



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

ENT-121: Fundamentals of Entomology

Lecture 15: Insect Immature Stages:

1. Eggs: The first stage of development in all insects is egg. Majority of insects are oviparous. Egg stage is inconspicuous, inexpensive and inactive.

Types of eggs:

1. Singly laid :

- **Sculptured egg:** Chorion with reticulate markings and ridges e.g. Castor butterfly.
- **Elongate egg:** Eggs are cigar shaped. E.g. Sorghum shoot fly.
- **Rounded egg:** Eggs are either spherical or globular. e.g. Citrus butterfly
- **Nit:** Egg of head louse is called nit.
- **Egg with float:** Egg is boat shaped with a conspicuous float on either side. Eg. Mosquitoes

2. Eggs Laid in Bunch:

- **Pedicellate eggs:** Eggs are laid in silken stalks e.g. Green lacewing fly.
- **Barrel shaped eggs:** Eggs are barrel shaped. e.g. Stink bug.
- **Ootheca (Pl. Oothecae):** Each ootheca has 16 eggs arranged in two rows.
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- **Egg pod :** Grasshoppers secrete a frothy material that encases an egg mass which is deposited in the ground.
- **Egg cass:** Mantids deposit their eggs on twigs in a foamy secretion called spumaline
- **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.
- **Egg raft :** In Culex mosquitoes, the eggs are laid in a compact mass consisting of 200-300 eggs called egg raft in water.

Types of Larvae:

1. **Oligopod:** eg. Coleoptera (Includes Campodei form and Scarabaeiform)
2. **Polypod:** Caterpillars (Includes Hairy Caterpillar, Slug Caterpillars {Platyform}Looper and Semiloopers)
3. **Apods:** They are larvae without appendages for locomotion. (Eucephalous, Hemiccephalous and Acephalous)

Types of Pupae: It is the resting and inactive stage in all holometabolous insects.

1. **Obtect:** Various appendages of the pupa viz., antennae, legs and wing pads are glued to the body by a secretion produced during the last larval moult. E.g. moth pupa.
 - a. **Chrysalis:** It is the naked pupa of butterfly.
 - b. **Tumbler:** Pupa of mosquito is called tumbler. It is an obtect type of pupa. It is comma shaped with rudimentary appendages.
2. **Exarate:** Various appendages viz., antennae, legs and wing pads are not glued to the body. They are free. All oligopod larvae will turn into Exarate pupae. The pupa is soft and pale e.g. Pupa of rhinoceros beetle.
3. **Coarctate:** The pupal case is barrel shaped, smooth with no apparent appendages. The last larval skin is changed into case containing the Exarate pupa. The hardened dark brown pupal case is called puparium. E.g. Fly pupa.

Pupal Protection: In general pupal stage lacks mobility. Hence it is the most vulnerable stage. To get protection against adverse conditions and natural enemies, the pupa is enclosed in a protective cover called cocoon. Based on the nature and materials used for preparation of cocoons, there are several types.

Silken cocoon (Silk) Silk worm

Earthen cocoon (Soil + saliva) Gram pod borer

Hairy cocoon (Body hairs)

Fibrous cocoon (Fibres) Red plam weevil

Puparium (Hardened last larval skin) House flies

