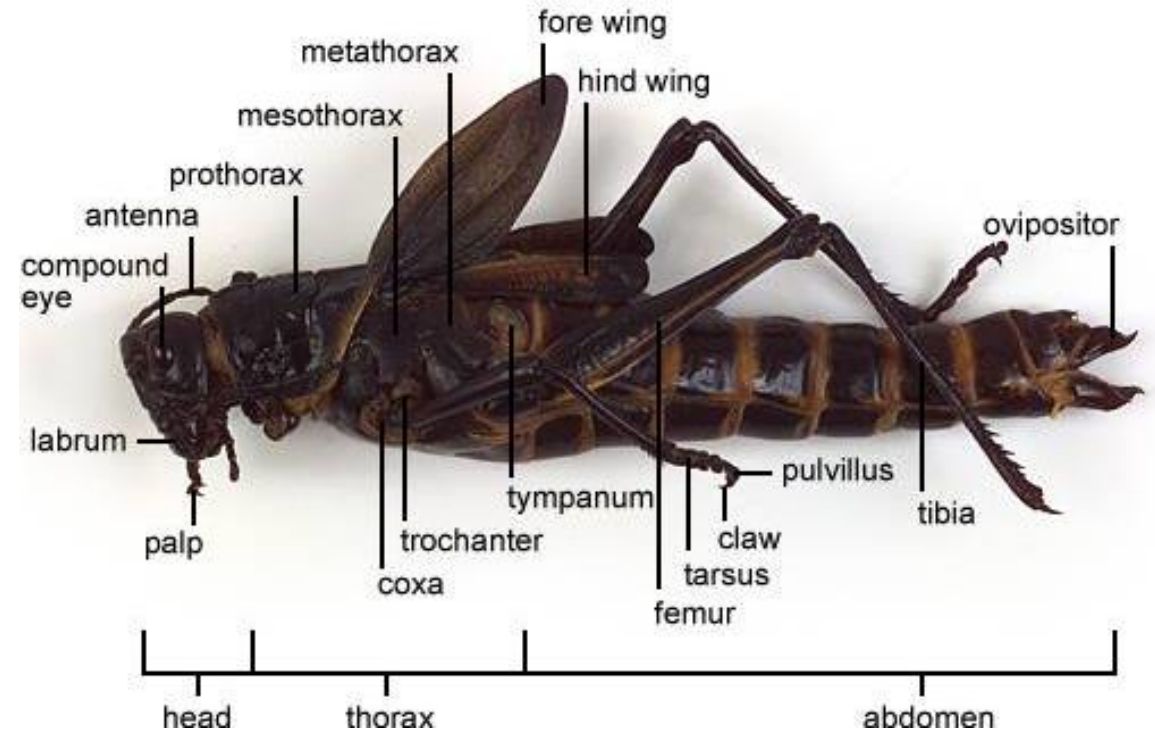


Body Appendages of Insects

Insect Appendages

An appendage is an outgrowth or an external body part, or natural prolongation, that protrudes from an organism's body.

Appendages of arthropods have been adapted for all types of locomotion i.e., walking, pushing, running, swimming, flying and burrowing.



