

2. **Mesopleuron** (Fig. 16B): It consists of two large sclerites between the bases of mesoleg and fore wing. The anterior sclerite is called the mesoepisternum while the posterior is the mesoepimeron. They are separated by the mesopleural sulcus which is located at the level of middle of coxa. The mesopleuron is separated anteriorly from the propleuron by a very clear interpleural sulcus which contains a spiracle on its lower end. The mesopleuron is also separated posteriorly from the metapleuron by a well-defined interpleural sulcus which also contains a spiracle on its lower end.

3. **Mesosternum** (Fig. 16C): At its anterior end is a narrow transverse sclerite, the presternum. It is followed by the large basisternum. These two sclerites are separated by the presternal sulcus. The basisternum is limited posteriorly by a rather broader groove, the mesofurcal sulcus which has three pits in it. The lateral ones are oblique, elongated and called apophyseal pits. The middle one is the spinal pit and represents the rudimentary spinasternum. The basisternum is extended back from the sides to form large mesosternal lobes which represent the sternellum. These lobes are widely separated by the mesosternal interspace. This space accommodates the anterior median prolongation of the metasternum.

(b) **Metathorax**: Study the main sclerites and sulci of the following sides.

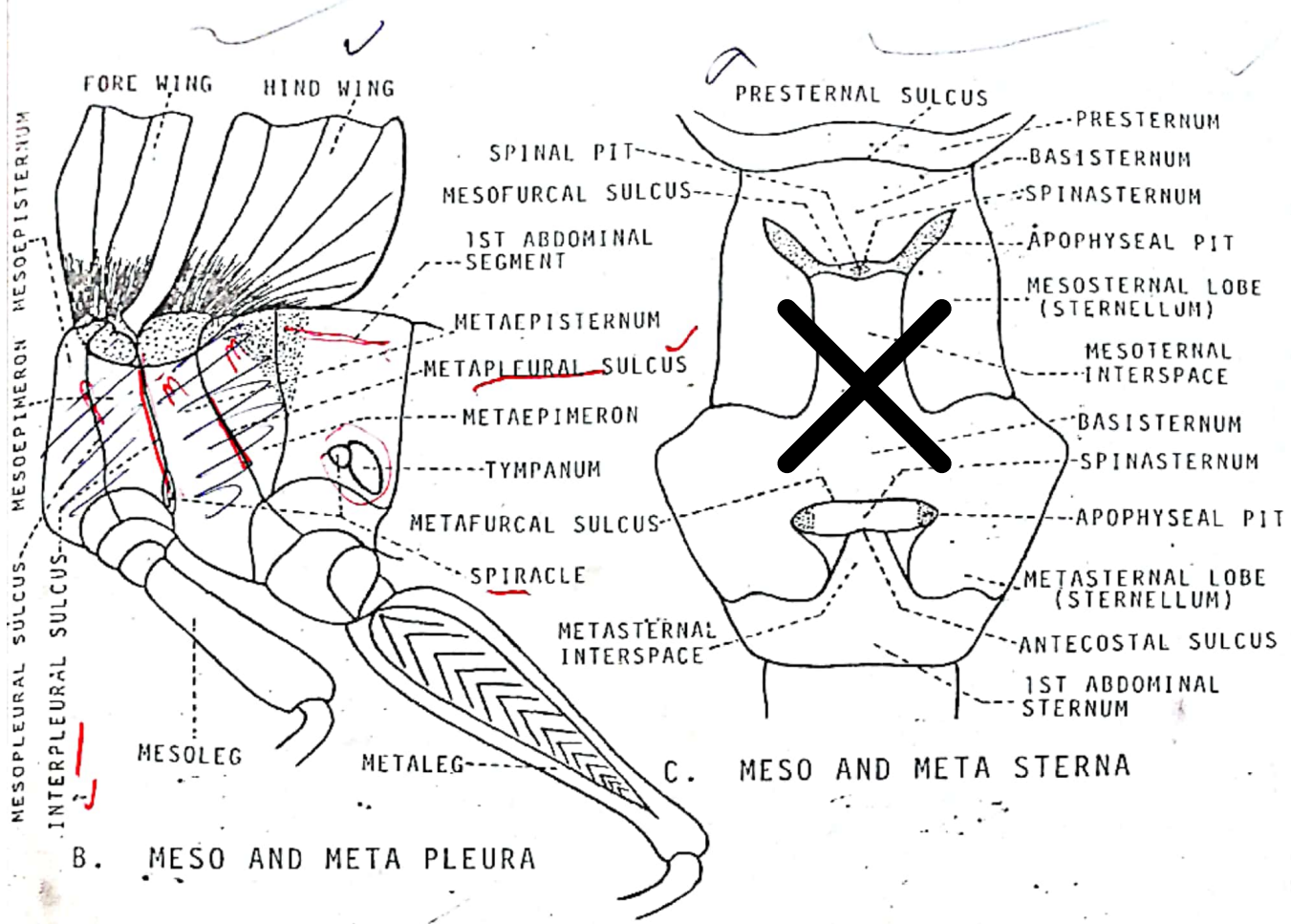
1. **Metanotum** (Fig. 16A): It has the same sclerites and sulci as mesonotum plus an additional sclerite, the postnotum at the end. The acrotergite is much narrower than that of the mesonotum and almost entirely overlapped by the transverse membranous fold of the mesonotum. The two triangular areas of the prescutum are also much smaller than those of the mesonotum. Two large triangular areas on the sides of the scutellum are also considered as parts of the scutum. Behind the membranous fold is a broad transverse intersegmental sclerite, the postnotum (postscutellum).

