

Metamorphosis



- **Most insects show big changes as they grow from immatures to adults.**



- These changes are known as **metamorphosis**, and may involve **physical, biochemical, and/or behavioral changes**.
- Metamorphosis **helps the same insect to feed on different food sources, and to live in different habitats**. This increase survival, dispersion, and reproduction of insects.

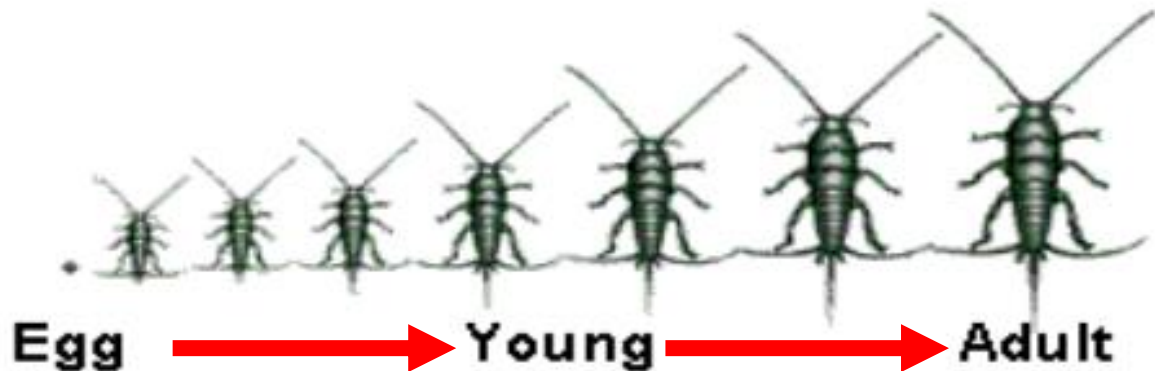


Types of metamorphosis

- ✓ **Ametabola.**
- ✓ **Hemimetabola.**
- ✓ **Holometabola.**

1-Ametabolous insects

- ✓ Undergo **little or no structural change** as they grow older.
- ✓ Immatures are called **Youngs**
- ✓ Immatures are physically similar to adults in every way except size and sexual maturity.



2-Hemimetabolous insects

- Exhibit gradual changes in body form during morphogenesis.
- Immatures are called **nymphs**
- if aquatic, they are called **naiads**.



egg



nymph



adult



Ex: cockroaches

egg



nymph



adult



Ex: grasshopper

- **Maturation and other adult structures as wings, external genitalia** appear in small steps from molt to molt.
- **Wings** grow with each molt until they are fully developed and functional in the adult stage.

growing of Wings



**Insects with complete
metamorphosis
Holometabolous insects**

- ✓ Insects with complete metamorphosis have immature forms (**larvae**) that are quite different from adults.
- ✓ They become larger at each molt but **completely different of adults**



✓ Larvae are "**feeding machines**".