Appendages on insect head

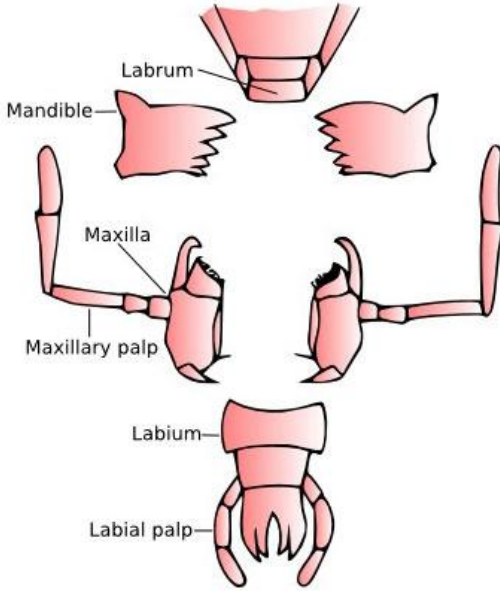
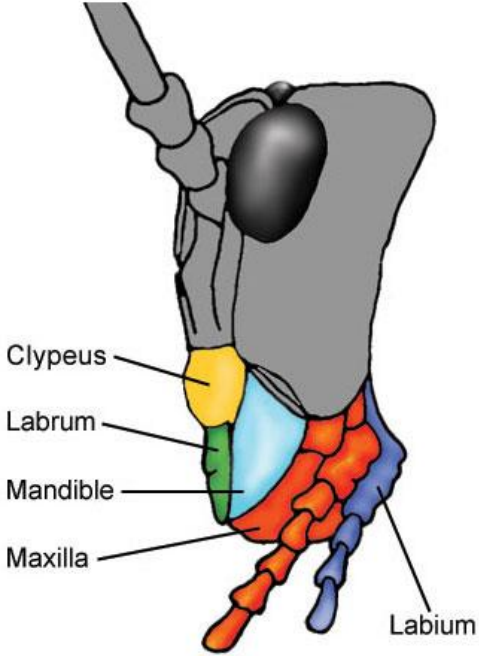
The head is formed by the fusion of six embryonic segments of which the 2nd and 4th to 6th carry appendages in the adult.

These appendages are the antennae, mandibles, maxillae and labium.



Mouth Parts:

Essentially, these organs comprise three pairs of appendicular jaws, the anterior mandibles followed in turn by the maxillae and a second pair of maxilla-like structures that fuse medially during embryonic development to form the labium or lower lip. Closely associated with them are two unpaired, non-appendicular structures, the labrum or upper lip and the median, tongue-like hypopharynx.



The Antennae

These are a pair of very mobile jointed appendages which are articulated with the head in front of or between the eyes.

They vary greatly in form in the higher orders, however and some segments are frequently differentiated from their fellows.

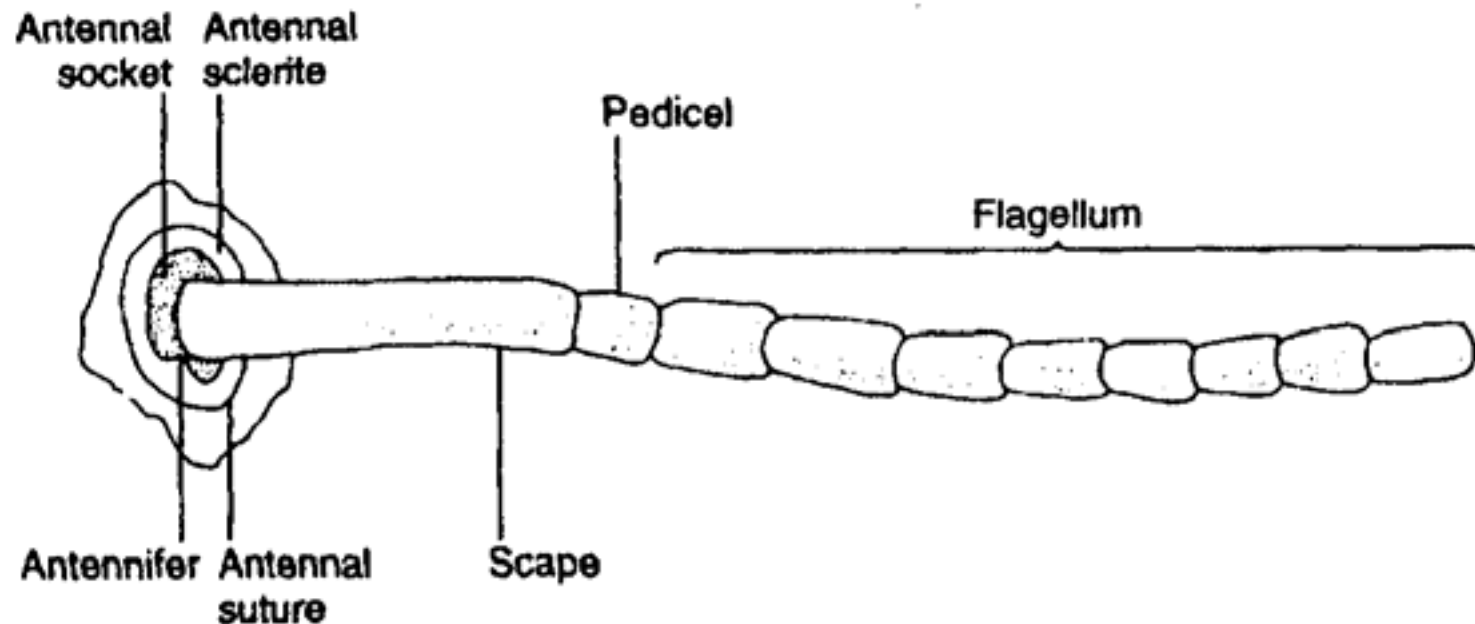
The antenna is divisible into scape, pedicel and flagellum