2. **Metapleuron** (Fig. 16B): It is similar in structure to the mesopleuron. It has two large sclerites, the anterior one is the metaepisternum while the posterior one is the metaepimeron. These are separated by the metapleural sulcus lying at the level of middle of coxa.

3. **Metasternum** (Fig. 16C): It is broader than mesosternum. It largely consists of basisternum whose anterior broad prolongation is fitted into the mesosternal interspace. The basisternum is followed by a small rectangular sclerite, the spinasternum from which the spiracle and its corresponding internal process have disappeared. The basisternum and spinasternum are separated by the metafurcal sulcus which has two widely separated apophyseal pits on its lateral ends. The spinasternum is separated from the first abdominal sternum by the antecostal sulcus. The basisternum is extended back from the sides to form smaller metasternal lobes which together form the sternellum. These lobes are separated by a large gap which is called metasternal interspace. This space accommodates the anterior median prolongation of the first abdominal sternum.

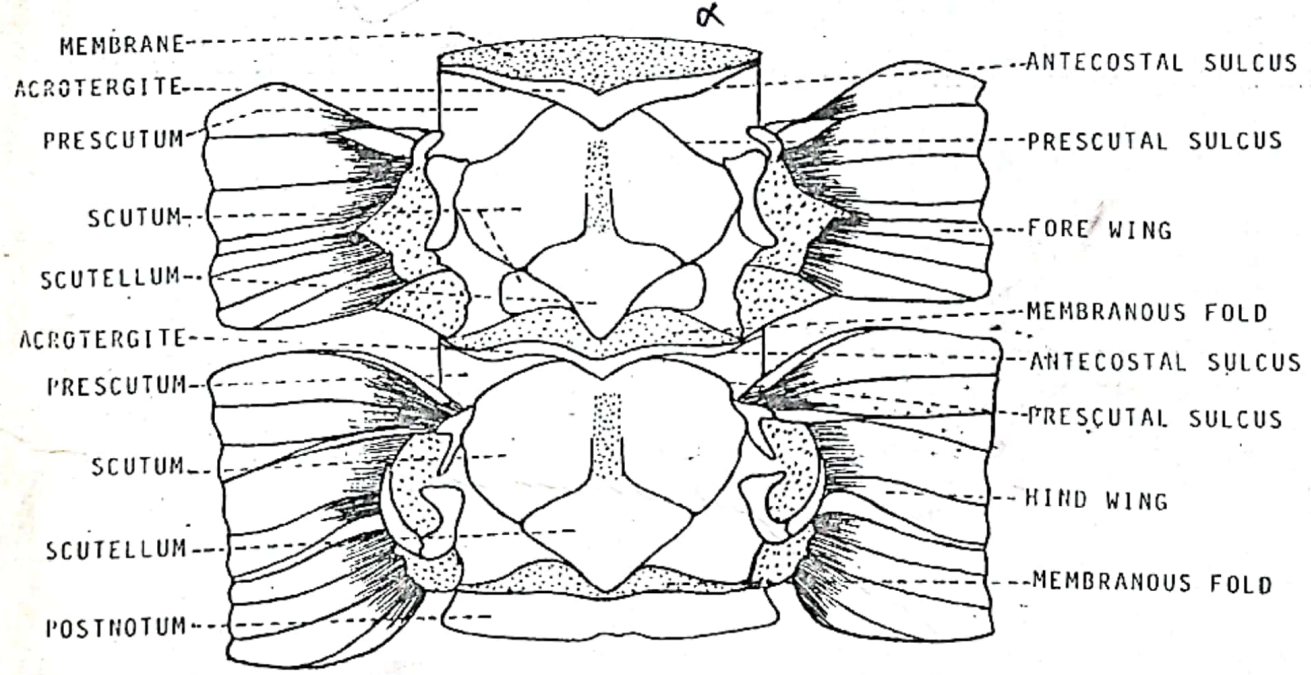
ABDOMEN

This is the third and last division of the insect body. It is long, narrow and consists of eleven segments (Fig. 17A). Some of its posterior segments are so modified for mating and oviposition that they do not look like segments. Each segment is divided into two parts: the large dorsal part which also covers the sides is the tergum and the smaller ventral part is the sternum. These



B. MESO AND META PLEURA

C. MESO AND META STERNA



A. MESO AND META NOTA

FIG. 16. PTEROTHORAX OF AK GRASSHOPPER

two are separated by a longitudinal sulcus which represents the greatly reduced lateral area (pleuron). The first abdominal segment is the largest one. It looks like a part of the thorax than of the abdomen and is intimately fused with the thorax. Its sternum (Fig. 16C) is very broad with its anterior median prolongation fitted into the metasternal interspace. On its each side just above the hind coxa is a white membrane, stretched across an oval cavity, which is called tympanum or outer membrane of the ear. Note a nearly circular spiracle in front of the tympanum. Segments two to eight are similar, each having a tiny spiracle at the lower anterior angle of its tergum on each side. The 9th and 10th terga, especially the former in the male (Fig. 17B), are narrow in both sexes. They are partially fused because the sulcus between them is obsolete on the lower side. The 11th tergum is represented by a triangular