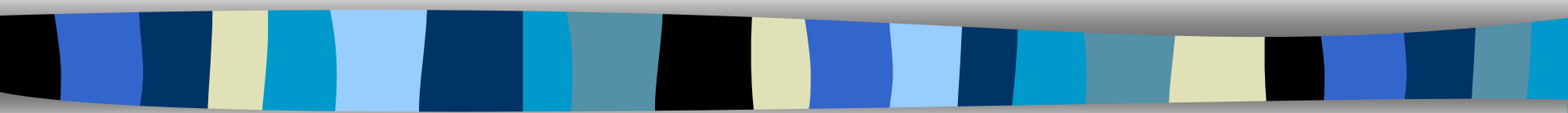


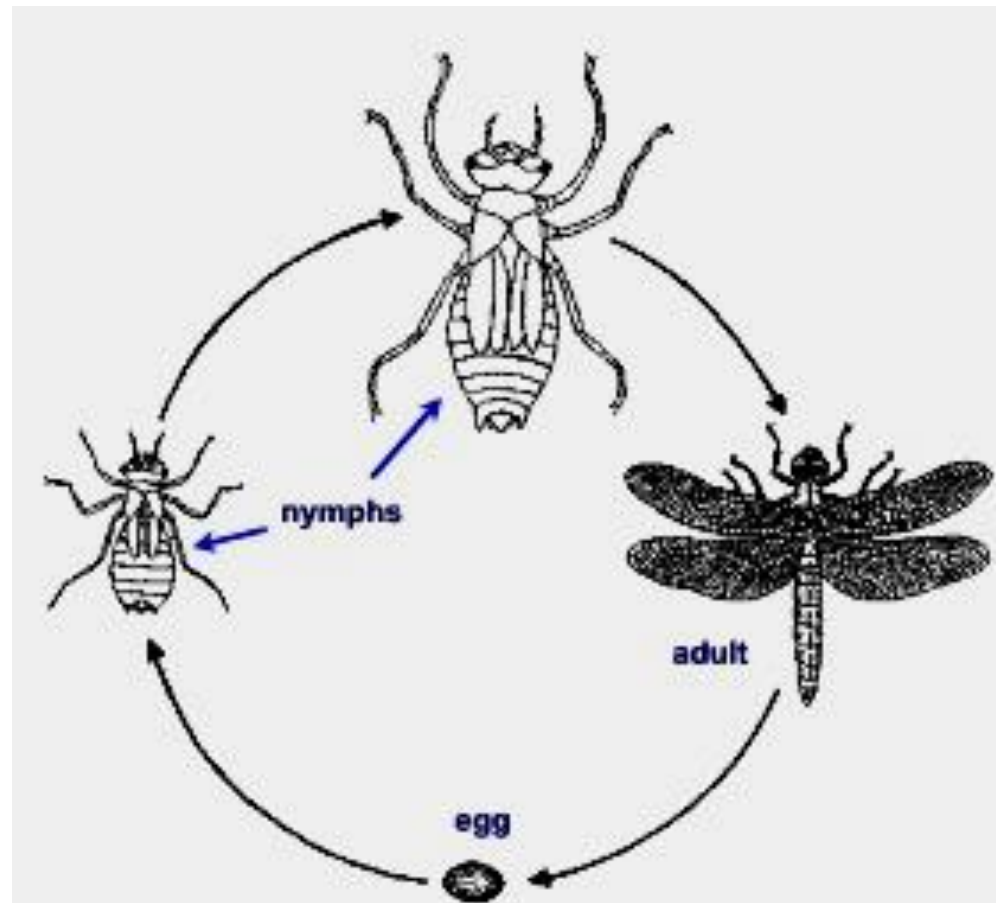


DEVELOPMENT AND SPECIALIZATION



EVENTS IN INSECT DEVELOPMENT

- Embryo
- Immature
- Adult





EVENTS IN INSECT DEVELOPMENT

- **Eclosion**-emergence of the adult from the pupa
- **Instar**-stage of the insect between molts; differ in form and size
- **Metamorphosis**-change in form

