

# Onchocercosis

## Causal factor for Equidae

### Equidae:

- ✓ *Onchocerca reticulata*.....Forefoot flexor tendon connective tissue, heel
- ✓ *Onchocerca cervicalis*.....Lig. nuchae

### Ruminants:

- ✓ *Onchocerca armillata*.....The aorta inner wall or outside the nodule
- ✓ *Onchocerca gibsoni*.....Lower part of the chest, food outer face is in the nodule
- ✓ *Onchocerca lienalis*.....Lig. nuchae connective tissue, tibiofemoral connective tissue, posterior connective tissue, gastrosplenic ligament
- ✓ Parasites are 7-70 cm long.
- ✓ Life cycle is indirect.
- ✓ Intermediate host is the mosquitoes of the genus *Culicoides*.

# Pathogenesis and Clinical signs

- Adult parasites cause widespread hot and edema swellings.
- Swells 3-4 weeks stay and then disappear.
- The ligaments are thickened and the inside of the nodules is the case of caseification or calcification.
- The region is edematous and swollen, because of the nerveal pressure, lameness occurs.
- The lameness disappears when the swelling disappear
- The microfilaria is the cause of dermatitis.
- The microfilaria can cause blindness in the eyes.

*O.cervicalis*, bristle loss in the tail,  
aqueous dermatitis

Intense microfilaria in the  
tear duct

*Onchocerca cervicalis*

# Diagnosis – skin biopsy: Onchocercosis

- Biopsy sample is taken from skin.
- The skin part is put into warm saline and waited 6-7 hours.
- Then physiological saline is cantrifuged and microfilaria are searchend in the buttom portion.

# Treatment

- Adult parasites are surgically removed.
- There is no effective treatment.
- As the lesions in the eye can pass by itself or symptomatic treatment may be required.
  - Ivermectin 0.2 mg/kg p.o./s.c. ➤ microfilaria and dermatitis
  - Moxidectin 0.3-0.5 mg/kg p.o. ➤ microfilaria
  - Diethylcarbamazine 5-8 mg/kg s.c. 21 days ➤ microfilaria
  - Corticosteroid is applied for allergic reaction.
- Within 1-3 weeks, healing is seen in microfilaria and onchocercal dermatitis.

# Genus: *Setaria*

- *Setaria equina* is parasite of **horses** that lives in the **abdominal cavity**, **lung** and **scrotum**.
- *Setaria digitata*
  - **Ruminant**
  - **Abdominal cavity**
- Adult parasites are long and slender, reaching 8 cm for males and 13 cm for females.
- The microfilariae, which are found in the blood, are about 0.25 mm long.
- Intermediate hosts is mosquito (*Culex*, *Aedes*).

# Biology, Pathogenesis, Clinical signs and Treatment

- Larvae produced by adult worms in the body cavity.
- Circulate in the blood and are taken up by culicine mosquitoes (including *Aedes* and *Culex* species).
- Infective larvae(L3) develop in the mosquito in 12 days.
- And are reinjected into horses when mosquitoes feed.
- Adult parasites are present 8 to 10 months after infection.

## ○ *S. digitata*

- Adult parasites are not pathogen
- But larvae(microfilariae) are caused by **Cerebrospinal nematodiasis** in **sheep, goats** and **horses**, lumbal paralysis in the back legs, blindness and intraocular nematodiasis in horses.

## Biology, Pathogenesis, Clinical signs and Treatment-2

### o *S. equina*

- o Adult worms in the abdominal cavity are of no concern, but worms occasionally develop in the eye and cause damage.
- o If *Setaria* developing in the eye may be very damaging, it can cause blindness.