plate above the anal opening which is called epiproct or supra-anal plate. On the sides and slightly concealed under the epiproct are two lateral plates, the paraprocts or podical plates. They represent the 11th sternum. On each paraproct is a conical process, the cercus (pl. cerci). It comes out from a membrane on the posterior margin of the 10th tergum. It is very small in the female as compared with that of the male. The last visible sternum is 8th in the female and 9th in the male (Fig. 17A,B). In both the sexes it is called a subgenital plate which will be discussed below as a part of the external genitalia.

External genitalia:

1. Female: The subgenital plate is very large and produced backwards beyond the limits of its corresponding tergum (Fig. 17A). Its posterior margin bears a median process called egg-guide and two lateral lobes (if seen from ventral side). The egg-guide is triangular or conical and wedged between the bases of the ventral valves of the ovipositor.

The ovipositor (Fig. 17C) consists of a dorsal pair and a ventral pair of valves with their tips directed in opposite directions. The dorsal and ventral pair of valves can be spread apart and brought together. These are used as digging organs in oviposition. Push apart the dorsal and ventral pair of valves with your dissecting needle and note a small inner pair of valves or the forked organ concealed between them. The inner valves and the egg-guide are used for placing the eggs in the egg-pod.

2. Male: The subgenital plate (Fig. 17B) is a large boat-like structure. It forms the genital chamber on its upper side which conceals the male genital organs. The copulatory or genital organs are collectively known as aedeagal or phallic complex. The posterior end of the subgenital plate which incurves into the genital chamber to cover the tip of the phallic complex is called pallium. Expose the phallic complex by depressing the posterior end of the subgenital plate with a dissecting needle and take it out. It consists of two parts, the aedeagus and the epiphallus.

The aedeagus (Fig. 17D) is nearly flask-shaped, strongly sclerotised and wrapped (except tip) in a thick membranous sac, the ectophallic membrane. Now remove this membrane to see the parts clearly. The aedeagus consists of a pair of large basal valves which are connected with two long, narrow and curved apical lobes. Tips of these lobes are separated by a narrow slit which leads into a large cavity, the phallosome cleft. This cleft contains penis basal valves and apical lobes. Also see the lateral view of the aedeagus (Fig. 17E).