The scape is the first or basal segment of the antenna and is often conspicuously longer than any of the succeeding segments.

The pedicel is the segment which immediately follows the scape.

The flagellum forms the remainder of the antenna.

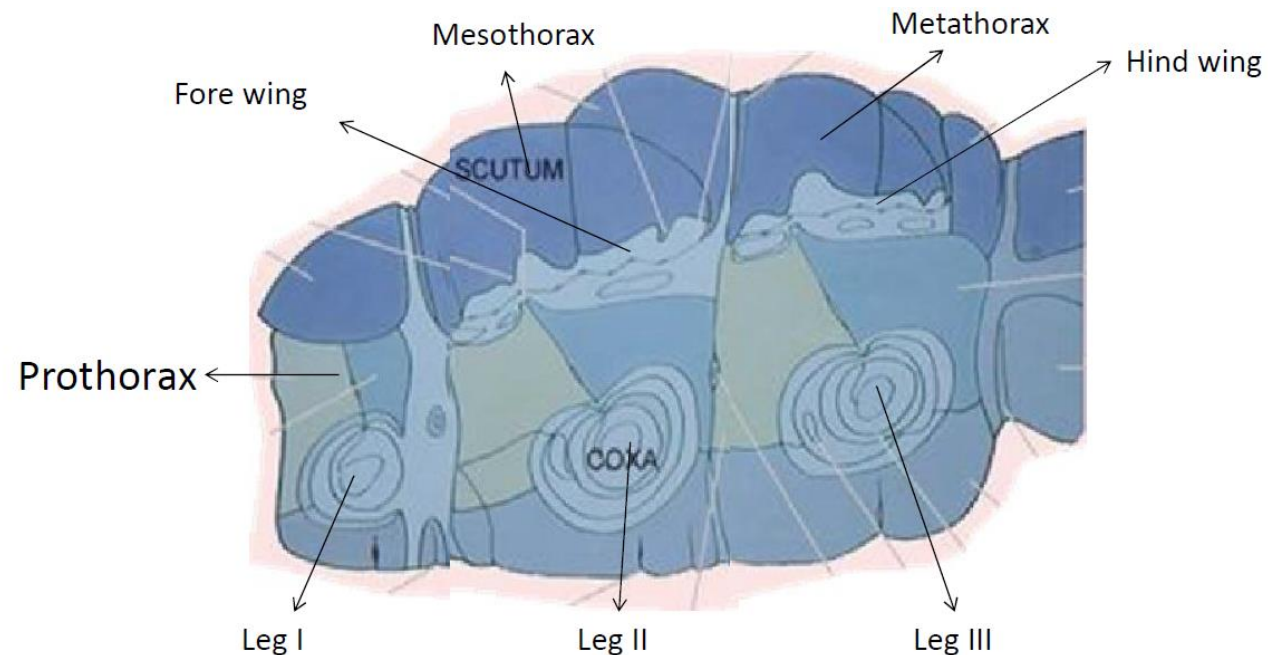


Appendages on Thorax

The thorax is composed of three segments, prothorax, mesothorax and metathorax.

In almost all insects each segment bears a pair of legs.

In most adults both the meso and metathorax carry a pair of wings.



Legs

Coxa: 1st basal segment, large, elongated, attached with body by coxal corium membrane.

Trochanter: Small, Triangular segment, fixed with femur.

