



# جامعة البصرة كلية التربية \القرنة

## قسم علوم الحياة

## المادة علم الحشرات

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الادوار الغير الكاملة في الحشرات  
والتشكل

Metamorphosis and  
incomplete stages

Metamorphosis



Growth & holometaboly  
in *Danaus plexippus*,  
the monarch butterfly



1st instar and egg chorion



last larval instar

Chrysalis, outer cuticle is skin of last larval instar

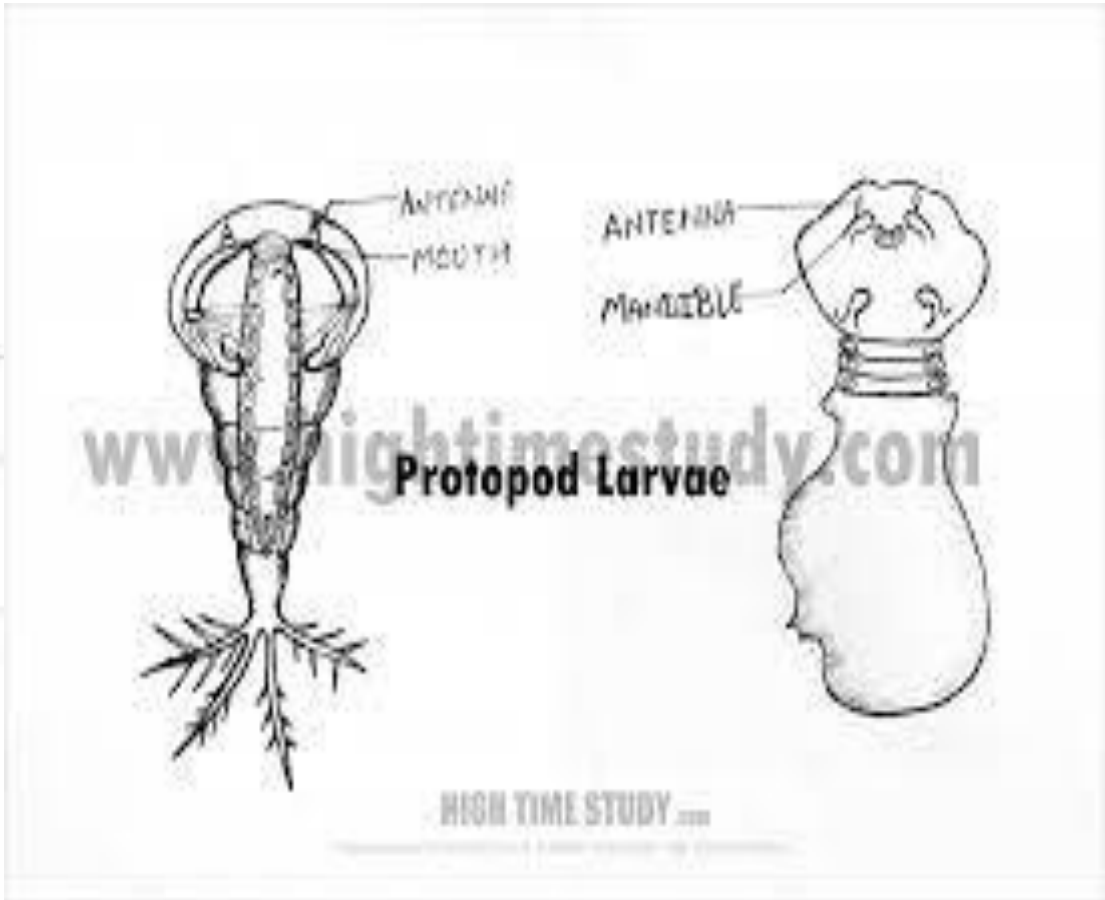
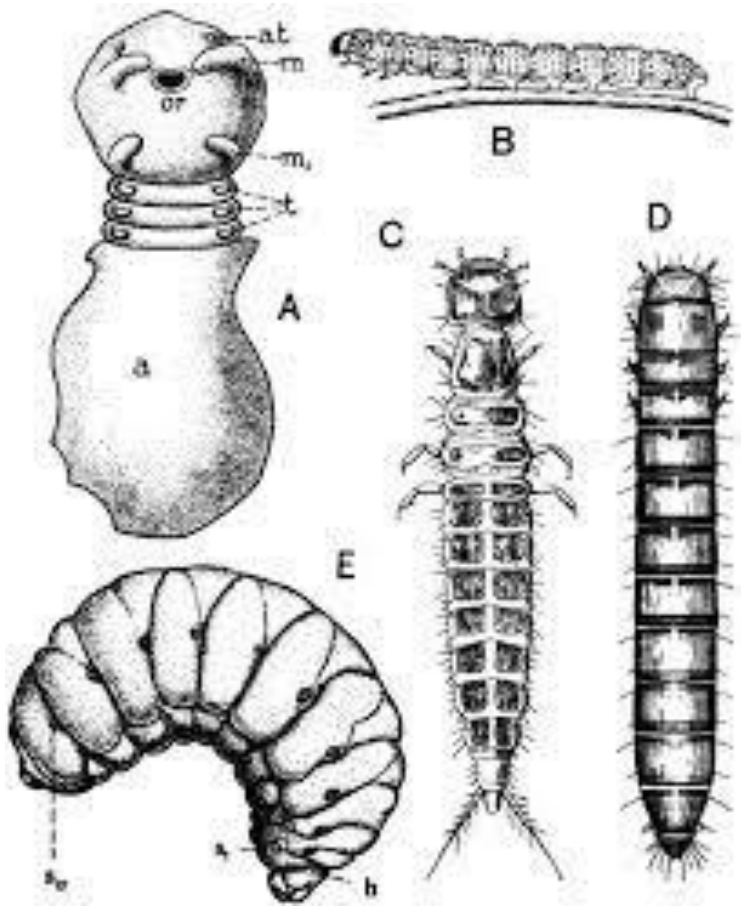