### Diagnosis:

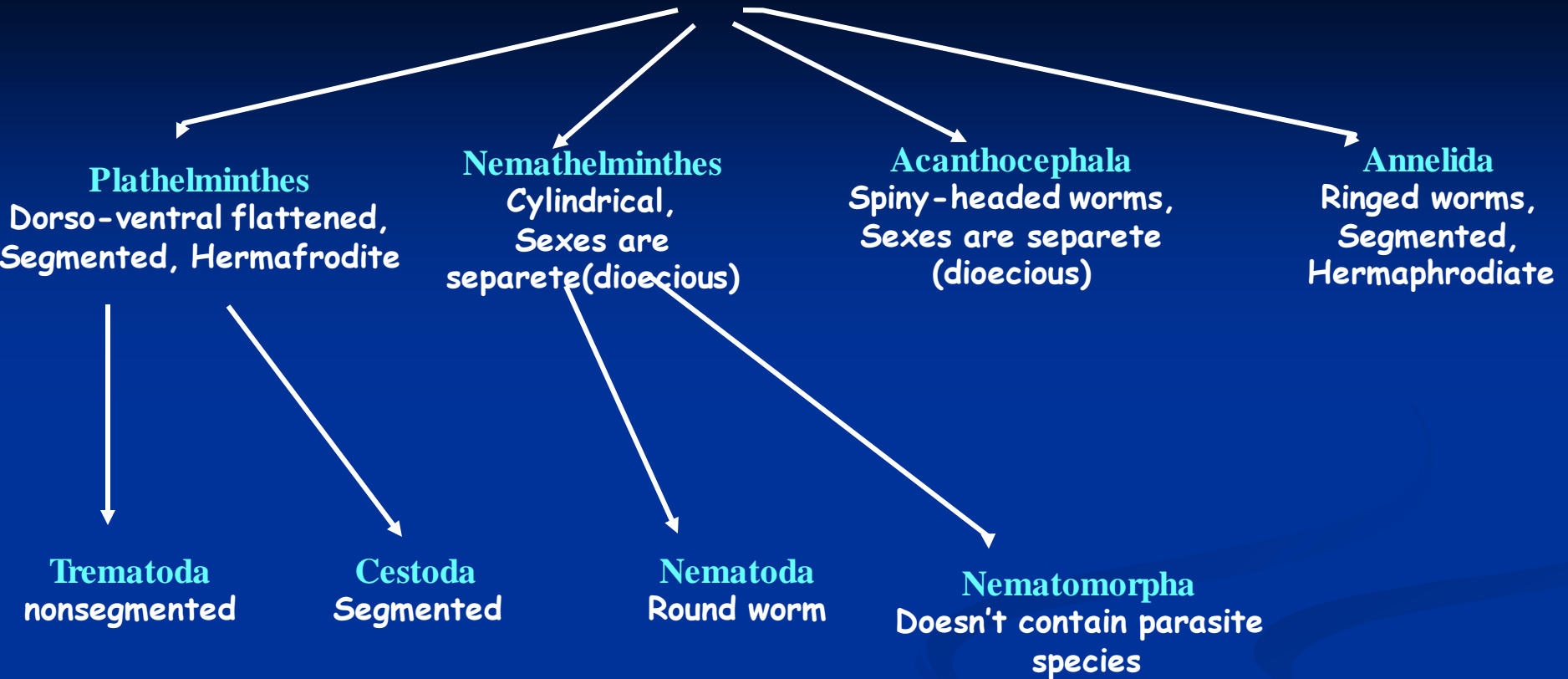
- o Diagnosis is based on detection of microfilariae in the blood.

### Treatment: Ivermectin for adult parasite

- o Mosquito control is important in the control of *Setaria* in horses.
- o Oral diethylcarbomazine may also be effective to remove circulating microfilaria.



