

Lec.9

The Reproductive System

The reproductive organs of insects are similar in structure and function to those of vertebrates: a male's testes produce sperm and a female's ovaries produce eggs (ova). Both types of gametes are haploid and unicellular, but eggs are usually much larger in volume than sperm.

Most (but not all) insect species are bisexual and biparental — meaning that one egg from a female and one sperm from a male fuse (syngamy) to produce a diploid zygote. There are, however, some species that can reproduce by parthenogenesis, a form of asexual reproduction in which new individuals develop from an unfertilized egg (virgin birth). Some of these species alternate between sexual and asexual reproduction (not all generations produce males), while others are exclusively parthenogenetic generations (produce only females).

As insects are short-lived, their life history, behavior and reproductive condition must be synchronized. This requires finely tuned and complex physiological responses to the external environment.

The main function of the female reproductive system are egg production and storage of male's spermatozoa until the eggs are ready to be fertilized.

The female reproductive system

The female reproductive system consists of

- 1- A pair of ovaries
- 2- A pair of lateral oviducts.
- 3- Median oviduct opening posteriorly into a genital chamber.
- 4- Vagina, Opening from the genital chamber.
- 5- spermatheca for storing sperm.
- 6- A pair of accessory glands is also present.

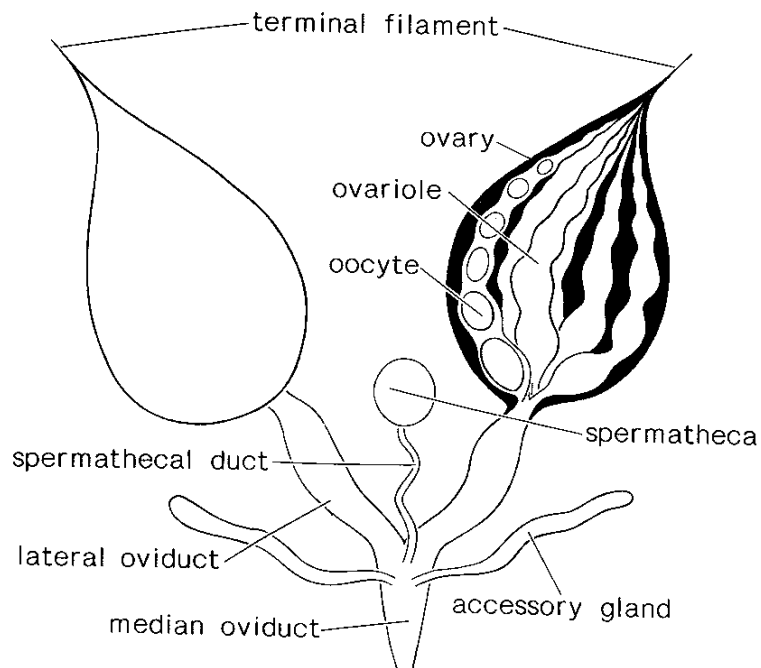


Fig.1 Female reproductive system

Oogenesis

Oogenesis: Is the process by which germ cells develop into eggs

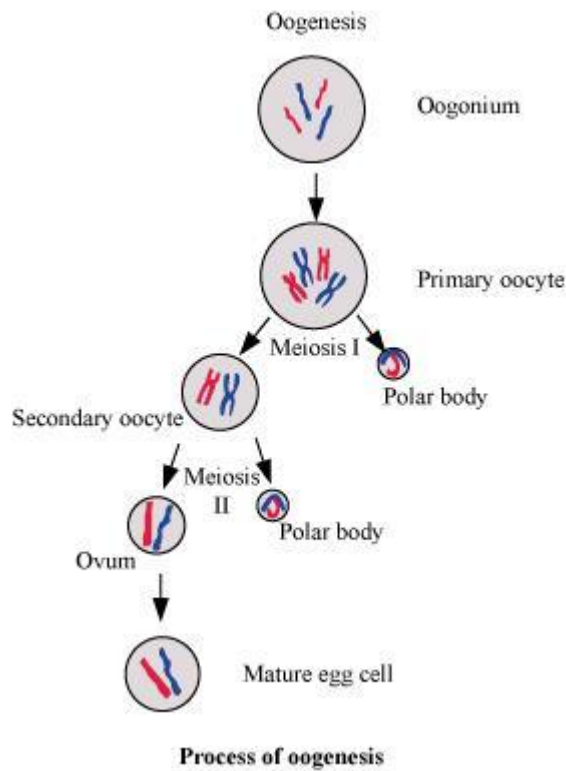


Fig.2 The Oogenesis of germ cells

General structure of insect egg

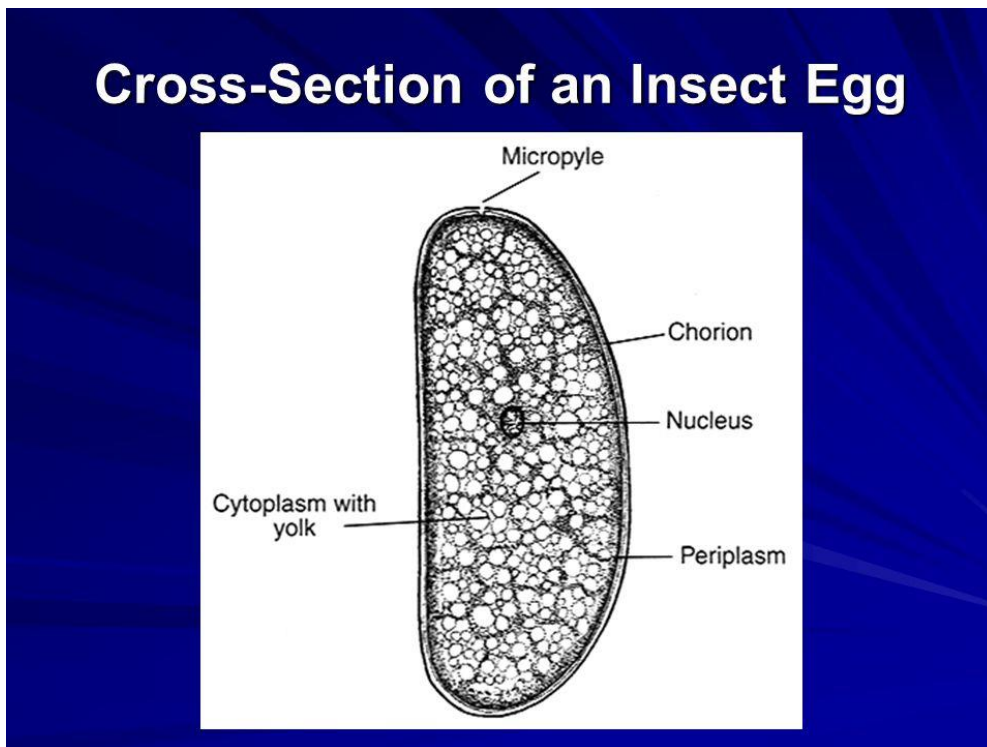


Fig.3 The Cross section of an insect egg



www.shutterstock.com · 48707203

Fig.4 The different shapes of insect eggs

Where do most insects lay their eggs?

Eggs are laid in protected places in environments where young are likely to find food. For example, many butterflies lay their eggs on larval food plants, mosquitoes lay their eggs in water in which larval food grows, and parasitoids lay eggs in, on, or near a host insect.