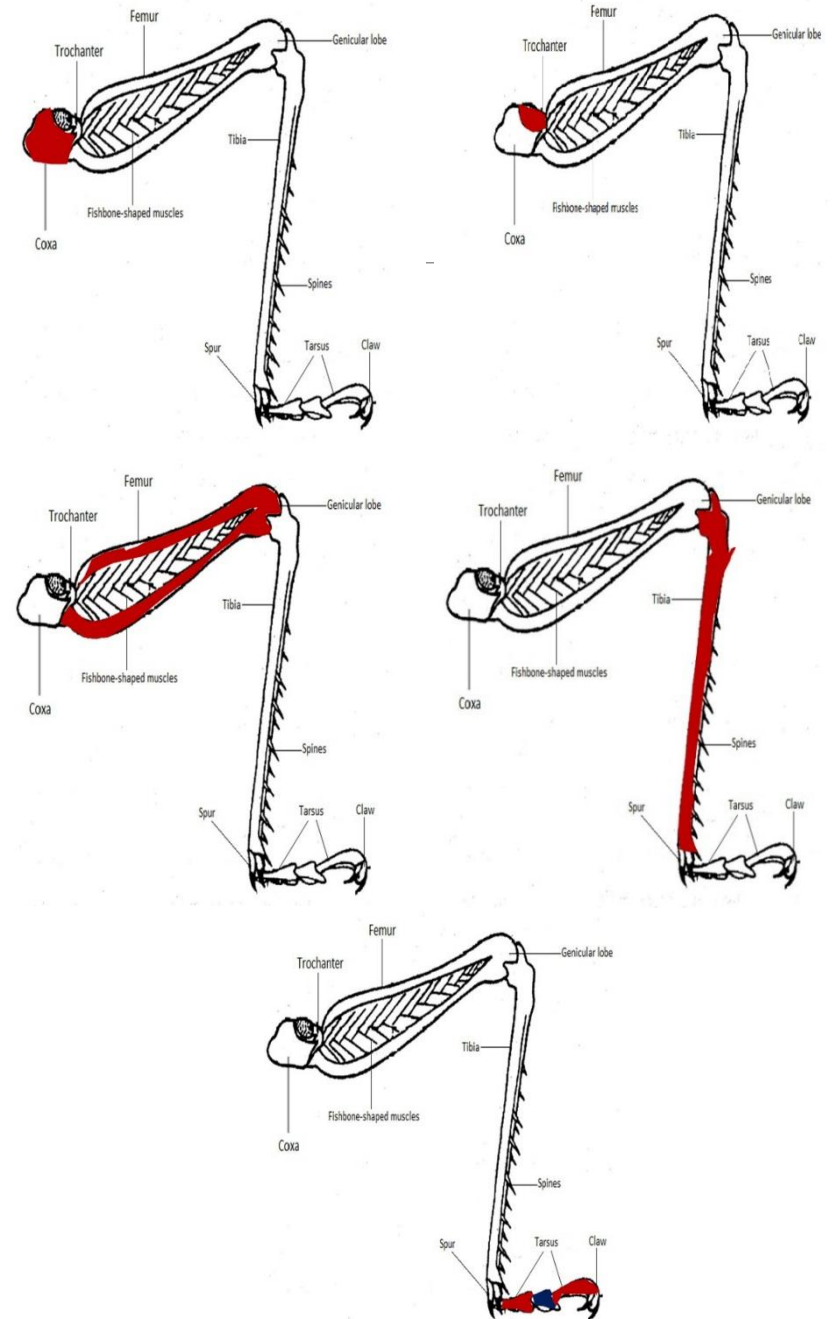
Femur: Long and thick segment femur fishbone provided muscles on it narrows towards apex

Tibia: Long, slender tibia spines over it strong spurs at apex.

Tarsus: 3 segmented

1st segment longer than 2nd and 3rd segment is largest.

