

LECTURE 12.

Metamorphosis: Egg structure and types of eggs

Metamorphosis and immature stages in insects

Metamorphosis is the change in growth and development an insect undergoes during its life cycle from birth to maturity. There are four basic types of metamorphosis in insects.

1. **Ametabola:** (No metamorphosis) e.g. Silver fish. These insects have only three stages in their life namely egg, young ones and adult. It is most primitive type of metamorphosis. The hatching insect resembles the adult in all respects except for the size

and called as juveniles. Moulting continues throughout the life.

2. **Hemimetabola:** (Incomplete metamorphosis) e.g. Dragonfly, damselfly and may fly.

These insects also have three stages in their life namely egg, young one and adult. The

young ones are aquatic and are called as **naiads**. They are different from adults in habit

and habitat. They breathe by means of tracheal gills. In dragonfly naiad the lower lip

(labium) is called mask which is hinged and provided with hooks for capturing prey.

After final moult, the insects have fully developed wings suited for aerial life.

3. **Paurometabola:** (Gradual metamorphosis) e.g. Cockroach, grasshopper, bugs.

The young ones are called **nymphs**. They are terrestrial and resemble the adults in

general body form except the wings and external genitalia. Their compound eyes and

mouth parts are similar to that of adults. Both nymphs and adults share the same habitat.

Wing buds externally appear in later instars. The genitalia development is

gradual. Later

instar nymphs closely resemble the adult with successive moults.

4. Holometabola: (Complete metamorphosis) e.g. Butterfly, moth, fly and bees.

These insects have four life stages namely egg, larva, pupa and adult.

Majority of insects

undergo complete metamorphosis. Larvae of butterflies are called caterpillar. Larva

differs greatly in form from adult. Compound eyes are absent in larva.

Lateral ocelli or

stemmata are the visual organs. Their mouth parts and food habit differ from adults.

Wing development is internal. When the larval growth is completed, it transforms into

pupa. During the non-feeding pupal stage, the larval tissues disintegrate and adult organs are built up.

1. Eggs: The first stage of development in all insects is egg. Majority of insects are

oviparous. Egg stage is inconspicuous, inexpensive and inactive. Yolk contained in the

egg supports the embryonic development. Eggs are laid under conditions where the food

is available for feeding of the future Youngones. Eggs are laid either individually or in

groups. The outer protective shell of the egg is called chorion. Near the anterior end of

the egg, there is a small opening called micropyle which allows the sperm entry for

fertilization. Chorion may have a variety of textures. Size and shape of the insect eggs

vary widely.

TYPES OF EGGS :

a) **SINGLY LAID :**

1) **Sculptured egg :** Chorion with reticulate markings and ridges e.g. Castor butterfly.

2) **Elongate egg :** Eggs are cigar shaped. e.g. Sorghum shoot fly.

3) **Rounded egg:** Eggs are either spherical or globular. e.g. Citrus butterfly

4) **Nit :** Egg of head louse is called nit. It is cemented to the base of the hair. There is an egg stigma at the posterior end, which assists in attachment. At the anterior end, there is an oval lid which is lifted at time of hatching.

5) **Egg with float :** Egg is boat shaped with a conspicuous float on either side. The lateral sides are expanded. The expansions serve as floats. e.g. *Anopheles* mosquito.

b) **EGGS LAID IN GROUPS :**

1) **Pedicellate eggs :** Eggs are laid in silken stalks of about 1.25mm length in one groups on plants. e.g. Green lacewing fly.

2) **Barrel shaped eggs :** Eggs are barrel shaped. They look like miniature batteries. They are deposited in compactly arranged masses. e.g. Stink bug.

3) **Ootheca (Pl. Oothecae) :** Eggs are deposited by cockroach in a brown bean like chitinous capsule. Each ootheca consists of a double layered wrapper protecting two parallel rows of eggs. Each ootheca has 16 eggs arranged in two rows. Oothecae are carried for several days protruding from the abdomen of female prior to oviposition in a secluded spot. Along the top, there is a crest which has small pores which permit gaseous exchange without undue water loss. Chitinous egg case is produced out of the secretions of colleterial glands.

4) **Egg pod :** Grasshoppers secrete a frothy material that encases an egg mass which is deposited in the ground. The egg mass lacks a definite covering. On the top of the egg, the frothy substance hardens to form a plug which prevents the drying of eggs.

5. **Egg cass :** Mantids deposit their eggs on twigs in a foamy secretion

called spumaline

which eventually hardens to produce an egg case or ootheca. Inside the egg case, eggs are aligned in rows inside the egg chambers.

6. Egg mass: Moths lay eggs in groups in a mass of its body hairs. Anal tuft of hairs

found at the end of the abdomen is mainly used for this purpose. e.g. Rice stem borer.

Female silk worm moth under captivity lays eggs on egg card. Each egg mass is called a dfl (diseases free laying).

7. Eff raft : In *Culex* mosquitoes, the eggs are laid in a compact mass consisting of 200-300 eggs called egg raft in water.

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