*imago*, or  
adult

# دور اليرقة و اشكالها

## 1-Protopod typ







scarabaeiform



carabiform



Elateriform larvae



campodeiform



# Eruciform



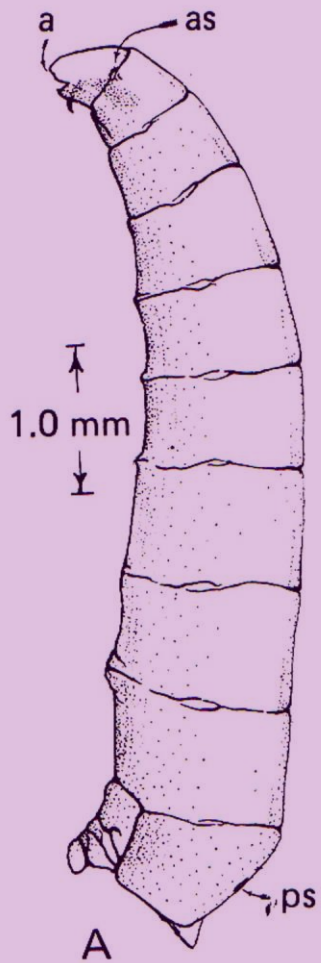
**Housefly maggots**



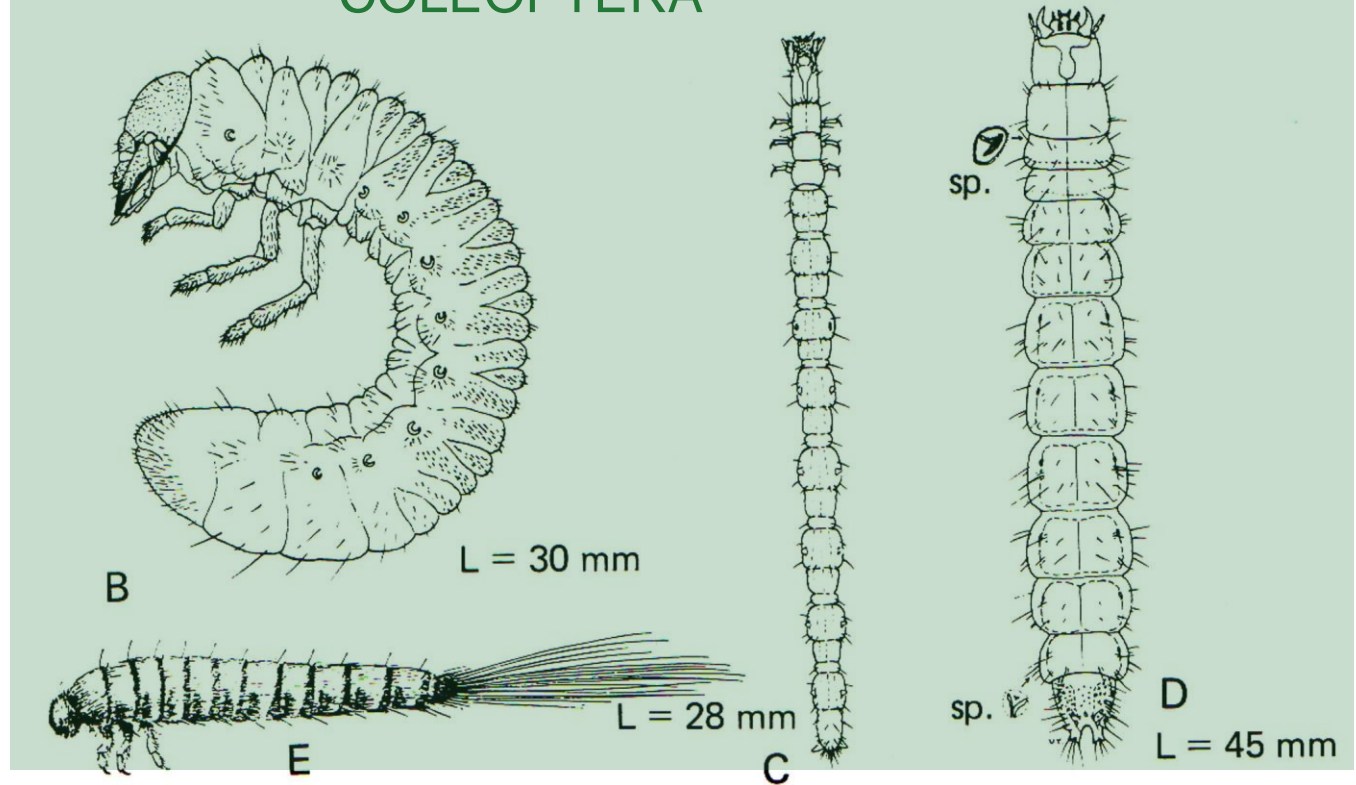
**Mosquito larvae (wriggler)**



# DIPTERA



# COLEOPTERA



# HYMENOPTERA



Some insect larval types. In terms of numbers and biomass, *most insect life at any one time consists of larvae.*