Plantulae, Claws and Arolium are present

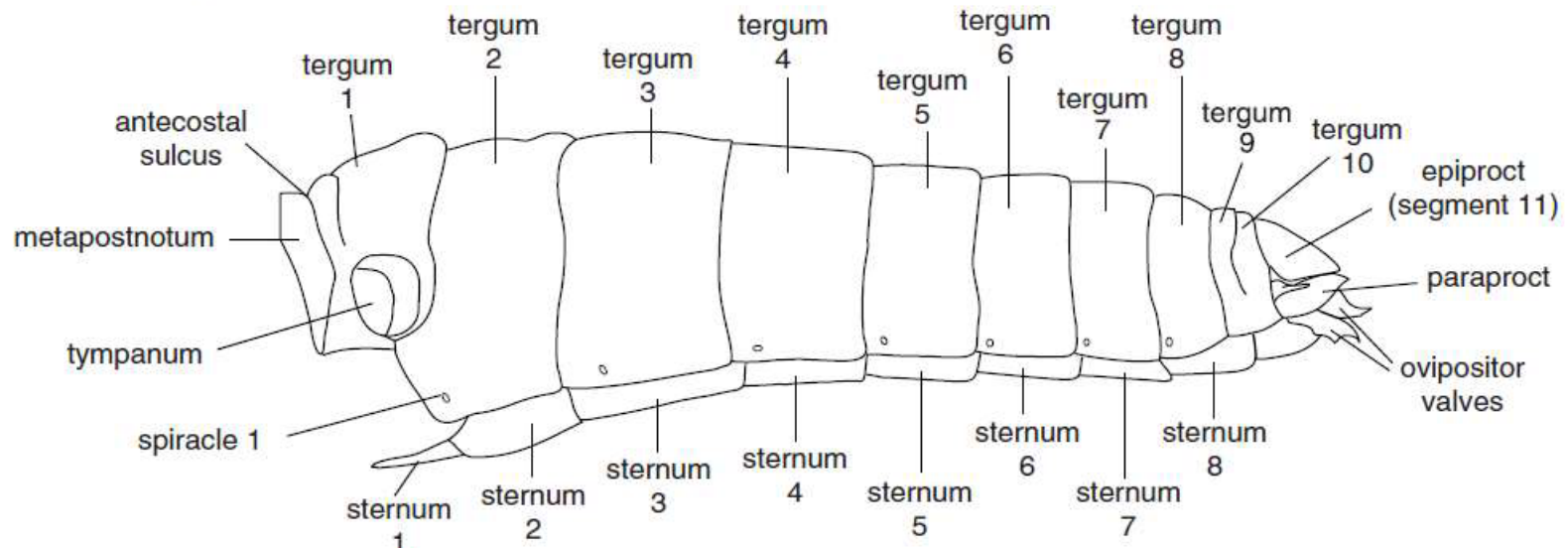


Abdominal appendages

The abdomen is composed of a series of segments which are more equally developed than in the other regions of the body.

For the most part they retain their simple annular form, the terga and sterna are generally undivided shields, while the pleura are membranous and usually without differentiated sclerites.

(a) grasshopper



Styli

:

(Stylus : Singular) Varying number of paired tube like outgrowths are found on the ventral side of the abdomen of silverfish.

- These are reduced abdominal legs which help in locomotion.



Collophore:

It is also known as ventral tube or glue peg:

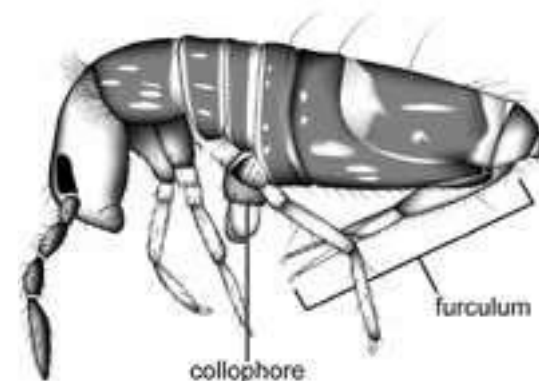
It is located on the ventral side of the first abdominal segment of spring tail.

It is cylindrical.

It is protruded out by the hydrostatic pressure of haemolymph.

It might serve as an organ of adhesion.

