

Salahaddin University - Erbil
Collage of Agricultural Engineering sciences
plant protection Department



1st Lab.

Horticulture insects

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Horticulture Insects-4th stage

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What is Entomology?

Entomology is the scientific study of insects, and a branch of zoology.

What is pest?

pest is an organism living and growing where they are not wanted and can cause damage to these plants.

The damages of these pests would involve economical orchards trees such as:-

pomegranate

apple

citrus

peach,apricot,
and vegetables for instance

tomato

potato

cucumber.

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Objectives

- Our aims of reading horticulture insects are to better understand the sources of infestation and how to minimize the lost by finding suitable solutions.

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Effect of insects on horticulture trees and plants:

insects destroy or damage all kinds of growing crops and other valuable plants by :

- 1- chewing leaves ,buds ,bark or fruits .
- 2-sucking the sap from leaves ,buds ,stem.
- 3-Boring or tunneling in the bark ,fruits ,nuts ,or seeds (worms or weevils).
- 4-Attaching roots and under ground
- 5-Taking parts of the plant for the construction of nests.
- 6-Disseminating organisms of plant diseases (fungi-Bacteria-Protozoa and viruses) injecting them into the tissues of the plant as they feed ,carrying them into their tunnels.

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Life cycle of insects

What is metamorphosis?

The transformation of an immature stage to mature stage

Types pf metamorphosis:-

- 1.Ametamorphosis(Ametabolous)
- 2.Gradual metamorphosis
- 3.Incomplete metamorphosis
- 4.Complete metamorphosis

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1- A metamorphosis (without metamorphosis)

(Immature are called juveniles)

Same shape as the adult get beggar no distinct rearrangements of body structure

Example :- wingless(Apterygota)

Orders:

Thysanura

Collembolla

Protura

Diplura



Egg \longrightarrow Young stages \longrightarrow Adult

2. Gradual metamorphosis

Immatures called nymphs

Changes in form is gradual

Development of external wing

Differences in color or markings

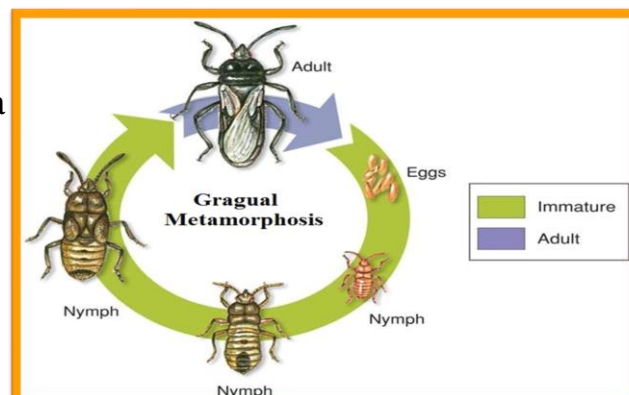
Nymphs and adults share the same habitat

seen in such orders

as the grasshoppers

(Orthoptera) Isoptera

(termites)



3- (Incomplete metamorphosis) Hemimetabolous

Immature are called naiads

Immatures do not closely resemble adult stage

Naiads have tracheal gills

Naiads and adults live in different habitats



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4- Holometabolous Complete metamorphosis:

Immature are called larvae and pupae

Larvae do not resemble adult

Wings and other adult features an immobile pupal stage

Immatures and adults may or may not share habitats

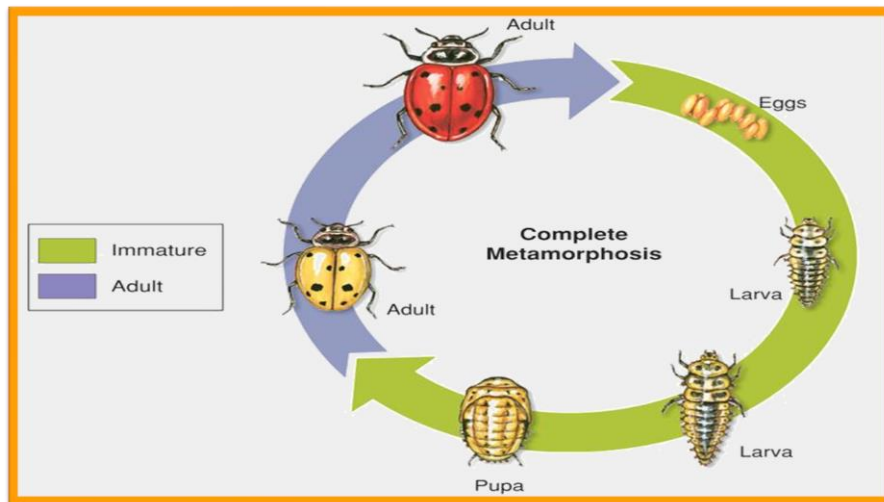
found in butterflies(Lepidoptera),beetles(Coleoptera),flies

(Diptera), and bees, wasps, and ants (Hymenoptera).

This life cycle has the four stages of:

Egg → Larvae → Pupa → Adult

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Egg

The egg is the first stage in the life cycle of most insects. Eggs can be laid singly, in clusters or in specialist structures called ootheca.

Insect eggs are very small and often susceptible to drying out (desiccation) so the female insect often selects the site to lay her eggs on very carefully

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Larvae

Larval stage is the active growing stage.

It is the immature stage between the egg and pupal stage of an insect having complete metamorphosis.

This stage differs radically from the adult.

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There are three main types of insects larvae
namely
Oligopod, polypod and apodous.

1. **Oligopod:** Thoracic legs are well developed. Abdominal legs are absent. There are subtypes:-

A. **Campodeiform** :- flattened body with long legs
usually filaments on the end of the abdomen. Larvae are
generally predators
and very active

Examples
Coleoptera
(Coccinellidae)



B. Scarabaeiform

Scarabaeiform These larvae will usually C-shaped
and sometimes hairy
with a well-developed head capsule. Larva are sluggish
burrowing in to wood or soil

Scarabaeiform larvae
are found in some
families of Coleoptera



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2. Polypod

The body consists of an elongate trunk with large sclerotized head capsule. Three pairs of thoracic legs and up to five pairs of unjointed abdominal legs or prolegs are present.

A. Hairy caterpillar

The body hairs may be dense sparsely or arranged in tufts
E.X red hairy caterpillars



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B. Eruciform:- The body is cylindrical with a well-developed head capsule and very short antennae.

Eruciform larvae

have both thoracic (true) legs and abdominal prolegs.

Example: caterpillar (larvae

of moths and butterflies).



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3. Apodous:-

This larvae without appendages for locomotion. Based on the degree of development and sclerotization of head capsule, They are also called vermiform larvae.

Example: maggot (larva of housefly)



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Types of Pupa

1- Obtect P. (Chrysalis)

Developing appendages held tightly against the body by a shell like casing. Often found enclosed within a silken cocoon.

Ex. : Lepidoptera



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2- Exarate P.: All developing appendages free and visible externally.

Examples: Hymenoptera



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3- Coarctate P. (Puparium): Body encased within the hard exoskeleton of the next-to-last larval instars.

Examples: Diptera



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	Larvae	Nymph
1	Immature stage of endopterygotes	Immature stage of exopterygotes
2	It undergoes holometamorphosis	Undergoes hemimetamorphosis
3	The body is vermiform which differs from the adult in the structure and feeding habits	The body resemble the adult in all characters except the wings
4	The larva enters pupal stage	No pupal stage
5	Possess both thoracic and abdominal legs	Possess only thoracic legs
6	Eg. Lepidoptera and coleoptera	Eg. Hemiptera, Orthoptera