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Lecture title: Phylum Arthropoda

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Summary: Phylum Arthropoda

Phylum Arthropoda

The largest phylum in the animal kingdom, which having an

exoskeleton, a segmented body, and paired jointed appendages.

Characteristics of Arthropods

1- Bilateral symmetry

Their bodies are symmetrical on both sides

2-Body segmentation

The body is divided into repeated segments.

3-Exoskeleton

The body is covered by an exoskeleton Composed of chitin, which

provides protection and structural support

4-Jointed Appendages

Specialized for locomotion, feeding, and sending.

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

5- Open Circulatory System

The heart is typically a muscular tube that runs just under the back and

Blood is pumped into a body cavity

6- Sexual Reproduction

Most arthropods reproduce sexually, with internal or external

fertilization.

7- Advanced Nervous system

Includes a ventral nerve cord and segmented ganglia

8- Moulting

Shedding the old exoskeleton after growing a new one that is not yet

hardened.

Also called Ecdysis

9-Respiration

Many Arthropoda arachnids have book lungs.

Tracheae system of branching tunnels that run from the openings

in the body walls, deliver oxygen directly to individual cell in many

insect, myriapods and arachnids.

10- Digestive system

They have a well-developed digestive system.

11-Excretory system

end product of nitrogen metabolism is uric acid, which can be

excreted as dry material.

12-Senses or sense organs

They contain sensory organs like hairs, antennae, simple and compound

eyes, auditory organs, and statocysts.

13- Optical organs

Most arthropods have developed visual systems that include one or

ore usually both of compound eyes and pigment-cup ocelli ("little

eyes").

Ocelli are only capable of detecting the direction from which light is

coming.

Class Arachnida (Arachaids)

Order Acarina

Family Ixodidae (hard tick)

Family Argasidae (soft tick)

Family Ixodidae

called hard tick because of the presence of a rigid chitinous

scutum which covers the entire dorsal surface of the adult male;

in the adult female and in the Larva and nymph it extends for only

a small area which permits the abdomen to swell after feeding.

- series of grooves on the scutum and body in some species,

arrow of notches called festoons, on the posterior border of the body.

- Eyes, when present are situated on the outside margin of the

scutum.

-They are classified according to the number of hosts to which the ticks

attach during their life cycle.

One- host ticks where entire parasitic development from larvae to adult

takes place on the one host.

Two – host ticks where larvae and nymphs occur on one host and the

adults on another.

Three- host ticks where each stage of development takes place on

different hosts.

*Genus : Hyalomma

- Usually in ornate but with banded legs (the 'Bont legged

tick').

- Eyes are present and festoon sometimes present.

- They are usually two-host ticks with the larvae and nymphs

feeding on birds and small mammals and the adults on

ruminants and equines.

Pathogenesis:

- This genus is mainly responsible for tick toxicosis.

- Many species of this genus, transmit Babesial , Theilerial and

Rickettsial infections .

*Genus: Rhipicephalus

- Usually in ornate with eyes and festoons present.

- Are short and the basis capituli hexagonal dorsally.

- The genus includes both two-host and three-host ticks.

Pathogenesis

- It's primarily parasitic on dogs, called ' the brown dog or

kennel tick'.

- Its responsible for transmission of Babesia canis , also many

species of Rhipicephalus transmit B.bigemina and Theileria parva

*Genus: Boophilus

- In ornate ticks with eyes present and festoons absent.

- These, often known as ' blue ticks' are one host ticks.

Pathogenesis: This genus is the most important vectors of Babesia spp.

and Anaplasma marginale in cattle.

Control of one host ticks:

- The a Ivermactins / milbemycins may play an increasing role

in the control of one-host ticks.

- Treatment every 21 days during the tick season should give good

control.

Control of two- and three -host ticks:

-Weekly dipping should also control the larvae and nymphs.

- Ivermectin or closntel given by the parenteral route have

also been shown to be useful aid in the control against one-

host ticks.

- Formamidine, amitraz and some synthetic pyrethroids.

Family: Argasidae (soft tick)

Genus: Argas (the fowl tick)

The common species, Argas persicus , on domestic poultry in the tropics; it has only been recorded from Britain on a few occasions.

Life cycle:

- It involves one larval and at least two nymphal stages prior to the adult.
- These various stages live in cracks and crevices of the poultry house only approaching birds at night to suck blood about once per month.
- The adult stages live for several years, even in the absence of suitable hosts.

Pathogenesis:

1- These ticks cause sleeplessness.

2- Loss of productivity and anemia, which can prove fatal.

3- They transmit Borrelia anserina the cause of fowal spirochaetosis and Aegyptianella pullorum, a rickettsial infection.

Family: Sarcoptidae (Burrowing mites)

Genus: Sarcoptes

Hosts: All domastic mammals and man.

Species: Sarcoptes scabiei

Sarcoptes is round in outline with short legs.

The numerous transverse ridges and triangular scales on the dorsum.

Life cycle:

-The fertilized female creates a winding burrow or tunnel in the upper layers of the epidermis feeding on liquid oozing from the damaged tissues.

- The eggs are laid in these tunnels , hatch in 3-5 days.

- The six –legged larvae crawl on the skin surface.

- Then they burrow into the superficial layers of the skin to create small ' moulting pockets' in which the moults to nymph and adult are completed.

- Fertilization occur between males and females , the entire life cycle is completed in 17-21 days.

Family: Psoroptidae

Genus: Psoroptes

Hosts: Sheep, Cattle, equines.

Species: psoroptes ovis → sheep and cattle

Psoroptes equi → equines

- Psoroptes is atypical non-burrowing unite.

- Oval in shape and with all the legs projecting beyond the body margin.

Life cycle:

- The female layes about 90 eggs during her life time of 4-6 weeks.

- Development from the egg , through the larval and nymphal stages to mature adult, takes about ten days .

Family: Demodicidae

Genus: Demodex

Hosts: All domestic mammals and man.

Location: Hair follicles and sebaceous glands.

Demodex has an elongate tapering body, with four pairs of stumpy legs anteriorly.

Family: Dermanyssidae

Genus: Dermanyssus

Hosts: Domestic poultry and wild birds; it is occasionally parasitic on mammals, including man.

D.gallinae (red mite)

It's a large mite, with a body length about 1.5mm with long legs and somewhat spider-like, the color is white to greyish-black, becoming red when engorged with blood.

Life cycle:

- This mite spends much of its life cycle away from its host, the adult and nymph only visiting birds to feed, mainly at night.
- The favored habitats are poultry houses , usually of timber construction, in the cervices of which the eggs are laid .

Pathogenesis

- It's a vector of Borrelia anserina the cause of avian spirochetosis.

- Can cause erythema and intense pruritus in cats which occupy old

wooden poultry houses.