HEMIMETABOLOUS INSECTS

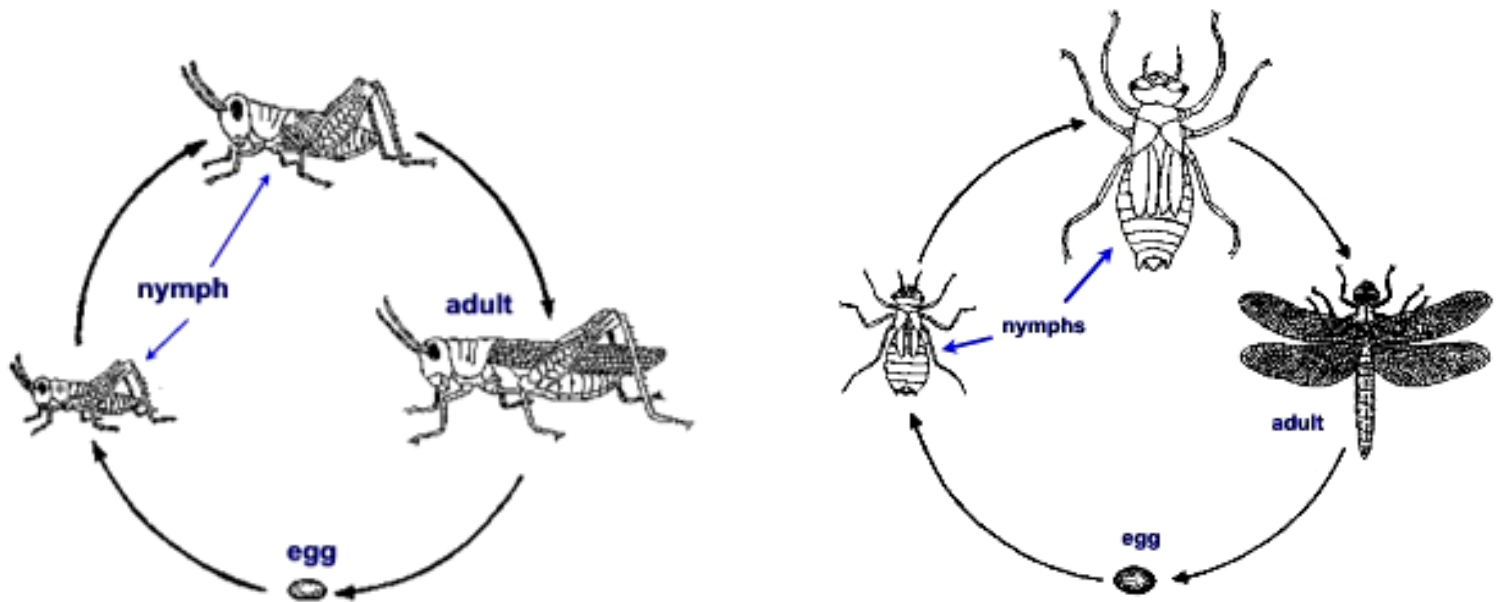
- Insects that have **gradual development or incomplete development**