The epiphallus (Fig. 17F) is a collar-like or bridge-shaped sclerotised structure which is present on the dorsal side of the aedeagus. It is also removed along the ectophallic membrane, with which it is attached. It consists of two long lateral sclerites which are connected sub-basally by a bridge. They also have two small triangular hook-like posterior projections which slightly project outwards. The epiphallus contains two lateral appendices which are also connected at their bases.

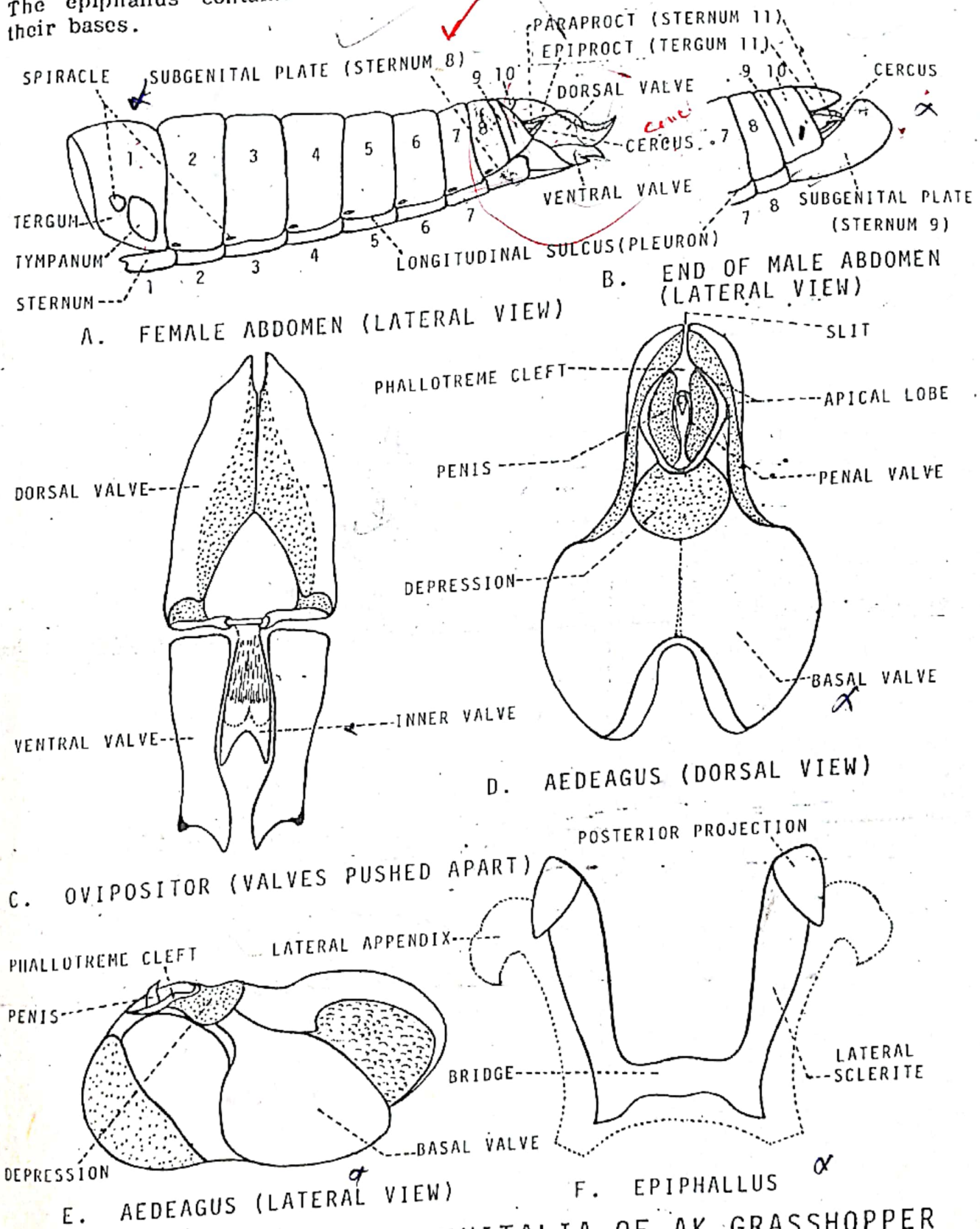


FIG. 17. ABDOMEN AND GENITALIA OF AK GRASSHOPPER