**Exarate pupa**



**obtect pupa**

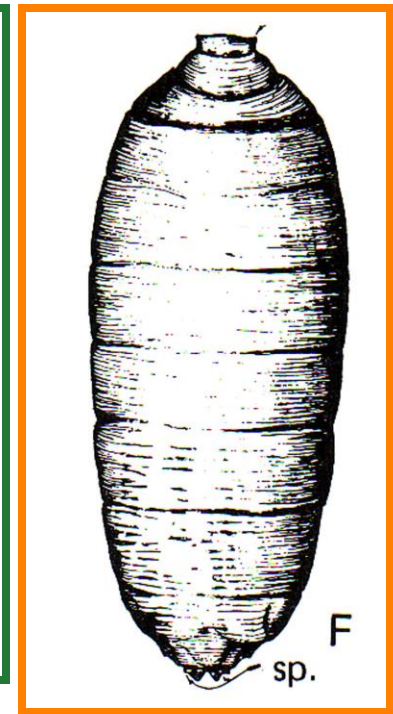
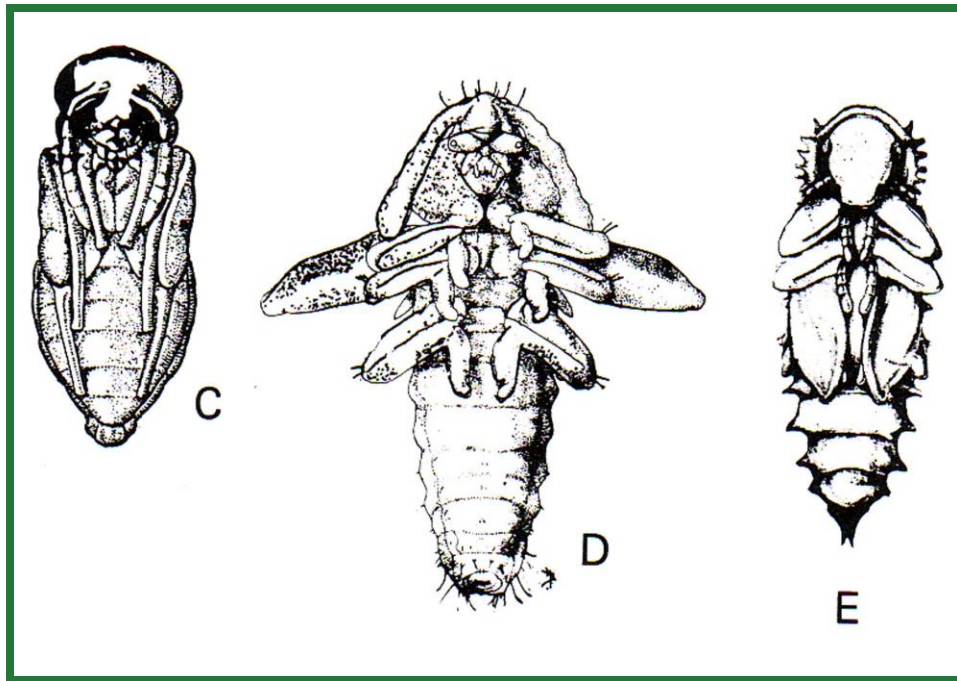
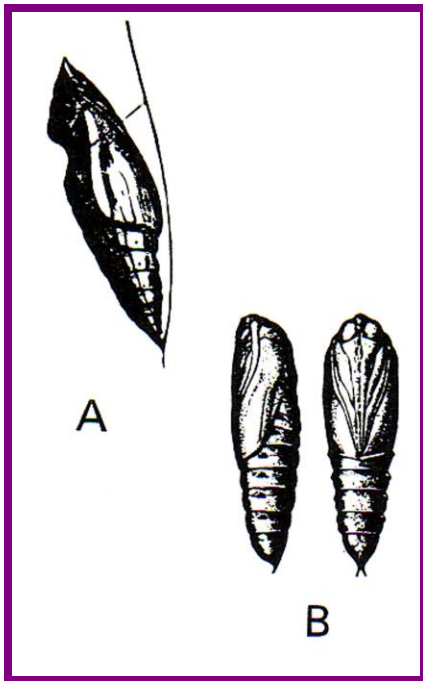


**Mosquito pupa (tumbler**



**Coarctate pupa**





from Borror, Triplehorn, & Johnson, 1989

butterfly

moth

parasitic  
wasp

beetle

beetle

muscoid fly

A, B: *obtect*,  
limbs appressed

C, D, E: *exarate*,  
limbs loose, movable in  
some spp.