HEMIMETABOLOUS INSECTS

□ Life stages

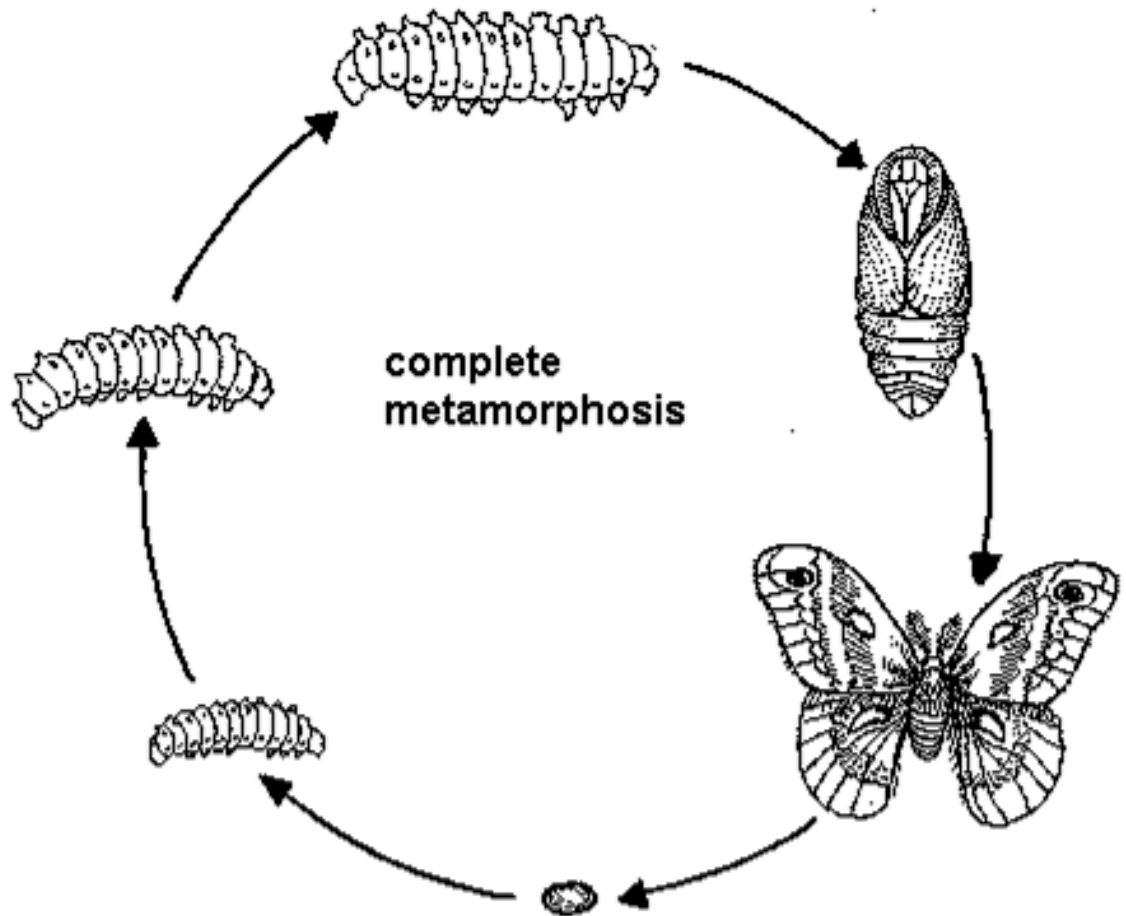
- **Nymphs or naiads** (immatures) are similar to the adult in appearance, food habits, and habitat
- **Adults**



