

Technology of Crop insects control (Practical)
Third Class, Field Crop and Medicinal Plant Department
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Assist. Lecturer- Mr. Azad Hasan Saleh
E mail: azad.saleh@su.edu.krd

Lecture 01

Kingdom: Animalia

Phylum: Arthropoda

Characteristics of the phylum:

- 1- They have a hard Exoskeleton. They don't have bones, but the hard outer covering supports the muscles.
- 2- The body is formed of a number of segments.
- 3- The appendages are jointed.
- 4- Bilateral symmetry.

Note: this phylum divided into some subphylum.

Subphylum 1: chelicerata

1- Class : Arachnida

A- order: Acarina Ex: Ticks and Mites, characterized by:-

- The body is oval and compact; consist of 1 segment (region) with small head.
- Have 4 pairs of legs.
- Compound eye, wings and Antennae are absent.
- Ticks parasite on animals only but Mites is parasite on Humans, animals and insects.

B- Order: Scorpionida Ex; Scorpion

- The body divided into Cephalothorax and Abdomen.
- Have 4 pairs of legs.
- Have (1) pair of chelicerae.
- Without antenna and wing.

C-Order Araneada Ex: Spider

- The body consists of 2 segments (regions) prosoma and Opisthosoma
- Have 4 pairs of legs without wings and antenna.
- The eyes are simple, most spiders have 8 eyes, but some have fewer.
- All spiders are predaceous and feed mainly on insects.
- They rarely bit human. But only few Species in USA are dangerously venomous.

Ex: crab spider, jumping s and Black widows.

Subphylum 2: Mandibulata

Class A: Chilopoda (Centipedes)

- The body are elongate, worm like with small head and long trunk consist of 20-22 segments.
- Each segment bear (1) pair of legs.
- (1) Pair of long antennae.
- The 1st pair of legs modified into venomous [Fangs].
- Terrestrial and nocturnal, some of it are very poisonous and others are beneficial because they feed on fly, spider and small animals.
- They are active, fast, found in variety place, but usually in protected situation such as under bark & rotten logs.
Ex. *Scolopendra spp.*

Class B: Diplopoda (Millipedes)

- The body is cylindrical, has more than 50 segments.
- Each body segment bears 2 pair of legs.
- (1) Pair of short antennae with 7 segments.
- They are usually found in damp places, under (fall leaves, stones and board) in rotting woods and soil etc...
- Sometimes do serious damage in greenhouses and gardens.
- EX. *Iulus* sp.