# HELMINTHS



# Acanthocephala=Spiny-headed worms

Species	long	Definitive host	Intermediate host
<b>Macrocanthorhynchus hirudinaceus</b>	10-35 cm	pig	Coleoptera
<b>Oncicola canis</b>	5-14 mm	dog, cat (Parathenic host: armadillo, turkey)	Artropodes
<b>Moniliformis moniliformis</b>	4-27 cm	dog, mice	blattela
<b>Polymorphus boschadis</b>	3-10 mm	goose, duck	Gammarus
<b>Filicollis anatis</b>	6-25 mm	goose, duck	Crustacea

- Live in intestine.
- There is barbed nose over the front which can move back and forth.
- Sexes are separated (i.e. dioecious)
- There is no digestive system, food is absorbed.
- Life cycles are indirect.
- Intermediate host for **Acanthocephalous** with terrestrial life cycles include insects (especially *Coleopptera* and *Orthoptera*).
- Larval development takes place (occur) in intermediate arthropod hosts.

- ❑ The remainder of the body forms a cylindrical or flattened trunk often bearing rings of small spines.
- ❑ Most *Acanthocephalans* are less than 20 cm long.
- ❑ Females are generally larger than males.
- ❑ Digestive tract has been completely lost and most other organ systems are notably reduced, with the exception of reproductive system.

# Life cycle, Pathogenesis, Clinical signs and Diagnosis

- Adult *Acanthocephalus* attach to their host intestinal wall with their retractable proboscis hooks which can be pulled back into pockets like the claws of a cat.
- Much of the early development of *Acanthocephalus* takes place within the female's body cavity.
- Eventually a shelled «acanthor larva» develops.
- Exiting to the outside World in the host's feces.
- Developing *Acanthocephalan* must be ingested by an arthropod intermediate host to continue its life cycle.
- The «acanthor» larvae penetrates the gut wall of intermediate host and enters the body cavity.
- Where it eventually develops into an encapsulated form known as a "cystacanth".

# Life cycle, Pathogenesis, Clinical signs and Diagnosis-2

- Larvae «**acanthor**» are found in the egg, laid out by feces.
- These eggs are taken up by intermediate host in 1 to 3 months infective larvae which «**cystacanth**» develops in intermediate host.
- The last (definitive) host infected by eating infected intermediate hosts.
- The larvae hold in the gut, develop and mature.
- Prepatent time in *Macrocanthorhynchus hirudinaceus* is 2-3 months.

## Pathogenesis:

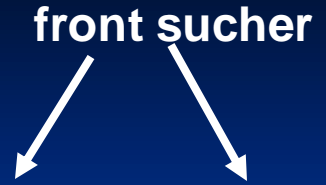
- Due to the proboscis is embedded in the intestinal mucosa, inflammation, hemorrhage, intestinal perforation, peritonitis and death.
- Diarrhea, abdominal pain, weight loss

## Diagnosis:

- Eggs in feces are searched (oviform, thick-shelled, there is a circle-shaped hooks on the front of the «**acanthor**» in the egg.

# Hirudinea(Annelid)=Leeches

- Leeches are typically dorsoventrally flattened
- Do not full segmented.
- Hermafroditic but do not self-fertilize
- There are front and back suchers,
  - Front sucker has blood-sucking task.
  - Back sucker has movement and gripping task.
- There is digestive system.
- Eggs are in cocoon.
- Life cycle is direkt.



# Life cycle

- Leeches usually live in muddy freshwater. some live in the sea or on land.
- eggs stay on a cocoon,
- young leeches out of egg.
- Life expectancy is about 1 year.
- Some are predators, others are scavengers.
- Those who are parasites suck blood (temporary parasite)

# Leechs species

- *Hirudo medicinalis* (medicinal leech)
  - 8-12 cm. long
  - Dorsal face greenish brown color, there are 6 red bands.
  - Ventral face olive's green  
and there is one black band in each side of the lateral.
- *Hirudo officinalis*
  - 8-12 cm. long
  - green color
  - There is black stain and black band
- *Limnotis nilotica* (horse leech)
- It lives in stagnant water, in ponds and lakes.
  - 8-12 cm. long
  - Dorsal face is dark brown color. There are several longitudinal black spots.
  - Ventral is darker. There is orange band on both sides.
- *Hemadipsa zeylanica*
  - 2-3 cm. long



# Patogenesis, Clinical signs, Treatment and Control

## Patogenesis, Clinical signs:

- It is attached to the skin and the oro-pharyngeal mucosa of the host's organs, shrinks the epidermis or mucosa.
- Anemia
- Nasal cavity or pharyngeal cough, coughing sputum, mouth and mouth light-colored foam blood, wheezing and respiratory distress.
- If parasite is adherent to the larynx, oedema, asphyxia, and death.

