Department of biology

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((علم الحشرات I))

Stage (Two)

LEC-Five

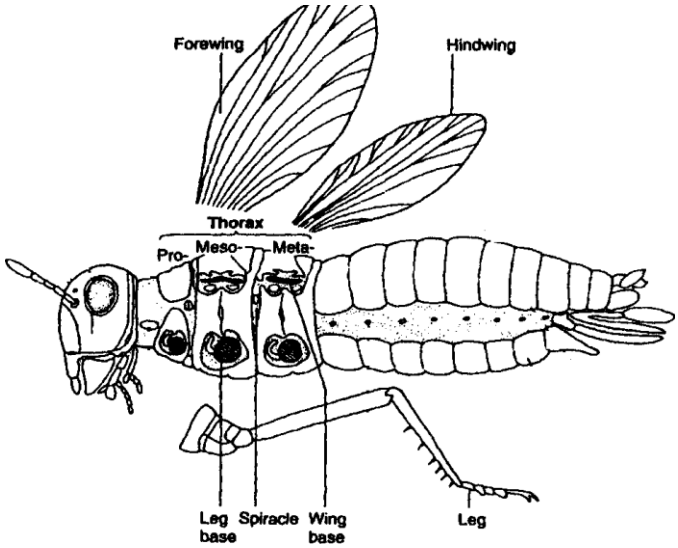
By

ا.د علي شعلان معيلف

THORAX

The insect thorax is divided into three parts: the prothorax (pro=first), mesothorax (meso=middle), and metathorax (meta=last). Each segment consists of hardened plates, or sclerites. Dorsal sclerites are called nota (sing. notum), lateral sclerites are called pleura (sing. pleuron), and ventral sclerites are called sterna (sing. sternum).

Each of the three thoracic segments contains one pair of legs.
Wings are found only on the meso- and metathoracic segments.



LEGS

The **fore-legs** are located on the prothorax, the **mid-legs** on the mesothorax, and **the hind legs** on the metathorax. Each leg has six major components, listed here from proximal to distal: **coxa** (p1. coxae), **trochanter**, **femur** (p1. femora),**tibia**(p1.tibiae),**tarsus** (p1. tarsi), **pretarsus**.

The femur and tibia may be modified with spines. The tarsus appears to be divided into one to five "pseudosegments" called **tarsomeres**.

Structure:
In almost all insects all the three thoracic segments *viz*., pro-, meso- and metathorax bear a pair of segmented legs. Each leg consists of five segments viz., coxa, trochanter, femur, tibia and tarsu

Coxa : (Pl. coxae) It is the first or proximal leg segment. It articulates with the cup like depression on the thoracic pleuron.

It is generally freely movable.

Trochanter: It is the second leg segment. It is usually small and single segmented. Trochanter seems to be two segmented in dragonfly, dameselfy and ichneumonid wasp.

The apparent second trochanter is in fact a part of femur, which is called trochantellus.

Femur: (Pl. femora) It is the largest and stoutest part of the leg and is closely attached to the trochanter.

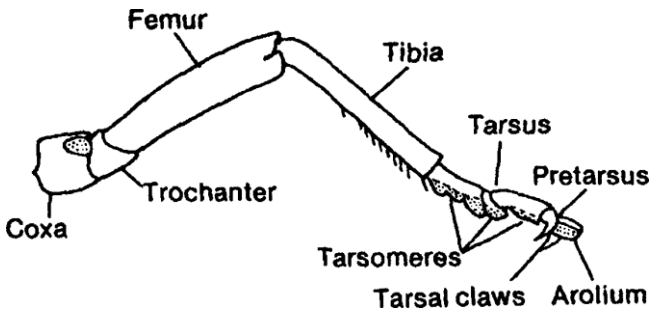
Tibia: (Pl. tibiae) It is usually long and provided with downward projecting spines which aid in climbing and footing. Tibia of many insects is armed with large movable spur near the apex.

Tarsus: (Pl. tarsi) It is further sub-divided. The sub segment of the tarsus is called tarsomere. The number of tarsomeres vary from one to five.

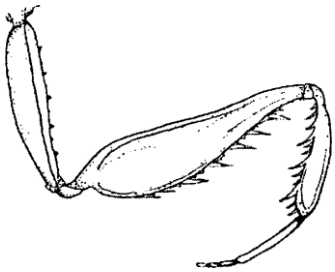
The basal tarsal segment is often larger than others and is named as basitarsus.

Pretarsus: Beyound the tarsus there are several structure collectively known as pretarsus. Tarsus terminates in a pair of strongly curved claws with one or two pads of cushions at their base between them. A median pad between the claws is usually known as arolium and a pair of pads, at their base are called pulvilli (Pulvillus-singular).

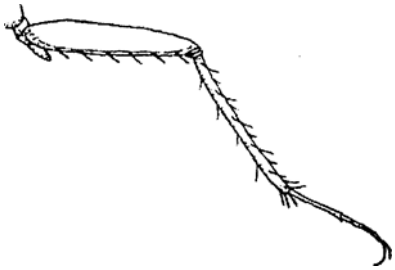
Leg pads are useful while walking on smooth surface and claws give needed grip while walking on rough surface. When one structure is used, the other is bent upwards.