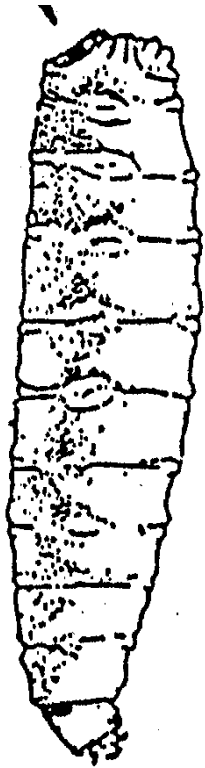
HOLOMETABOUS INSECTS

□ Life stage

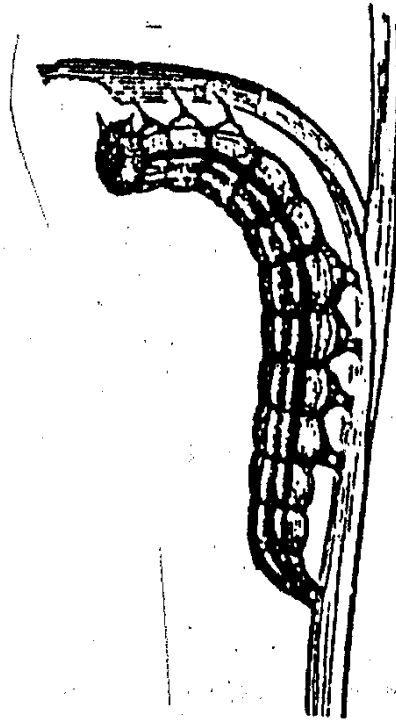
- Egg
- Larva
- Pupa
- Adult



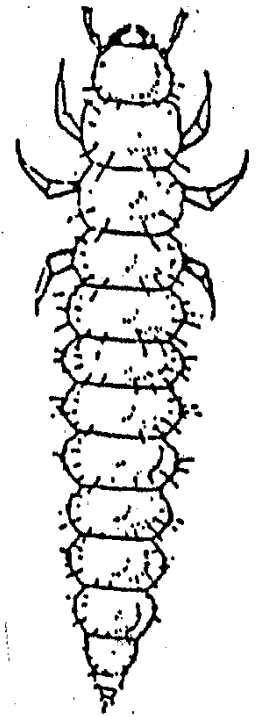
LARVAL LIFE FORMS



**VERMIFORM
(MAGGOT)**

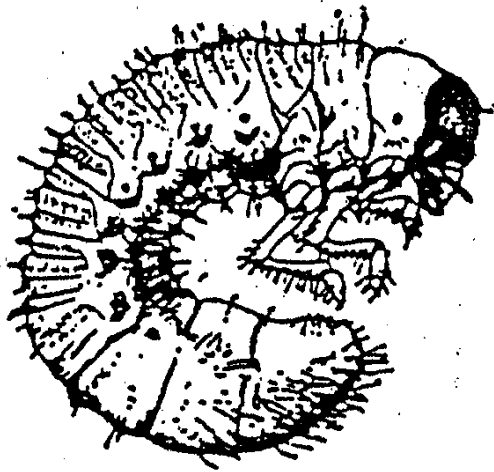


**ERUCIFORM
(CATERPILLAR)**

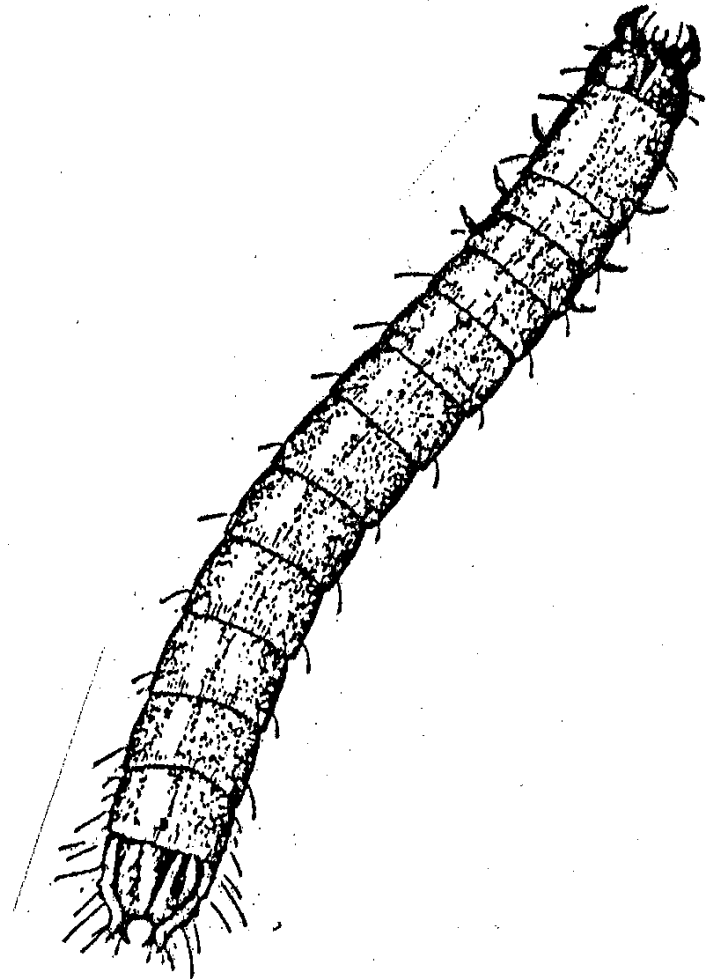


**CARABIFORM
(LEAF BEETLES)**

LARVAL LIFE FORMS

