

TYPES OF REPRODUCTION IN INSECTS

PHYSIOLOGY OF REPRODUCTION

1. Spermatogenesis: (occurs inside sperm tube)

mitosis

Spermatogonia -----> Primary spermatocytes (2n) Meiosis

mitosis

Spermatids (n) <----- Secondary spermatocytes (n)

Spermiogenesis-----> Sperms (n)

2. Oogenesis : (occurs inside egg tube)

Mitosis

Meiosis

Oogonia -----> Primary oocytes(2n) -----> Secondary oocytes (n)

Oogenesis

Mitosis

Ovum (n) <----- Oocytes (n) <-----

3. Sperm transfer

(i) **Intragenital:** Common method, through, aedeagus via vaginal orifice into female genital passage.

(ii) **Haemocoelous:** Sperms transferred into the body cavity e.g. Bed bug.

(iii) **External:** Spermatophores are ejected out into open place by male, while female walk over it and gets inseminated e.g. Silver fish.

4. **Fertilization:** Sperm enters into egg to produce morphogenesis. Egg nucleus divides meiotically into **female gamete nucleus** and **polar body**. Then the fertilization occurs by the fusion of male and female gamete nuclei.

TYPES OF REPRODUCTION

1. OVIPARITY

Majority of female insects are oviparous that is, they lay eggs. Embryonic development occurs after oviposition by utilizing the yolk, e.g. Head louse moths.

2. VIVIPARITY

Unlike oviparous, here initiation of egg development take place within the mother. The life cycle is shortened by retention of eggs and even developing young within the mother. Four main types of viviparity are observed in different insect groups.

i. OVOVIVIPARITY

Fertilized eggs containing yolk are incubated inside the reproductive tract of the female and hatching of egg occur just prior to or soon after oviposition e.g. Thysanoptera, some cockroaches, few beetles, and some flies-(fleshfly). Fecundity of this group is low.

ii. PESEUDOPLACENTAL VIVIPARITY

This occurs when a yolk-deficient egg develops in the genital tract of the female. The mother provides a special placenta-like tissue, through which nutrients are transferred to developing embryos. There is no oral feeding and larvae are laid upon hatching. e.g. aphids, some earwigs, psocids and polytenid bugs.

ii. HAEMOCOELOUS VIVIPARITY

This involves embryos developing free in the female's haemolymph with nutrients taken up by osmosis. This form of **internal parasitism** occurs only in sterpsiptera and some gall midges.

v. ADENOTROPHIC VIVIPARITY

This occurs when a poorly developed larva hatches and feeds orally from accessory (milk) gland secretion within the uterus of the mother's reproductive system. The full grown larva is deposited and **pupariates** immediately (eg) tsetse flies, louse or wallaby flies, bat flies.

3. PARTHENOGENESIS

Reproduction without fertilization is called parthenogenesis. Different types of parthenogenesis are as follows

I. BASED ON OCCURRENCE

- i. Facultative (not compulsory) - e.g. bee.
- ii. Obligatory or constant (compulsory) - e.g. stick insect
- iii. Cyclic or spodic : alternation of gamic and agamic population, e.g. aphid.

II. BASED ON SEX PRODUCED

- i. **Arrhenotoky**: Produce male e.g. bee
- ii. **Thelytoky**: produce female e.g. aphids
- iii. **Amphitoky or deuterotoky**: produce both male and female e.g. cynipid wasp.

III. BASED ON MEIOSIS

- i. **Apodictic** : no meiosis occurs
- ii. **Automictic**: meiosis occurs, but diploidy is maintained

4. POLYEMBRYONY

This form of asexual reproduction involves the production of two or more embryos from one egg by subdivision. Mostly observed in parasitic insects (e.g. platygaster). Nutrition for a large number of developing embryo cannot be supplied by the original egg and is acquired from the host's haemolymph through a specialized enveloping membrane called **trophamnion**.

5. PAEDOGENESIS

Some insect cut short their life cycles by loss of adult and pupal stages. In this precocious stage gonads develop and give birth to young one by parthenogenesis.

- i. Larval paedogenesis - e.g. gall midges
- ii. Pupal paedogenesis - eg *Miaster* sp.