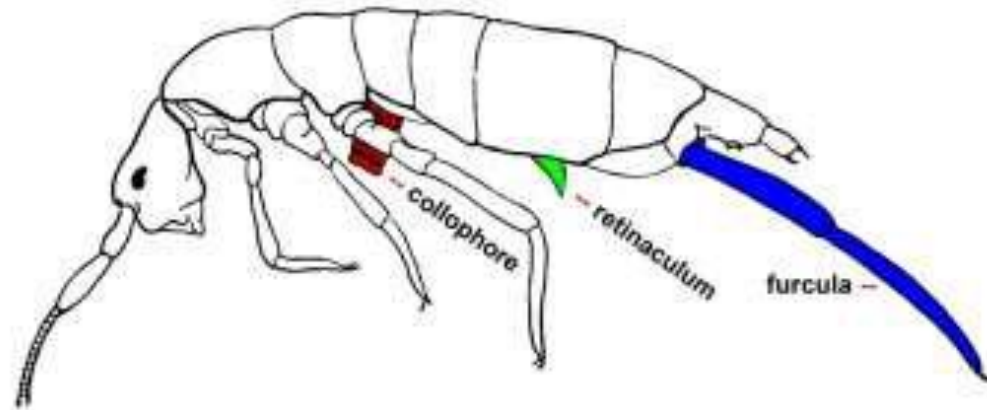
It aids in water absorption from the substratum and als



Retinaculum or tenaculum or catch:

It is present on the ventral side of the third abdominal segment.

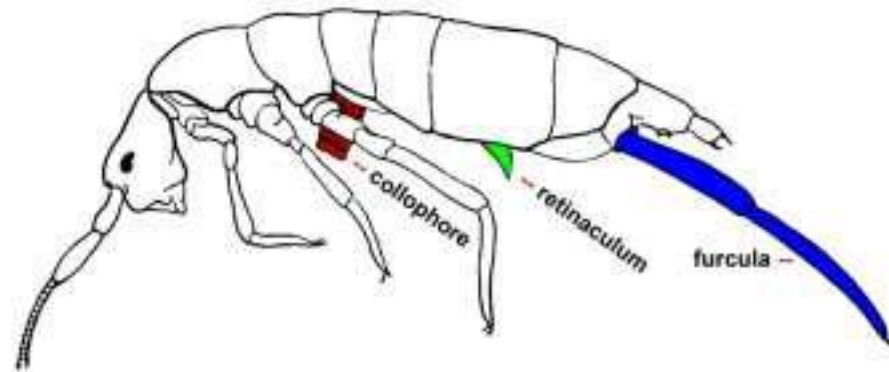
It is useful to hold the springing organ when not in use.



Furcula or Furca:

This is a 'Y' shaped organ. It is present on the venter of fourth abdominal segment.

When it is released from the catch, it exerts a force against the substratum and the insect is propelled in the air.



Abdominal appendages in immature insects:

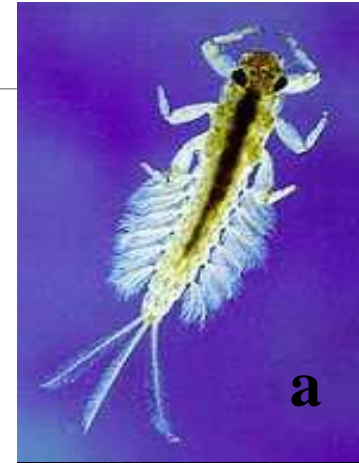
Tracheal gills:

Gills are lateral outgrowths of body wall which are richly supplied with tracheae to obtain oxygen from water in naiads.

Lateral gills: Seven pairs of filamentous gills are present in the **first seven abdominal segments** of naiads of may fly and are called as lateral gills.

Caudal gills: Three or two leaf like gills (lamellate) are found **at the end of abdomen** of naiad of damselfly and are called as caudal gills.

Rectal gills: In dragonfly the gills are retained **within the abdomen** in a pouch like rectum and are called as rectal gills.



Anal papillae:

A group of four papillae surrounds the anus in mosquito larvae.

These papillae are concerned with salt regulation.



Dolichasters:

These structures are found on the abdomen of antlion larvae.

Each dolichaster is a segmental protuberance fringed with setae.