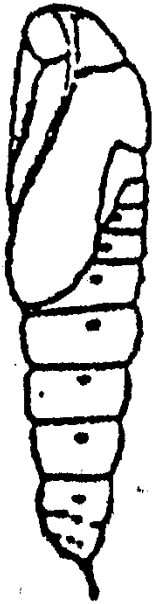


**SCARABAEIFORM
(GRUBS)**

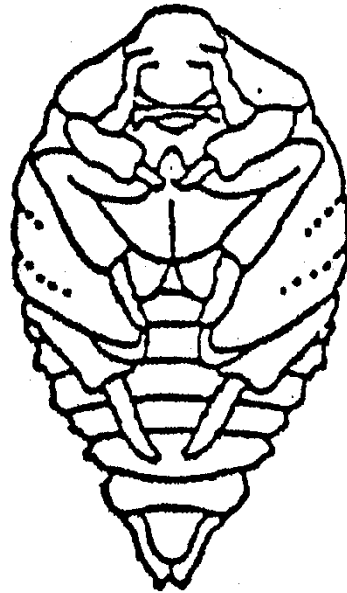


**ELATERIFORM
(CLICK BEETLE)**

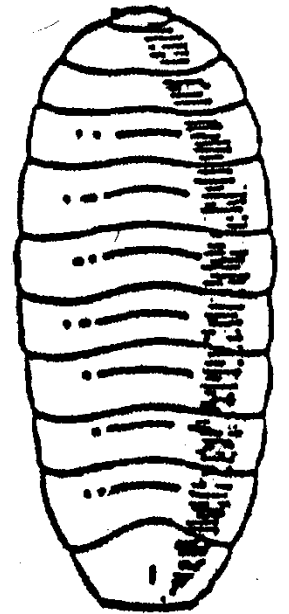
PUPAL LIFE FORMS



**OBTECT PUPA
(MOTH)**



**EXARATE PUPA
(SCARAB BEETLE)**



**COARCTATE PUPA
(FLY)**

INSECT DEVELOPMENT

- **Molting**-complex process by which an insect sheds its old cuticle to allow for growth and increase in size





