

EXTERNAL MORPHOLOGY OF AK GRASSHOPPER (*POEKILOCERUS PICTUS*)

The hard outer covering or body wall having muscles on its inner side is called exoskeleton. It bends or grows into the body cavity at different points to form rigid processes, the apodemes. They collectively make an endoskeleton. There are many outgrowths of the body wall (such as antennae, legs, wings, etc.) which are called appendages. The body wall consists of a number of hardened areas or plates, the sclerites. These are separated by the grooves called sulci (sing. sulcus). The grooves representing the line of fusion of two sclerites are still known as sutures (e.g. epicranial suture). The body consists of a series of joints or segments which are grouped into three regions, viz., head, thorax and abdomen.

HEAD

This is the first region of the body. If you press the head from top, it clearly becomes demarcated from the thorax. The hard outer covering of the head is the head capsule. This type of head having the mouthparts (see their types under INSECT APPENDAGES) on its lower side and projecting downward is called hypognathous. Compare this type of head with that of a beetle and a bug. In a beetle the head is of prognathous type in which the mouthparts are on the front side and project forward. In a bug it is of opisthognathous or opisthorhynchous type with the mouthparts on its lower side in the form of a proboscis projecting backward. The head is made up of 6 segments, fused together to form a box-like structure, the cranium.

First of all examine the front side of head (Fig. 14A). Its upper half is the frons. It has a median longitudinal furrow, the frontal furrow which bears a tiny median ocellus (simple eye) in it. Note an ocellus has a single lens. On upper one-third of the frons, there is a grooved high ridge, the frontal costa. The groove of the frontal costa merges below into that of the frontal furrow. On the sides of the frontal costa are depressions, the antennal sockets. From each socket arises a thread-like antenna (see its parts and types under INSECT APPENDAGES). On the margin of an antennal socket, just inner to the anterior end of a compound eye, lies a lateral ocellus (pl. ocelli). Below the frons is an other somewhat raised sclerite, the clypeus. It is separated from the frons by a transverse frontoclypeal or epistomal sulcus. The clypeus is partially divided by a trans sulcus (only clear from sides) into two parts. The anterior narrow part is the anteclypeus while the posterior broader part is the postclypeus. Below the clypeus is an other sclerite, the labrum. It is separated from the clypeus by a transverse clypeolabral sulcus. On each side of clypeus and labrum the grooved outer surface of the mandible is visible. See the mandible by lifting up the labrum with your dissecting needle. Also note the segmented maxillary and labial palpi (sing. palpus) on the sides of the mouth.

Now examine the head from the lateral side (Fig. 14B). On its upper part is a large compound eye which consists of innumerable hexagonal areas, the facets. Each facet is a transparent biconvex lens through which the light passes for making an image. The large sclerite forming the whole side below and behind the compound eye is the gena (pl. genae). It is separated from

the frons by a longitudinal frontogenal or subocular sulcus. It descends from the posterior margin of the antennal socket just anterior to the compound eye. Below the gena is a small sclerite, the subgena. It is separated from the gena by a subgenal sulcus.

Now examine the head from the dorsal side (Fig. 14C). The entire upper surface of the head capsule from the frons to the thorax is the epicranium. It is divided into two epicranial plates by a median longitudinal ecdysial cleavage line or epicranial suture. The anterior constricted part of the epicranium between the frons and an imaginary line between the compound eyes is the vertex. The anterior part of the vertex is the fastigium which is divided by a fastigial furrow. It is continuous anteriorly with the furrow of the frontal costa.

Finally remove the head carefully so that the head or thorax is not damaged. On the end of the epicranium is a narrow semicircular sclerite which also extends on sides. The upper part of this sclerite just behind the epicranium is the occiput (Fig. 14B). The sides of this sclerite behind the genae (cheeks) are called postgenae. The occiput is separated from the epicranium by a semicircular occipital sulcus. It also separates the gena and postgena. On the back side of the head is a large opening, the foramen magnum or occipital foramen. Also note the cervical membrane (neck) which connects the head with prothorax.

