LECTURE 9.

Anatomy: Reproductive system

Reproductive System

It is important to note here that variation among insect reproductive systems is great. Closely related species are often isolated from one another via small variations in the morphology of reproductive organs that prohibit interspecies mating. However, a generalized system can be constructed that closely represents all sexually reproducing insects. Do not be alarmed if you are unable to locate the indicated structures on your dissected specimens. Be familiar with differences in male and female genitalia and be able to identify structures when given a diagram. Directions are provided if you wish to attempt seeing the reproductive system of your specimen.

In insects male and female sexes are mostly separate. Sexual dimorphism is common where the male differ from the female morphologically as in bees, mosquito and cockroach. The other types are:

Gynandromorph: (Sexual mosaic) Abnormal individual with secondary sexual characters of both male and female. e.g. mutant Drosophila.

Hermaphrodite: Male and female gonads are present in one organism. e.g. Cottony cushion scale.

Female reproductive system

The main functions of the female reproductive system are egg production and storage of male's spermatozoa until the eggs are ready to be fertilized. The basic components of the female system are paired **ovaries**, which empty their mature oocytes (eggs) via the calyces (Calyx) into the lateral **oviduct** which unite to form the common

(median) oviduct. The **gonopore** (opening) of the common oviduct is usually concealed in an inflection of the body wall that typically forms a cavity, the **genital chamber**. This chamber serves as a copulatory pouch during mating and thus is often known as the **bursa copulatrix**. Its external opening is the vulva. In many insects the vulva is narrow and the genital chamber becomes an enclosed pouch or tube referred to as the **vagina**.

Two types of ectodermal glands open into the genital chamber. The first is the **spermatheca** which stores spermatoza until they are needed for egg fertilization. The spermatheca is single and sac-like with a slender duct, and often has a diverticulum that forms a tubular spermathecal gland. The gland or glandular cells within the storage part of the spermatheca provide nourishment to the contained spermatozoa.

The second type of ectodermal gland, known collectively as **accessory glands**, opens more posteriorly in the genital chamber. Each ovary is composed of a cluster of egg or ovarian tubes, the **ovarioles**, each consisting of a terminal filament, a germarium (in which mitosis gives rise to primary oocytes), a vitellarium (in which oocytes grow by deposition of yolk in a process known as **vitellogenesis**) and a pedicel. An ovariole contain a series of developing oocytes each surrounded by a layer of follicle cells forming an epithelium (the oocyte with its epithelium is termed a **follicle**), the youngest oocyte occur near the apical germarium and the most mature near the pedicel. There are different types of ovarioless based on the presence or absence of specialized nutritive cells called

trophocytes / nurse cells for nourishment of oocytes.
Paniostic ovariole: Lacks specialized nutritive cells so that it contains only a string of
follicles, with the oocytes obtaining nutrients from the haemolymph via the follicular
epithelium. e.g. Cockroach.
Telotrophic ovariole: (Acrotrophic) The trophocyte is present and its location is
confined to the germarium and remain connected to the oocytes by cytoplasmic strands as
the oocytes move down the ovariole. eg. bugs.
Polytrophic ovariole: A number of trophocytes are connected to each oocyte and
trophocytes moves down along with the ovariole, providing nutrients until depleted. Thus
individual oocytes are alternated with groups of smaller trophocytes in the ovarioles. e.g.
moths and flies.
Accessory glands of the female reproductive tract are often called as **colleterial
or cement glands**, because their secretions surround and protect the eggs or cement them
to the substrate. e.g. egg case production in mantis, ootheca formation in cockroach,
venom production in bees.

Sources

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