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Website:

Lecture title: Class Insecta

Lecturer Affiliation: Department of Microbiology, College of Veterinary Medicine, University of Mosul, Mosul, Iraq. **wasenamkad@uomsul.edu.iq**

Summary: Class Insecta

Morphology

Head

the head of an insect generally comprises six fused segments with a

single pair of antennae.

structure of the mouthparts, depending on feeding habits, with

adaptations for chewing biting, sponging or piercing-sucking

Thorax

three segments in the thorax (pro-, meso- and meta-thorax) each bear

a pair of jointed legs.

The thorax of many insects also bears two pairs of wings, but in the

winged insects of veterinary significance, i.e. the Diptera only one pair is

functional, the second being reduced to small knob-like sensory

structures, called halteres, which apparently have a balancing function.

Wings are out growths of the thoracic tegument supported by hollow

tubes called veins which run longitudinally and crosswise, the

intervening areas of tegument being known as cells.

Protozoa and Arthropoda /part2/3rd year 2024-2025

The arrangement of the veins and the shape of the cells are important

in identification.

Abdomen

The abdomen of insects consists of up to 11 segments with terminal

modifications to form the genitalia.

Mouthparts of insect

Life cycle

The sexes in insects are separate

-Holometabolous life cycle (complete Metamorphosis)

Holometabolous insects undergo a four -stage life cycle where each

stage is morphologically and functionally distinct

Four stages of Holometabolous life cycle

1-Egg stage

2-Larval stage (Feeding and Growth)

3-pupal stage (Transformation)

4- Adult (Imago)stage

Examples of Holometabolous insect Flies, Mosquitoes

-Hemimetabolous life cycle (Incomplete Metamorphosis)

Hemimetabolous insects undergo incomplete metamorphosis

meaning they develop through three distinct stages without a

pupal stage

Three stages of the Hemimetabolous life cycle

1-Egg stage

2-Nymph stage (Gradual Development)

3-Adult (Imago) stage

Examples of Hemimetabolous Insects Lice

Taxonomy of Insecta

Insects belong to the class Insecta, within the phylum Arthropoda. Their classification is based on morphological, anatomical, and molecular characteristics. Below is the hierarchical taxonomy of insects:

Kingdom: Animalia

Phylum: Arthropoda

Subphylum: Hexapoda

Class: Insecta

Order Diptera (Flies, mosquitoes).

Order Siphonaptera (Fleas).

Order Diptera

Suborder Nematocera

- These are small flies and the adults are characterized by having a pair of long, jointed antennae and segmented maxillary

Only the females are parasitic and have piercing-sucking mouthparts.

Suborder Brachycera

-These are large flies with stout antennae often consisting of

only three segments.

Suborder Cyclorrahpha

- These are small to medium sized flies with short, three-segmented antennae, the last of which often bears a feather-like attachment, the arista.

Family Simuliidae

Is a family of small, blood -feeding flies, black, brown or gray color.

commonly known as black flies

they are medically and economically important due to their role as vectors of disease

Hosts:

All domestic animals and man.

Distribution:

Worldwide

Morphology: - As their common names indicate these flies are usually black with a humped thorax.

Adult male and female flies are similar, but can be differentiated by the fact that in the female the eyes are distinctly separated (dichoptic) whereas in males the eyes are very close together (holoptic)

Life cycle

- Eggs are laid in sticky masses of several hundred on partially submerged stones or vegetation in flowing water.

- Hatching takes only a few days in warm conditions, but may take weeks in temperate areas and in some species the eggs can overwinter.

-The body is swollen posteriorly and just below the head

-maturation takes several weeks to several months and in some species larvae can overwinter.

- Mature larvae pupate in a slipper-shaped brownish cocoon fixed to submerged objects and the pupa has prominent respiratory gills projecting from the cocoon.

- the pupal period is normally 2-6 days, adult flies which gain the surface of the water and take flight.

Pathogenesis

- Only the adult females suck blood

- in domestic animals especially cattle, mass attack by these flies may be associated with an acute syndrome characterized by generalized petechial haemorrhages, particularly in areas of fine skin, together with oedema of the larynx and abdominal wall.

- The painful bites of swarms of Simulium may interfere with grazing and cause production loss

- in certain areas of Central Europe it is often impossible to graze cattle during the spring due to the activity of these flies.

- Horses are often affected by the flies feeding inside the

ears

- poultry may become anemic from blood loss when attacked.

- Simulium spp. may transmit

* The viruses causing Eastern equine encephalitis and vesicular

stomatitis

* The avian protozoan Leucocytozoon and filarioid helminths

such as Onchocerca gutturosa of cattle.

Control

The most practical control method is

- the application of insecticides to breeding sites to kill larvae by

repeated application of organochlorine or organophosphorus

insecticides to selected water courses at intervals throughout

the year.

In horses, insecticides or repellents may be applied topically

In poultry can be provided with insecticidal dust baths.