F: *coarctate*,  
enclosed in last  
larval skin

**Major insect pupal types. The insect pupa represents a stage of tissue reorganization.**

# Metamorphosis

Metamorphosis – The changes in the shape or characteristics of an organism's body as it grows and matures. •

Some animals, especially insects, have one kind of body when they are young and a very different kind of body when they are adults. •

# Insect Development or Metamorphosis

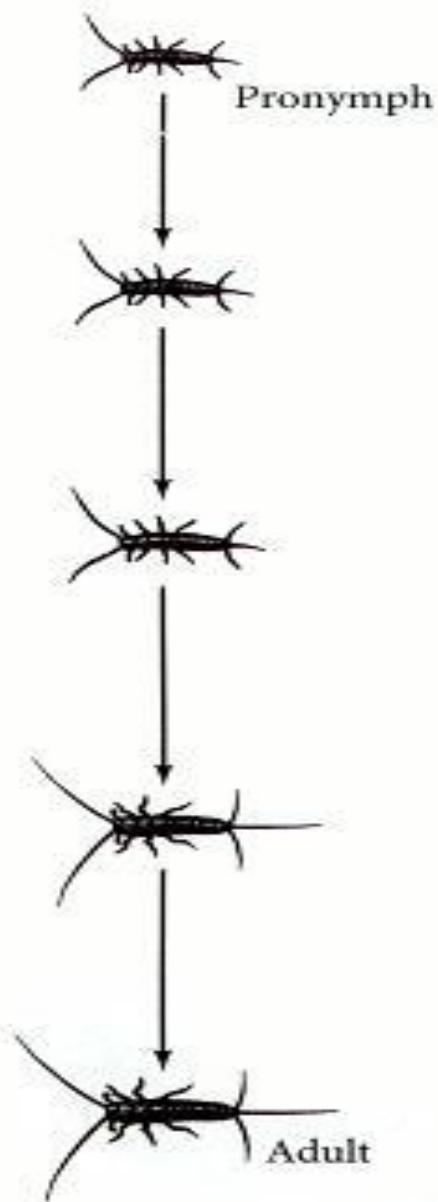
Two forms of development (change) •

Ametabola

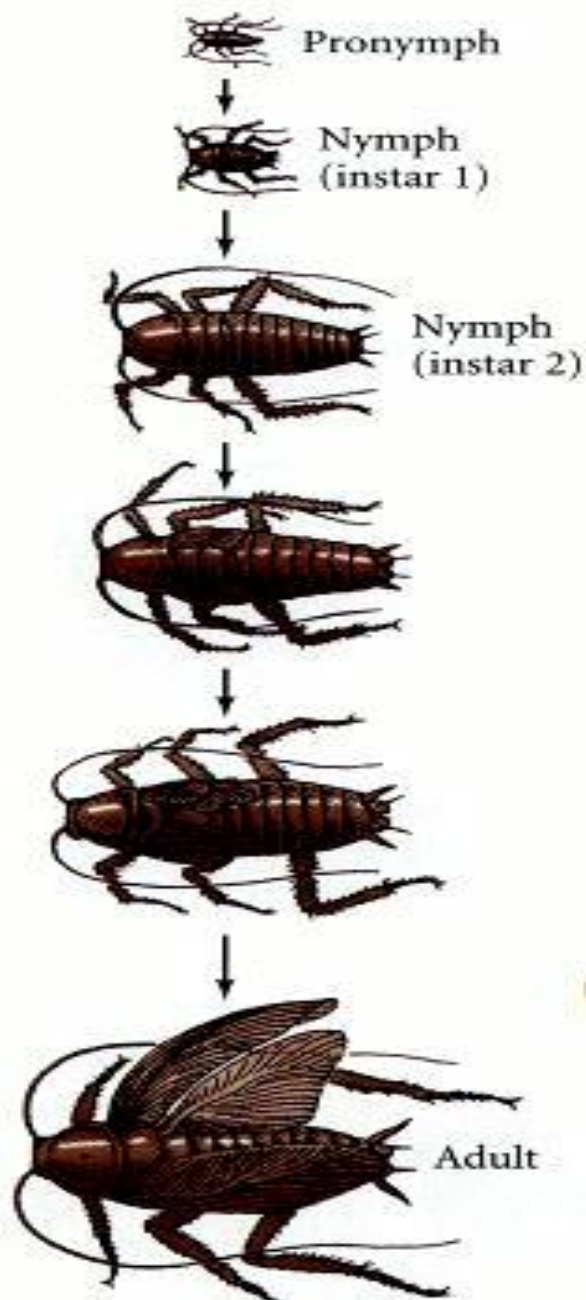
Metabola

1. Heterometabola (Paurometabola and Hemimetabola)
2. Complete or Holometabola and Hypermetamorphosis