INSECT DEVELOPMENT

- **Univoltine**-insect completes one generation per year



INSECT DEVELOPMENT

- **Bivoltine**-insect completes two generations per year



INSECT DEVELOPMENT

- **Multivoltine**-insect completes more than two generations per year





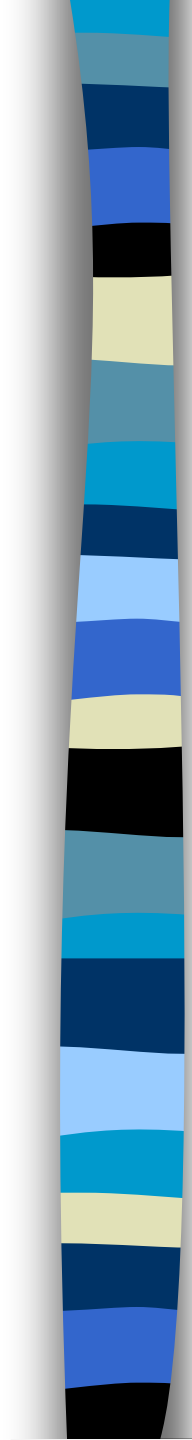
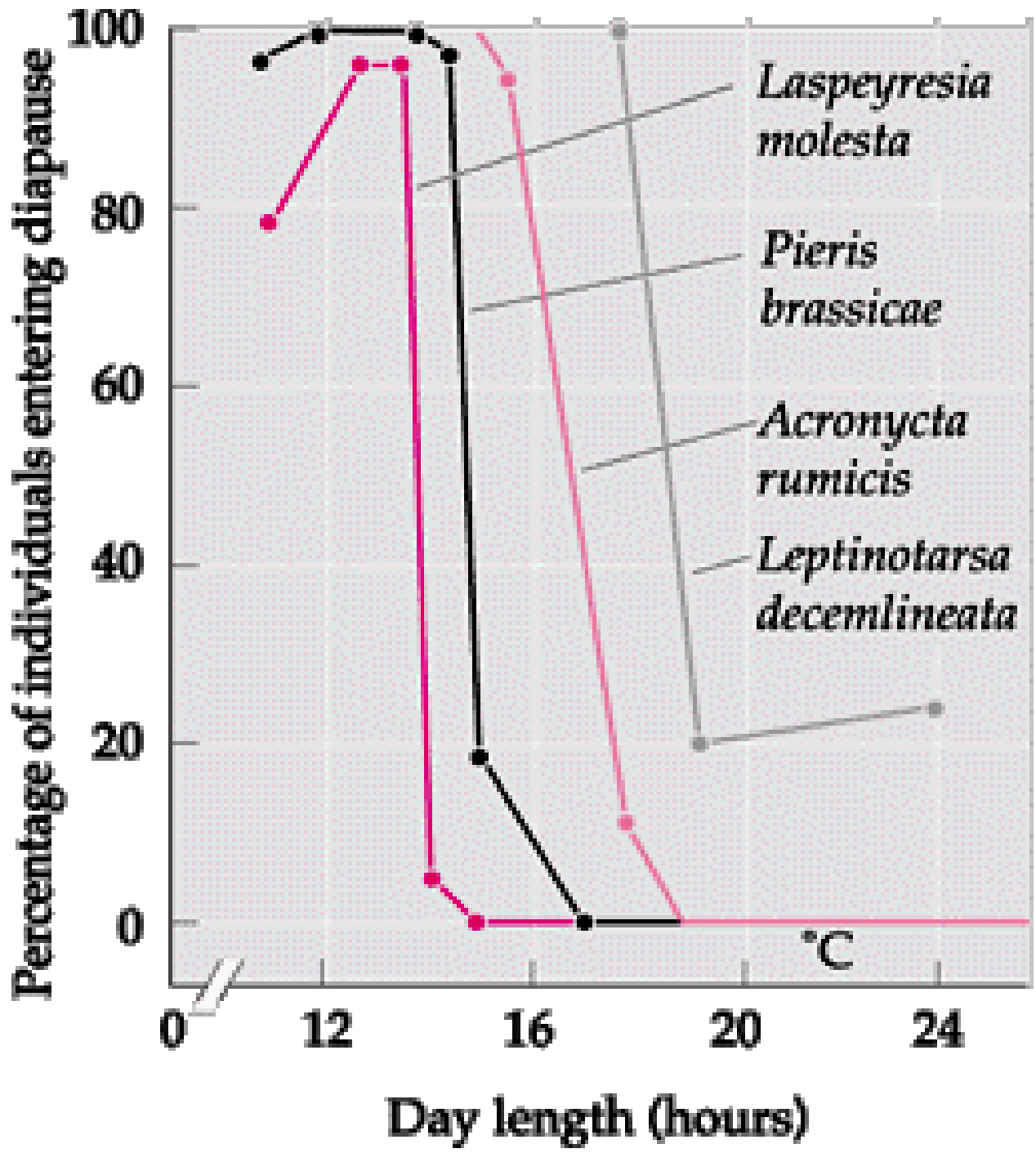
DIAPAUSE

- A state of arrested behavior, growth, and development that occurs at one stage in the life cycle
- Persists until the brain has been activated by a natural or artificial (refrigerator) winter
- **Diapause hormone** – regulates diapause



DIAPAUSE

- May be entered in any life stage
- Develops in response to **photoperiod**
- **Obligate**-intimately tied to certain environmental factors
- **Facultative**-insect may or may not enter diapause



END OF PRESENTATION