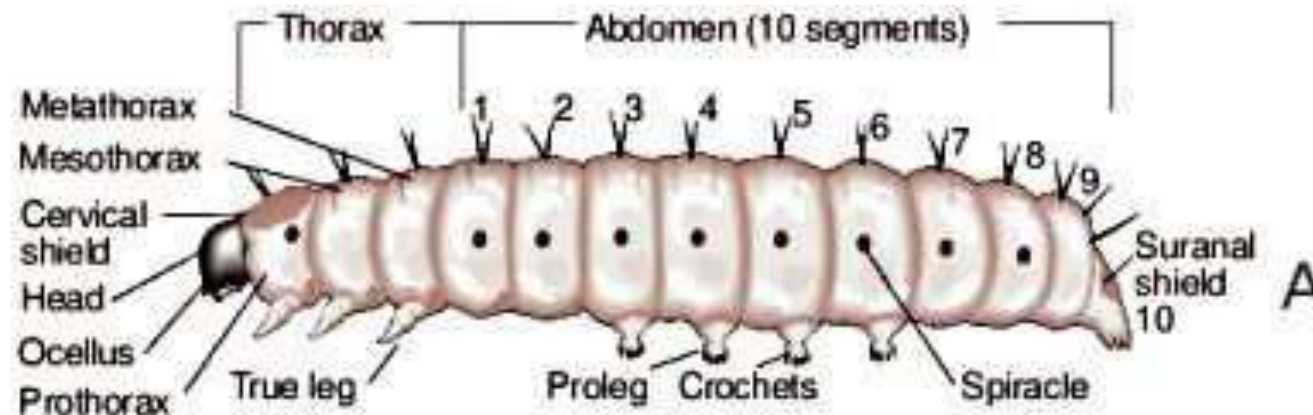
Prolegs:

These are present in the larvae of moth, butterfly and sawfly. Two to five pairs are normally present.

They are unsegmented, thick and fleshy.

The tip of the proleg is called planta upon which are borne heavily sclerotised hooks called crochets.

They aid in crawling and clinging to surface.



Abdominal appendages in winged adults:

Cornicles:

Aphids have a pair of short tubes known as cornicles or siphunculi projecting from dorsum of fifth or sixth abdominal segment.

They permit the escape of waxy fluid which perhaps serves for protection against predators.



Caudal breathing tube:

It consists of two grooved filaments closely applied to each other forming a hollow tube at the apex of abdomen. e.g. mosquito larvae.



Cerci : (Cercus - Singular)

They are the most conspicuous appendages associated normally with the eleventh abdominal segment. They are sensory in function. They exhibit wide diversity and form.

Long and many segmented :- e.g. Mayfly

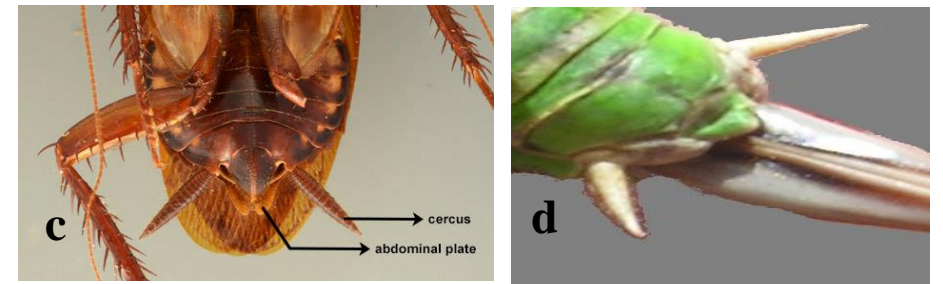
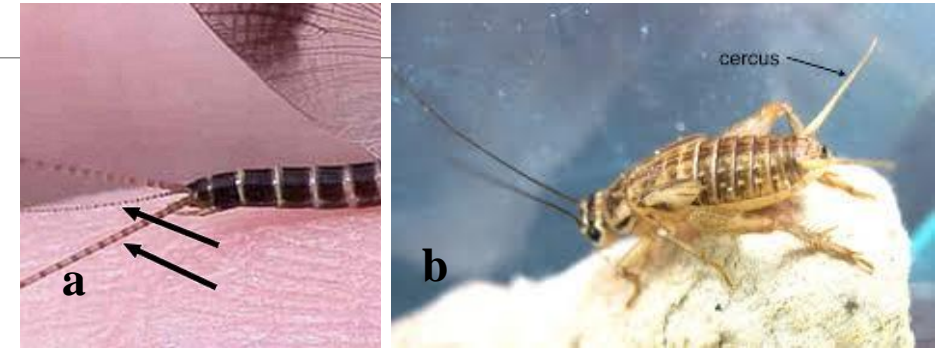
Long and unsegmented :- e.g. Cricket