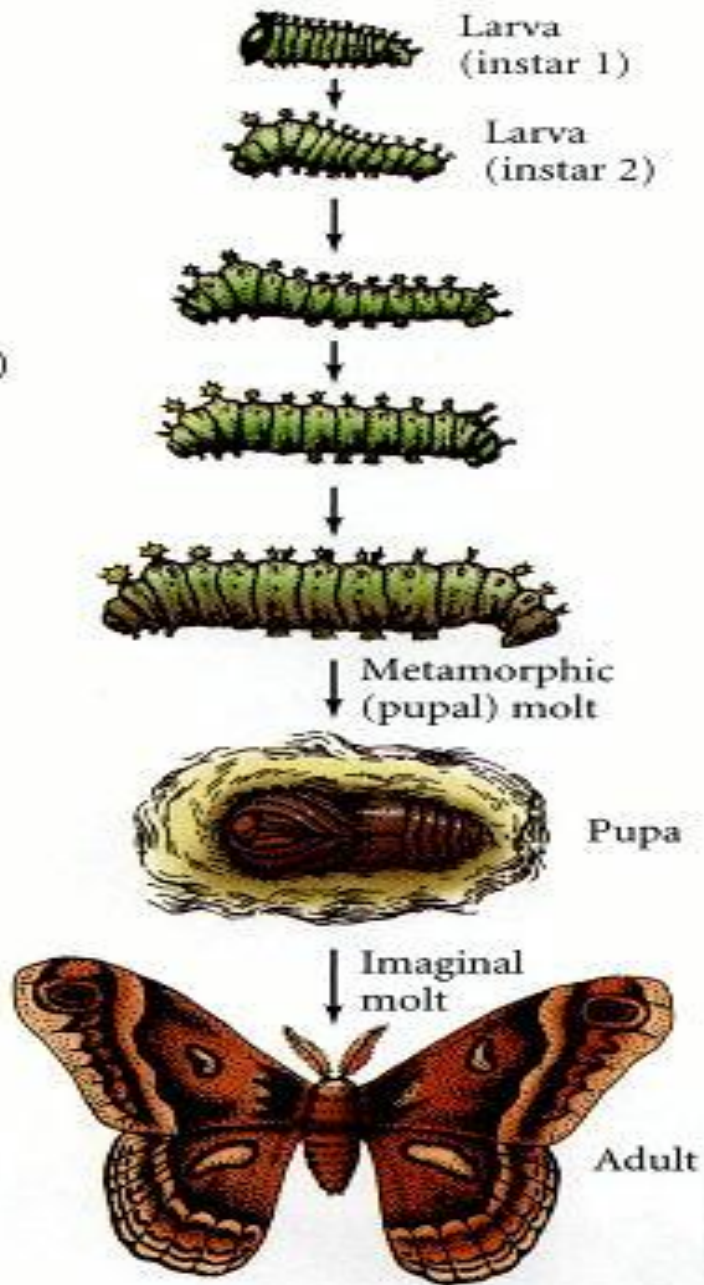
(A) AMETABOLOUS DEVELOPMENT



(B) HEMIMETABOLOUS DEVELOPMENT



(C) HOLOMETABOLOUS DEVELOPMENT





# Incomplete Metamorphosis

Egg- nymph or naiad- adult

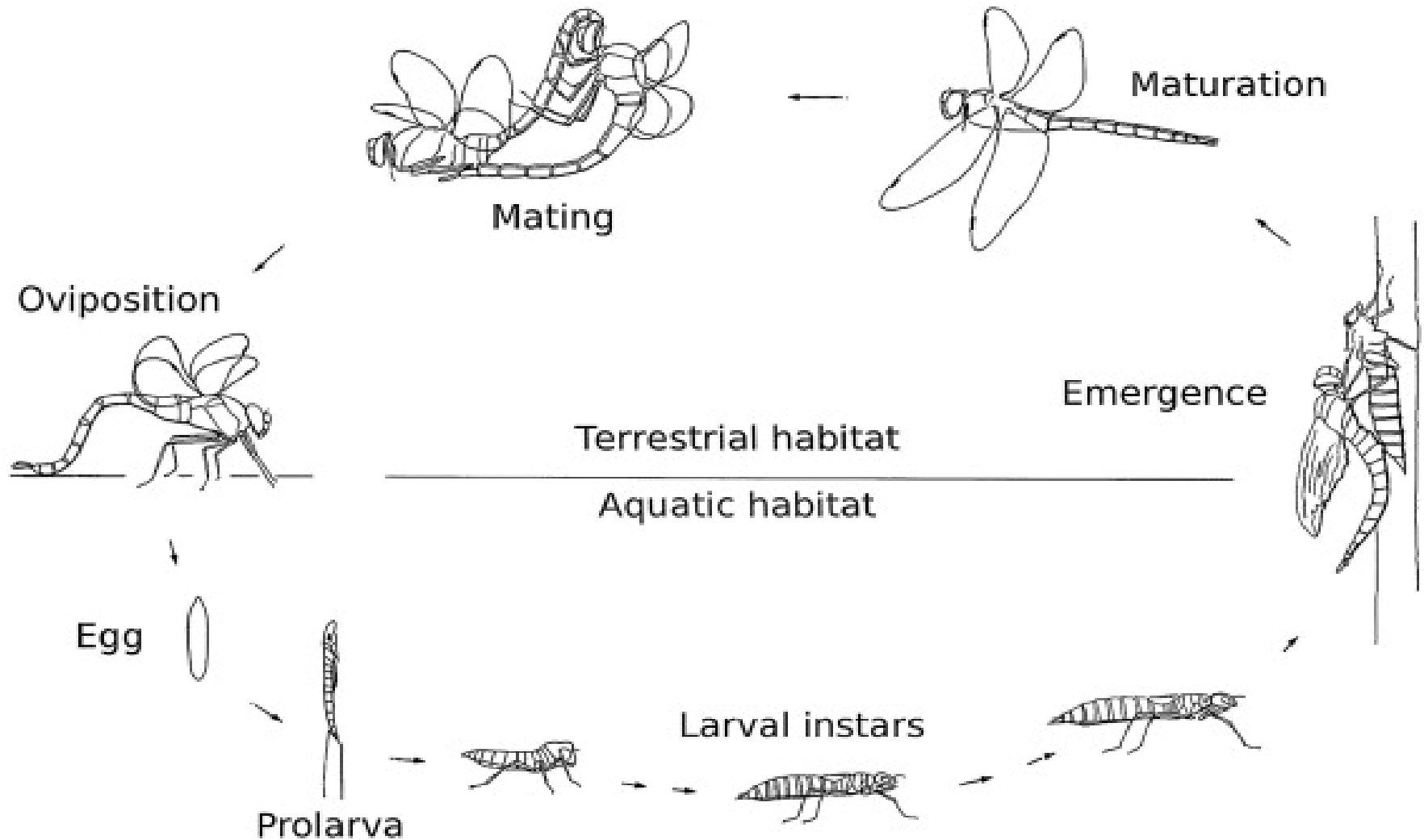
\*Three stages of development

At each stage the insect looks much the same as it does when it becomes an adult.

