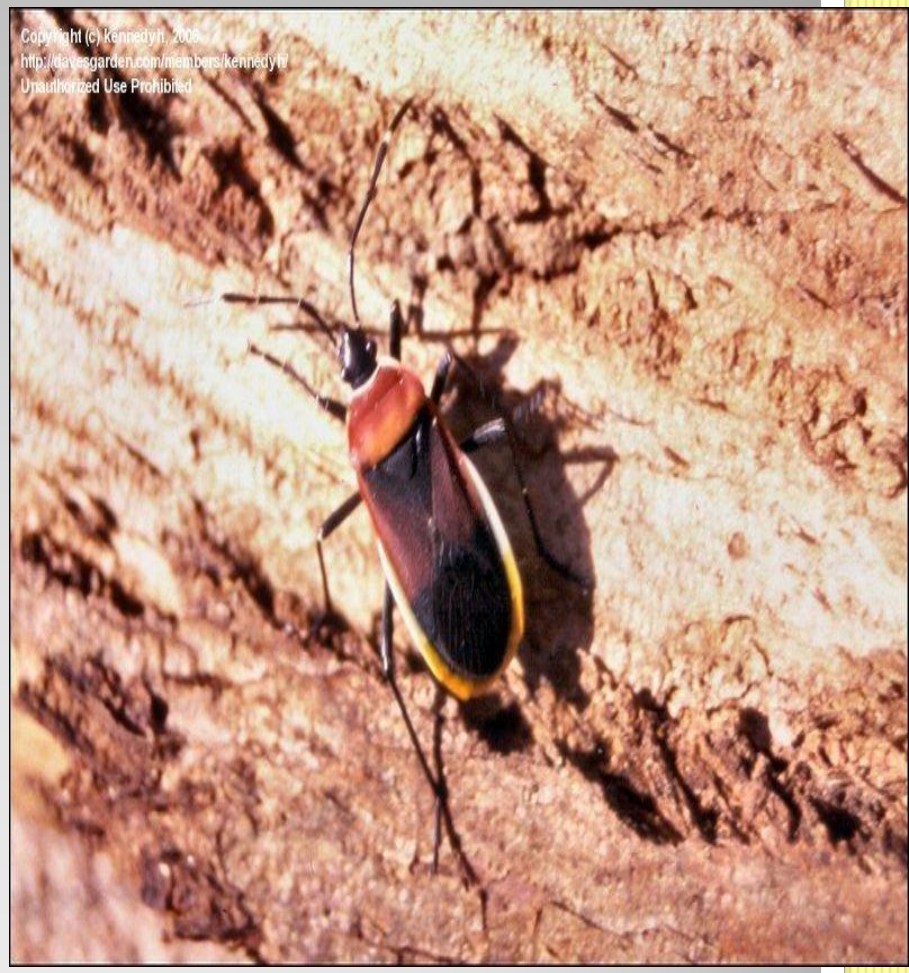


B. MOSQUITO RELATED CONDITIONS

Mosquitoes	Parasite
Anopheles mosquitoes	Plasmodium sp.
Culex mosquito	Wuchereria bancrofti
Aedes mosquito	Wuchereria bancrofti, yellow fever virus
Mansonia	Brugia malayi


head
thorax
antenna
wings
abdomen
legs
proboscis

- **BUG RELATED CONDITIONS**
- Other than being ectoparasites and a annoyance to humans, bugs like Triatoma (Kissing bug) are disease vector of Trypanasoma cruzi, which is seen in some countries of Latin America.



LICE RELATED CONDITIONS

Lice are usually ectoparasites, and they can live in different part of the body.

For example

- Pediculus human us capitis – head lice
- Pediculus human us corporis – body lice
- Phitrius pubis – pubic /crab lice