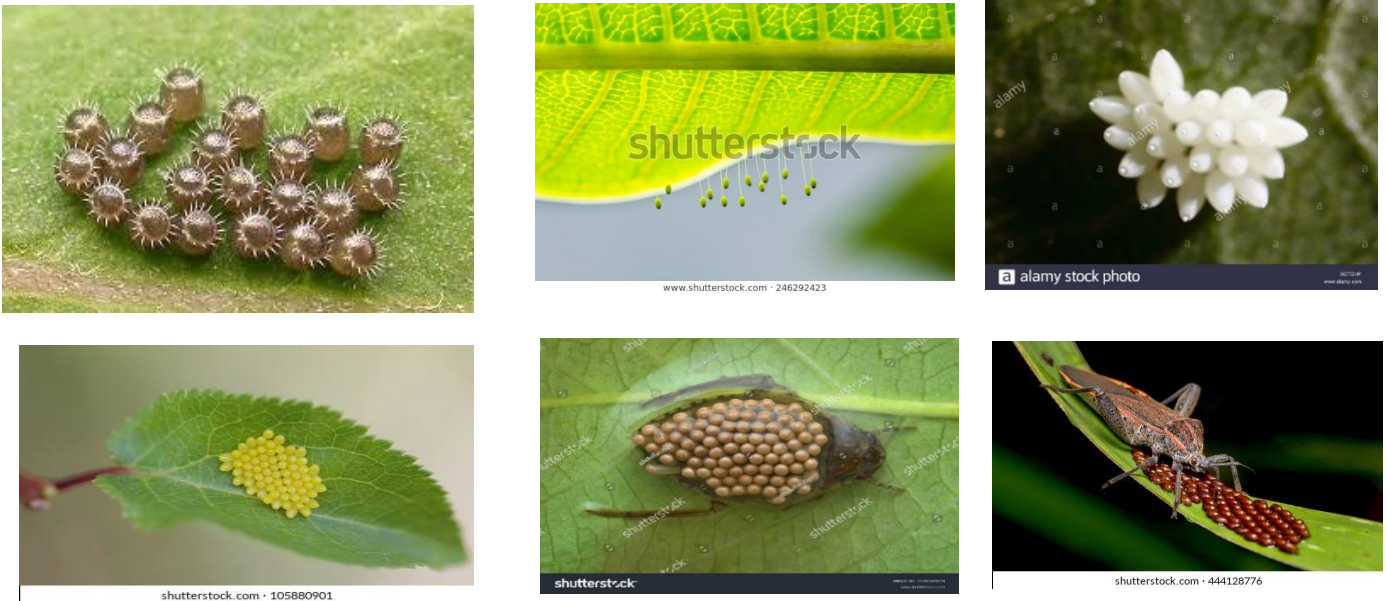


Fig. 5 Different ways of laying eggs in insects

The ovaries

The two ovaries lie in the abdomen above or lateral to the gut. Each consists of a number of egg-tubes, or ovarioles. The oocytes develop in the ovarioles. The number of ovarioles in an ovary varies in relation to size and lifestyle of the insect as well as its taxonomic position. In general, larger species within a group have more ovarioles than small ones; thus small grasshoppers commonly have only four ovarioles in each ovary, while larger ones may have more than 100.

Oviducts

The oviducts are usually two lateral tubes join a median oviduct. The median oviduct is opens at the gonopore which, in Dermaptera, is ventral on the posterior end of segment 7, but in most other groups opens into a genital chamber invaginated above the sternum of segment 8.

Sperm theca

A spermatheca, used for the storage of sperm from the time the female is inseminated until the eggs are fertilized, is present in most female insects. Sometimes there are two, as in *Blaps* (Coleoptera) and *Phlebotomus* (Diptera), and most of the higher flies have three.

Accessory glands

Female accessory glands often arise from the genital chamber or the vagina. Accessory glands often produce a substance for attaching the eggs to the substratum during oviposition and hence are often called colleterial (glue) glands. In several insects, they produce an Ootheca that protects the eggs after oviposition). The function of the female accessory glands is generally to fix eggs in position or protect them from desiccation and predators.

Male Reproductive system

The male reproductive organs typically consist of a pair of testes connecting with paired seminal vesicles and median ejaculatory duct in most insects there are also a number of accessory glands which open into the vasa deferentia or the ejaculatory duct.

Testis

The testis may lie above or below the gut in the abdomen and are often close to the midline. Usually, each testis consists of a series of testis tubes or follicles ranging in number from one in Coleoptera Adephaga to over 100 in grasshoppers (Acrididae).

Vas deferens

From each testis follicle a fine, and usually short, vas deferens connects with the vas deferens. The vasa deferentia run backwards to lead into the distal end of the ejaculatory duct and often they are dilated to form the seminal vesicles.

The seminal vesicles

In which sperm are stored before transfer to the female, are expansion of the vasa deferentia in many insects.

Ejaculatory Duct

The vasa deferentia join a median duct called the ejaculatory duct, which usually opens posteriorly in the membrane between the ninth(9) and tenth (10) abdominal segments (gonopore).

Accessory Glands

The number and arrangement of accessory glands varies considerably between different groups of insects. The insect male accessory gland (MAG) responsible for the synthesis and secretion of seminal fluid components, Secretions of low viscosity bathe the sperm.