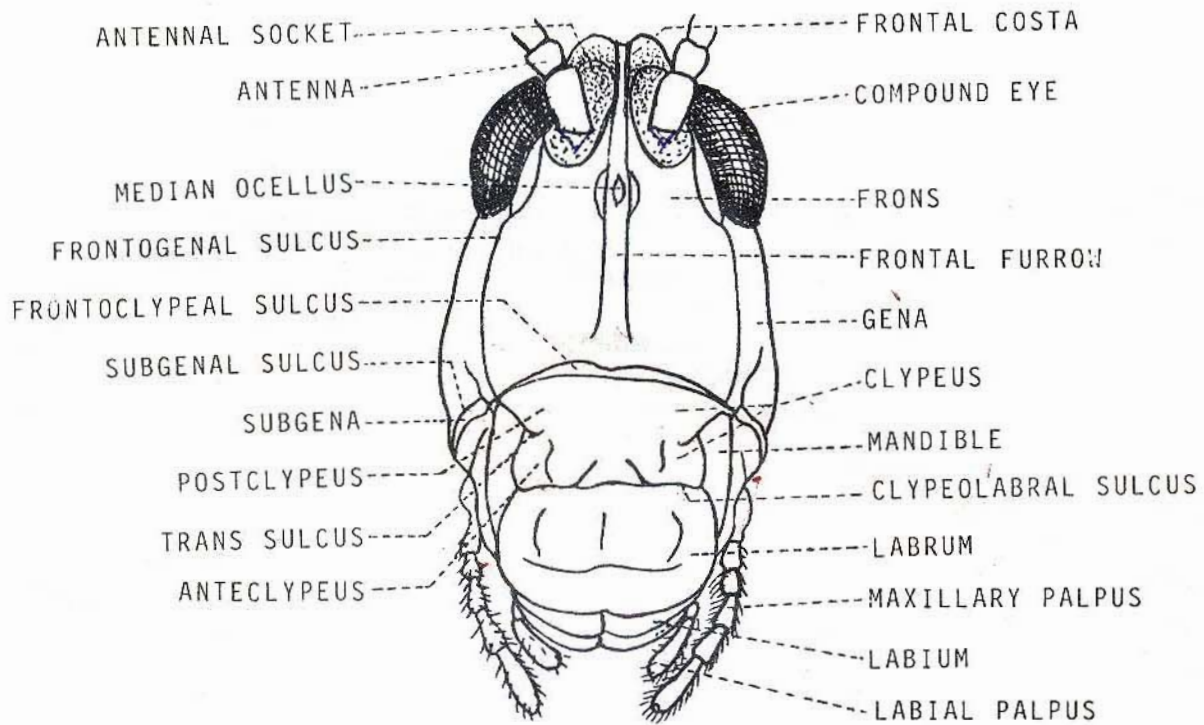
THORAX

This is the second division of the body. If you see it from below, it is very broad and thus clearly distinguished from the abdomen. The thorax consists of three segments: prothorax, mesothorax and metathorax. Each of these segments bears a pair of legs on the lower side. The mesothorax and metathorax each is provided with a pair of wings on the upper side. The mesothorax and metathorax are more or less fused together to form a single structure, the pterothorax (the part of the thorax bearing wings). Each thoracic segment has four sides: the upper or dorsal side is the notum or tergum (pl. nota or terga), the lower or ventral side is the sternum (pl. sterna) and each lateral side is the pleuron (pl. pleura). Generally the prefixes pro, meso and meta are used for indicating a sclerite or a leg on the prothorax, mesothorax and metathorax respectively.