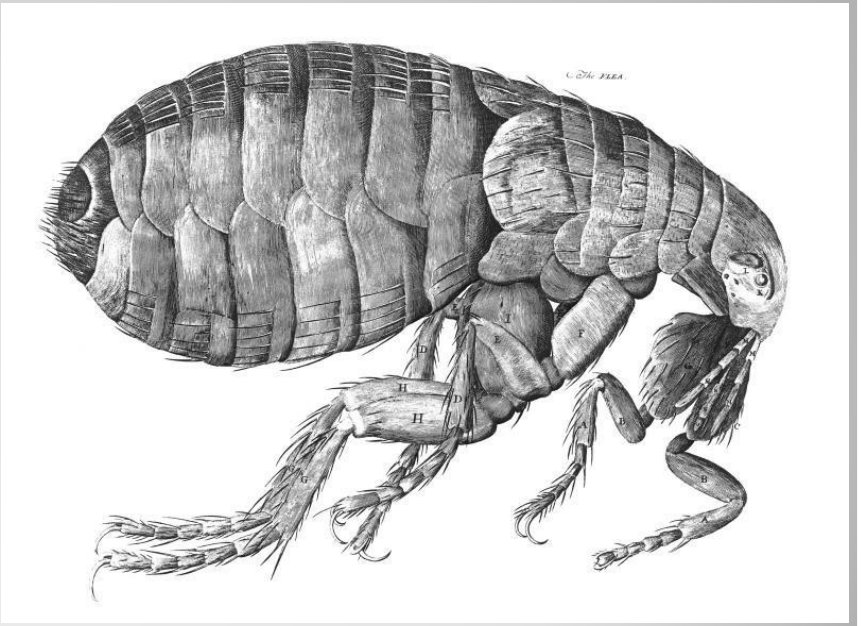
Lice are also responsible for transmission of diseases such as relapsing fever and epidemic typhus, most commonly in the highlands of Ethiopia

- Female lice are usually more common than the males, and some species are even known to be parthenogenetic.
- A louse's egg is commonly called a nit. Many lice attach their eggs to their host's hair with specialized saliva; the saliva/hair bond is very difficult to cut without specialized products.

Wingless insect

- The mouthparts are adapted for piercing and sucking the blood from host
- The body is compressed and flattened dorsoventrally
- The legs are short ,strong and adapted for hanging

- **FLEA RELATED CONDITIONS**
- Fleas can be ectoparasites,
- sometimes cause allergic dermatitis
- are intermediate hosts for certain bacteria like yersinia pestis and Rickettsia typhi.



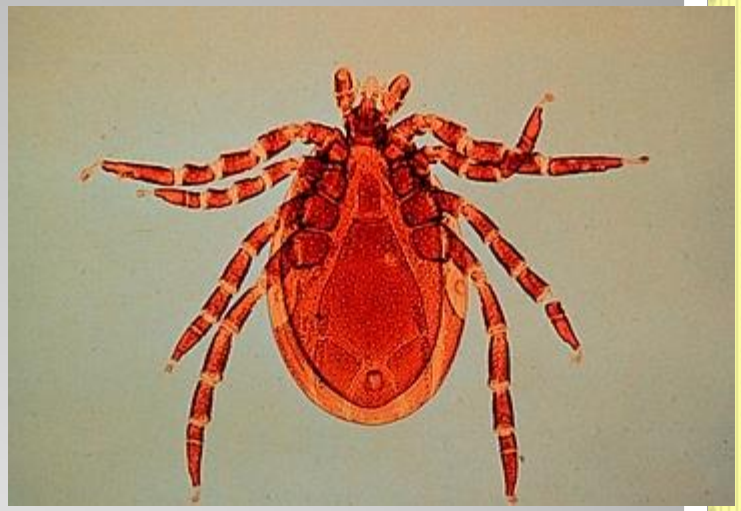
TICK RELATED CONDITIONS

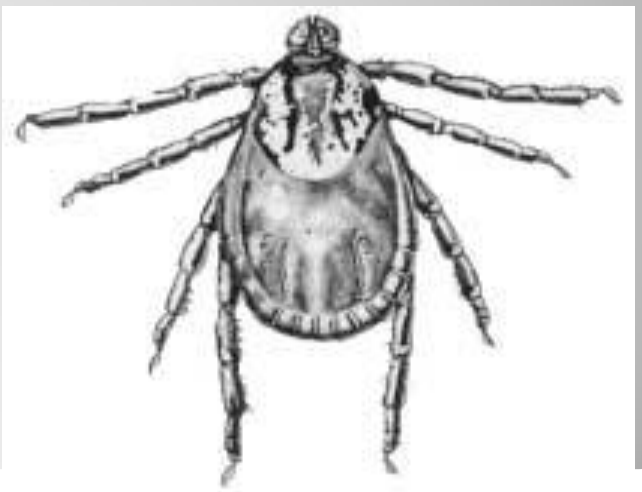
- Ticks can cause mechanical injury to the skin.

- They may sometimes produce toxins, which affect release of acetylcholine at the neuromuscular junctions.

This in turn produces a progressive ascending paralysis also called 'tick paralysis'.

- Ticks also transmit diseases like francella and Rickettsial illnesses.





MITE RELATED CONDITIONS

- A mite called Sarcoptes scabies causes itchy, popular eruptions in the skin
- usually termed as scabies.
- House dust mites either produce or concentrate potent allergens commonly
- Only millimeter in length
- Feed on blood , lymph, digested tissue or sebaceous secretion on or near the surface of the skin causing an intense pruritus