Adult fly

Eggs

**Metamorphosis
in the houseflies**

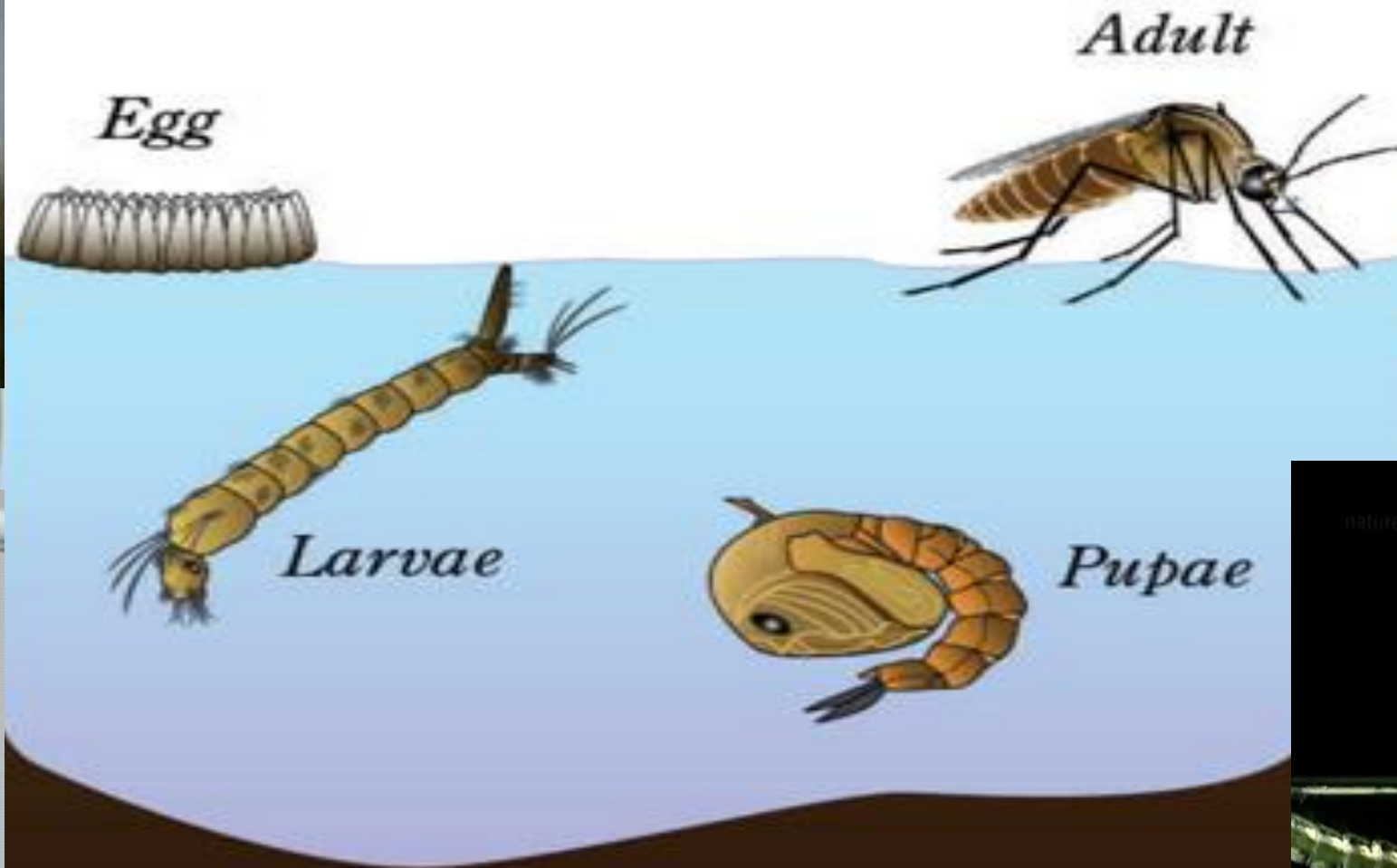


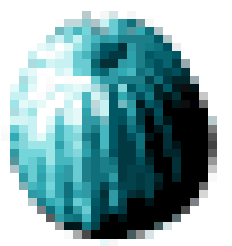
Pupa

1st larval stage



Mosquito Life Cycle





Egg



**Metamorphosis
is
in the
butterflies**



Pupa



6. Adaptability

- ✓ Most insects can adapt quickly to face a **changing environment.**
- ✓ Insects were among the first creatures to invade **the arid environment,**



Some species of beetle that is native to their Namib Desert in southern Africa. This is one of the most arid areas of the world is able to survive by collecting water on its bumpy back surface from early morning fogs.

- ✓ **Insects were the first animals to use flight as an escape from predators,**



✓ Insects were the first organisms to develop a complex social life with **division of labor** and **cooperative care of the young**.



- ✓ The most remarkable example of insect adaptation is the **development of resistance to a wide range of chemical and biological insecticides**





Thank You