## Treatment:

- Mechanical removal with fire and saline water.
- Washing the nose with 50% chloroform water (removed in 10 minutes)

## Control:

- Where the animals drink water and shallow-dip muddy places should not be allowed to drink water.

# Pentastomida

## Linguatula serrata

- *Linguatula serrata* lives in the nasal airways or frontal sinuses of dogs, wolves, foxes and other carnivorous mammals.
- The ventral part is flat, and the cuticle is line-transverse.
- Adult male's of *L.serrata*, 1.8-2 cm,
- while an adult female is 8-13 cm long.
- The worm is colorless and transparent.

□ Life cycle is indirect.

### Definitive host;

- dog, fox, wolve or other carnivour mammals.
- It lives in the nasal airways or frontal sinuses.

### Intermediate host;

- Ruminant, horse, rabbit- in which visceral linguatulosis have been described.
- Larvae lives in mesenchymal lymph nodes, liver, lungs of intermediate host.
- Larvae is «**nymp**».

# Life cycle

- ❑ After being ingested by an herbivorous intermediate host from an aquatic environment.
- ❑ Eggs hatch into their first larval stage looking superficially like a mite.
- ❑ These larvae as «nyphs».
- ❑ The first larval stage of *L.serrata* tunnels through gut wall with stylet.
- ❑ The immature larvae are then encysted.
- ❑ Encysting can happen in number of tissues, including the liver, lymph nodes and muscle.
- ❑ After a series of molts in these cysts.
- ❑ The third stage larvae lose the leg-like appendages and
- ❑ The third stage larvae can travel the abdominal cavity and abdominal wall.
- ❑ While the larvae are encysted, many of them die and calcify after about 2 years.
- ❑ Carnivorous host feeds upon the intermediate host when the larvae are in their third stage.
- ❑ The larvae develop to their adult stage in the nasopharynx of the carnivorous.

# Clinical signs, Diagnosis and Treatment

## Clinical signs:

- ❑ in definitive host;
  - ✓ sneeze, cough, dyspnoea
  - ✓ snore
  - ✓ nose scratching with front feet
  - ✓ Quic fatigue in hunting dogs.

## Diagnosis:

- ❑ Eggs are searched in feces and nasal stream.

## Treatment:

- ❑ Treatment is relatively effective with praziquantel 10% creolin, 3-5% ammonia application in the nose.
- ❑ Dogs and other carnivorous should not be given infected organ.

# Nematomorpha = Horsehair worm

- ❖ They are parasitic in arthropods during their juvenile stage.
- ❖ It is not parasite of pets and are confused with nematodes.
- ❖ Cylindrical, cuticle flat
- ❖ Sexes is separated (male and female)
- ❖ **Mature**; predatory insecta
  - Larvae; polypod (centigeda), crab and insect larvae
- ❖ Larvae which leave the egg (thorny ring overflows) become encaustic in the arachnoid.
- ❖ Intermediate host with cyst is matured by the last host, leaves the host and lives free in the water.
- ❖ They randomly enter the digestive tract of people or animals with drinking water.
- ❖ But do not live much.

## Spices:

### ❖ *Gordius aquaticus*

- ❖ Horsehair worm, wire worm
- ❖ Male is 17-27 cm. / female is 30-90 cm. long.
- ❖ Juvenile horsehair or gordian worms (*Nematomorpha*) are obligate parasites of terrestrial insects and as adults are freelifing in freshwater sites including lakes, streams and rivers.