Examples: Grasshopper or cockroaches



# Hemimetamorphosis



# Complete Metamorphosis

- Egg -Larvae-Pupae-Adult
- Four stages of development

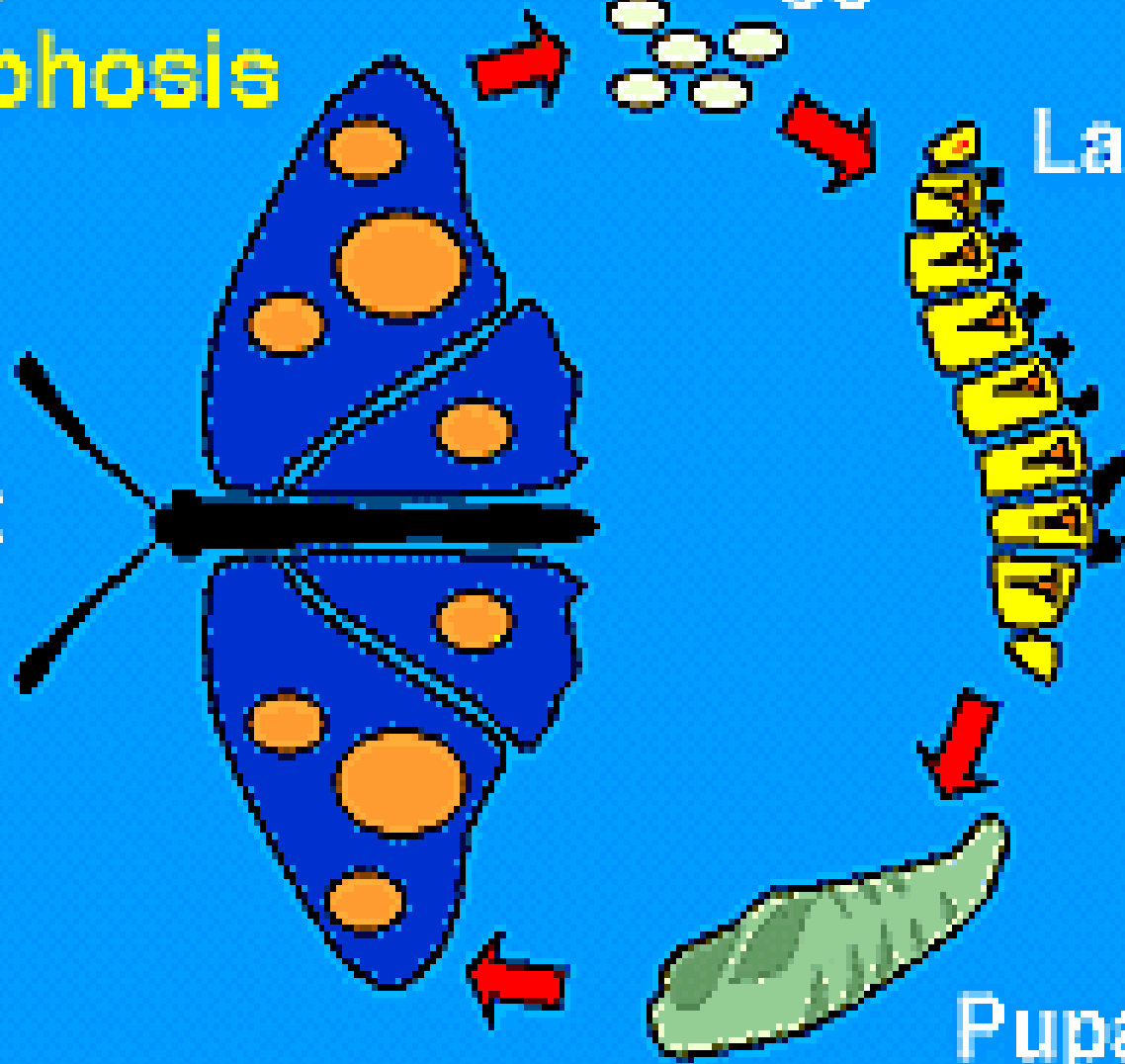
# Complete Metamorphosis

Adult

Eggs

Larvae

Pupae



# Metamorphosis in Insects

The transformation of an immature insect from a larva to a pupa to an adult