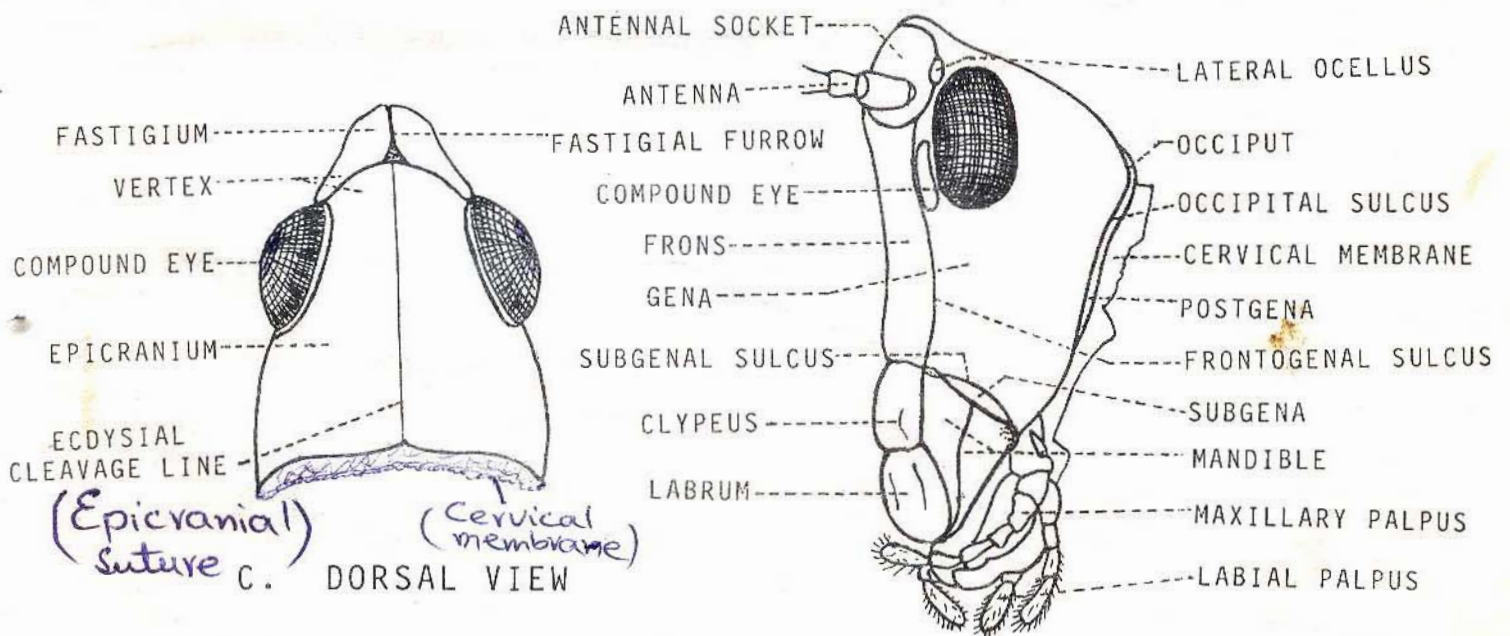
A. Prothorax: Press the prothorax and see that it is not firmly united with the rest of the thorax. Remove it along with the first pair of legs, the prolegs, and study the following:

1. Pronotum (Fig. 15A): It is a large saddle-like structure which is present between the head and bases of fore wings. It covers the upper and lateral sides of the prothorax. The parts covering the sides are called lateral lobes. It is produced posteriorly to form a hood-like structure, the notalia which overlaps the sides slightly and the upper side of the mesothorax entirely. The pronotum has three transverse pronotal furrows and a very fine rather an ill-defined longitudinal ridge, the median carina. The last furrow is more prominent and bent forward from its mid-dorsal line to form the tergal notch.

2. Propleuron (Fig. 15B): The only visible part is an anterior small triangular sclerite in front of the leg base and just below the anterior part of the lower margin of the lateral lobe. It is called proepisternum. Remove the overlapping lateral lobes of pronotum with the help of a blade and note a smaller posterior sclerite of proepimeron slightly above the leg base and just posterior to the



A. FRONTAL VIEW



B. LATERAL VIEW

FIG. 14. HEAD OF AK GRASSHOPPER