Short and many segmented :- e.g. Cockroach

Short and unsegmented :- e.g. Grasshopper

Sclerotised and forceps like : e.g. Earwig. Cerci are useful in defense, prey capture, unfolding wings and courtship.

Asymmetrical cerci :- Male embiid. Left cercus is longer than right and functions as clasp organ during copulation.



Median caudal filament:

In mayfly (and also in a wingless insect silverfish) the epiproct is elongated into cercus like median caudal filament.



Mayfly



Silverfish

Pygostyles:

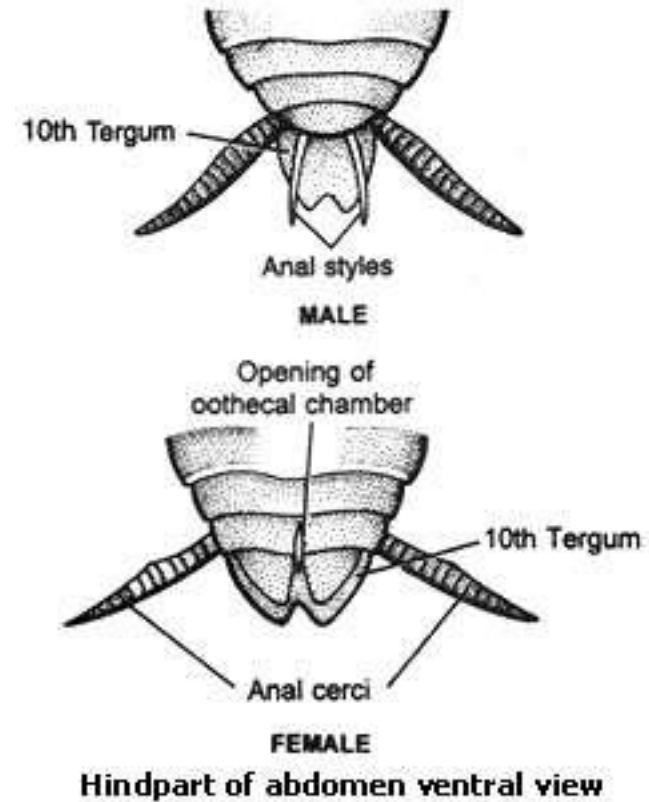
A pair of unsegmented cerci like structures are found on the last abdominal segment of scoliid wasp.



Anal styli:

A pair of short unsegmented structure found at the end of the abdomen of male cockroach.

They are used to hold the female during copulation



Ovipositor:

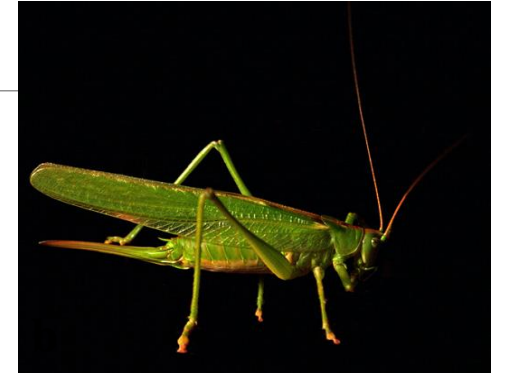
The egg laying organ found in female insect is called ovipositor. It is suited to lay eggs in precise microhabitats. It exhibits wide diversity and form.

Short and horny : e.g. Short horned grasshopper

Long and sword like : e.g. Katydid, long horned grasshopper

Needle like : e.g. Cricket

Ovipositor modified into sting : e.g. Worker honey bee.



Male genitalia:

External sexual organs of male insects are confined to ninth abdominal segment.

In dragonfly, the functional copulatory organ is present on the ventral side of second abdominal segment