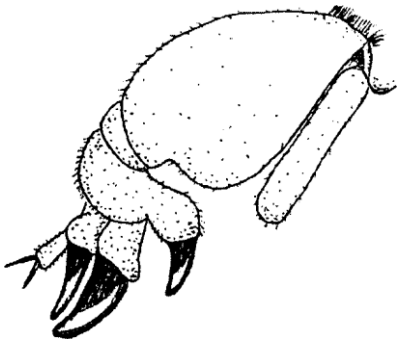
LEG TYPES AND FUNCTION



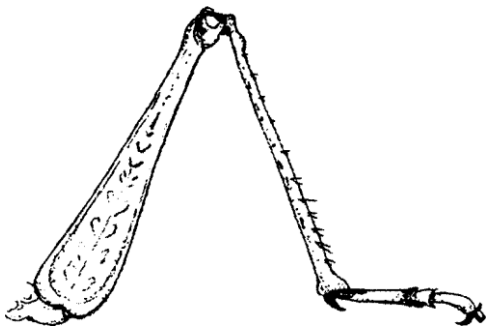
Cursorial: Used for walking/ running. Some textbooks distinguish the two by calling walking legs ambulatory or gressorial, but the leg structure is basically the same.



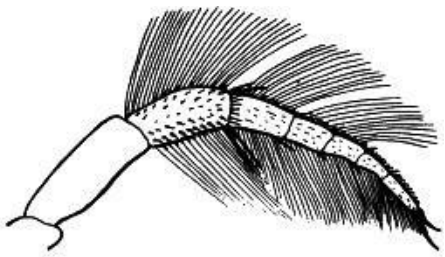
Raptorial: Fore legs modified for grasping. These are often associated with Preying Mantids.



Fossorial: Fore legs and tibiae specialized for digging; common in ground-dwelling insects.



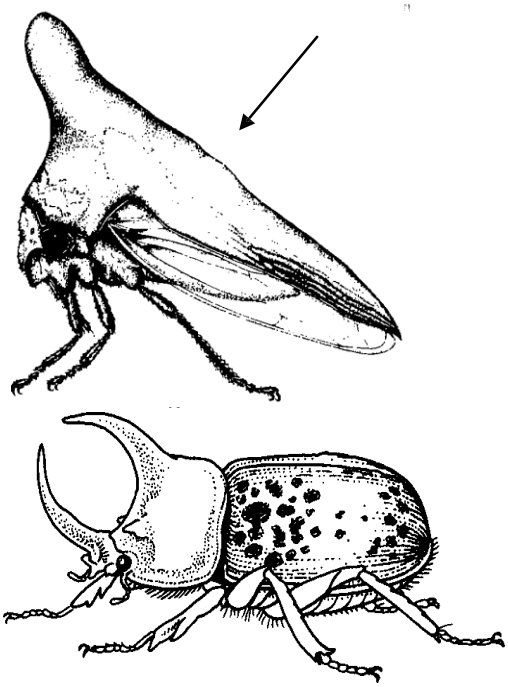
Saltatorial: Hind legs adapted for jumping; characterized by an elongated femur and tibia.

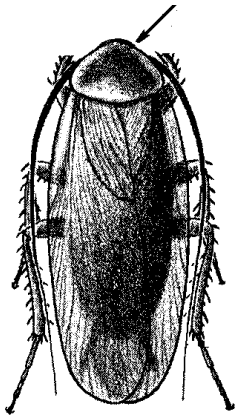


PRONOTUM

Natatorial: fore or hind legs adapted for swimming; charachterized by elongated setae on tarsi

Is the dorsal sclerite of the prothorax, which can be highly modified in various groups such as the Homoptera, Blattaria, and Coleoptera.





Types of legs

Insects are six legged arthropods and hence the class is also called Hexapoda. In insects legs perform varied functions and are modified accordingly.

1. **Digging or Fossorial type:** The forelegs are greatly expanded, tibia is digitate with three segmented tarsus beneath.

   The legs are used for digging soil.
   E.g. Mole cricket

2. **Jumping or Saltatorial type:** The hindlegs are modified for leaping or jumping. Femur is greatly enlarged, tibia is very long
   e.g. Grasshopper

3. **Walking or running type:** All three pairs of legs are equal in size and comparatively long. Trochanter is two segmented.

   E.g. Cockroach

4. **Grasping or Raptorial type:** The forelegs are modified for catching prey. The coxae are elongate and moveable, the femora are spiny and grooved along the lower side, the tibiae are also spiny and fit into the groove along the femur.

   The prey is held between the femur and tibia. Tarsus is five segmented. E.g. Preying mantids.

5. **Swimming or Natatorial type:** Usually the hind legs are modified for swimming. Hind coxae are flat and fixed to the body. Numerous long stiff hairs are present on the lateral aspects of the tibia and tarsus. E.g. diving beetles.

6. **Pollen carrying type:** The hind legs of honey bees are modified for carrying pollen. At the junction of tibia and basitarsus, a cavity guarded by hairs is present which is used for carrying pollen. This structure is also called carbiculum E.g. Worker honeybee.

7. **Antenna cleaner:** the forelegs of honey bees are modified for cleaning antenna. The first segment of tarsus has a notch, which can be closed by the flat tibial spur. The notch has an inner lining of fine hairs. The antenna is placed in the notch, closed by the spur and then drawn out to clean. E.g. Worker honeybees

8. **clinging type:** The legs are strong and adapted for maintaining a strong and firm hold on the host. Tarsi are single segmented and terminate in a single sickle shaped claw which works against a tibial process.E.g. Head louse and body louse.

9. **Climbing type:** The terminal segment of the leg, pretarsus, bears two claws and beneath the claws are two lobes ccalled pulvulii. Between the pulvulii is an elongate spine called empodium. The empodium and pulvulii help the insect to climb smooth surfaces.

   E.g. housefly.