Class C: Crustacea

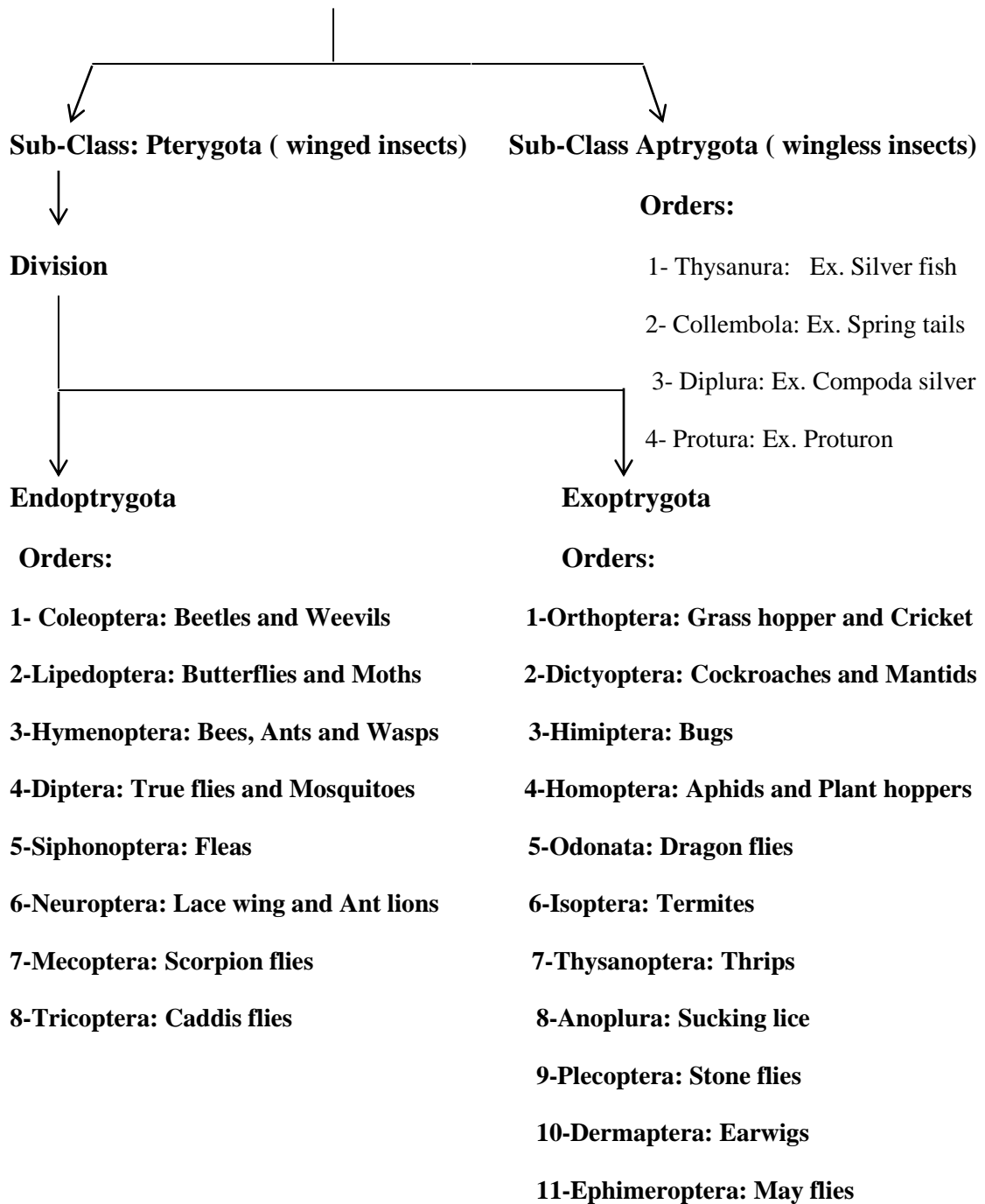
Order: Decapoda

1. Body regions are cephalothorax and abdomen.
2. Abdomen Segments may be fused.
3. 5 pairs of legs, the 1st pair is modified into mandibles (Jaws) for chewing called tongs.
4. (2) Pairs of antennae.
5. Aquatic (marine and fresh) water animal. Some are used as human food.
6. EX. *Crab* sp. and crayfish.

Class D: Insecta (Hexapoda)

- Body divided into **head, thorax** and **abdomen**
- (1) Pair of antennae.
- (3) Pairs of legs (6 legs).
- 1 or 2 pairs of wings or wingless.
- Have different types of Development.
- Divided into 2 subclass :-

Class: Insecta (Hexapoda)



Metamorphosis of Insects:

- 1- Ametabola (silver fish) Egg → Young stages → Adult
- 2- Incomplete Metamorphosis (Odonata) Egg → Naiad → Adult
- 3- Gradual Metamorphosis (grasshopper) Egg → Nymph → Adult
- 4- Complete M. (Butterfly) Egg → Larvae → Pupa → Adult

Mouth part Modifications among Field crops insects.

1- Biting or Chewing Mouth Part.

Such as Locust, Grasshopper and beetles.

2- Piercing-Sucking Mouth Part.

Such as Aphids and Bugs.

3- Rasping mouth parts such as Thrips.

The Larvae of Insects:

Insect's larvae are highly variable in form and most of them have developed adaptations suitable to their characteristic mode of life. Thus we can study mainly 4 types of insect larvae, namely, protopod, polypod, oligopod and apod larvae.

Types of Larvae:

A- **Protopod L.:** limbs rudimentary or absent; internal organs incompletely differentiated.

Examples: Some parasitic Hymenoptera.

B- Polypod Larvae.

1- **Eruciform L. (caterpillar):** cylindrical, well-formed head, thoracic legs, and abdominal legs. Ex.: Lepidopteran Larvae

C- Oligopod Larvae.

1- **Scarabaeiform L. (White grub):** C-shaped, well-formed head and thoracic legs (no prolegs). Ex. Coleoptera (Scarabidae)

2- **Campodeiform L. (Crawler):** flattened body with long legs usually filaments on the end of the abdomen.

Ex.: Coleoptera (Coccienellidae)

3- **Elateriform Larvae:** cylindrical shape like wire and they have thoracic legs only. Example: wire worm (larvae of click beetle) family Elateridae – order coleoptera.

D- Vermiform L. (Maggot): Cylindrical and elongate lacks legs.

Ex.: Diptera and Hymenoptera

The Pupae of Insects:

Based on the adherence of their appendages to the body, insect pupae are classified into three types:

1-Obtect P. (Chrysalis): Developing appendages held tightly against the body by a shell like casing. Often found enclosed within a silken cocoon. Ex: Pupae of Lepidoptera

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

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

Types of Larvae:



Protopod Larva.



Polypod Larva



Scarabaeiform Larva.



Campodeiform Larva



Elateriform Larva



Vermiform Larva