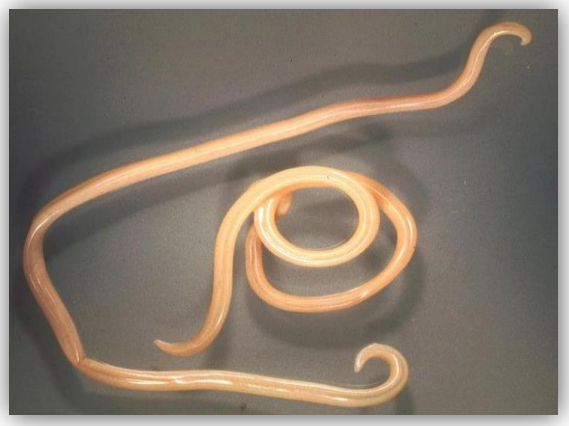
MJF COLLEGE OF VETERINARY & ANIMAL SCIENCES, CHOMU, JAIPUR

GENUS- TOXOCARA

Dr. Priyanka Saini
Assistant Professor
Veterinary Parasitology

Toxocara canis



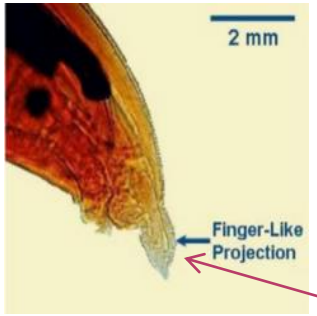
- Host: Dog & fox. Common in below 3 months of age
- Predilection site: Small Intestine

General characters

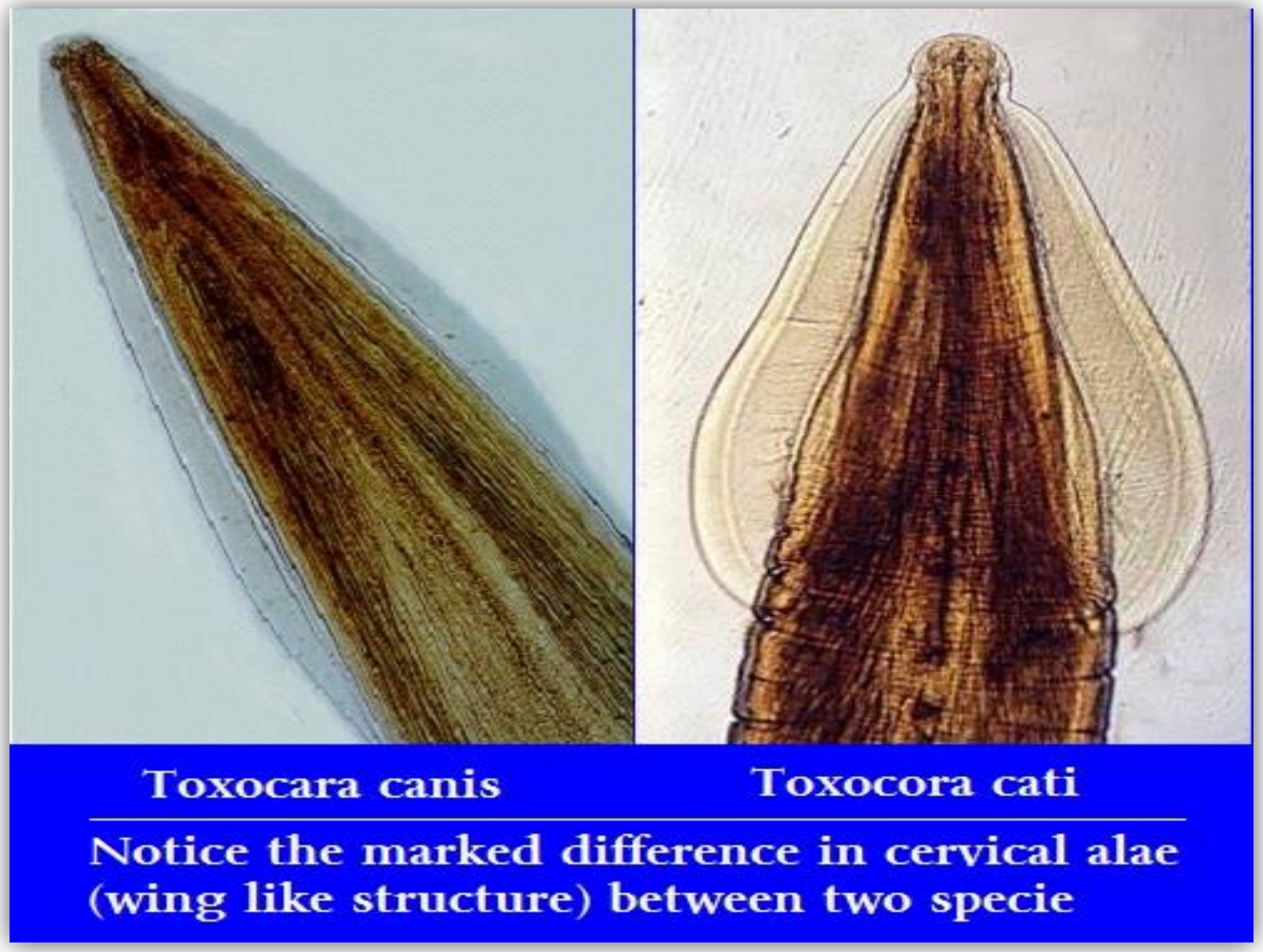
- Males are up to 10 cm and Females are up to 18 cm long
- Presence of large cervical alae

  Cervical alae looks like a "arrow". So these worms are commonly called as Arrow headed worms.
- Anterior end is bent ventrally.
- Tail of male worm bears a small finger like process.

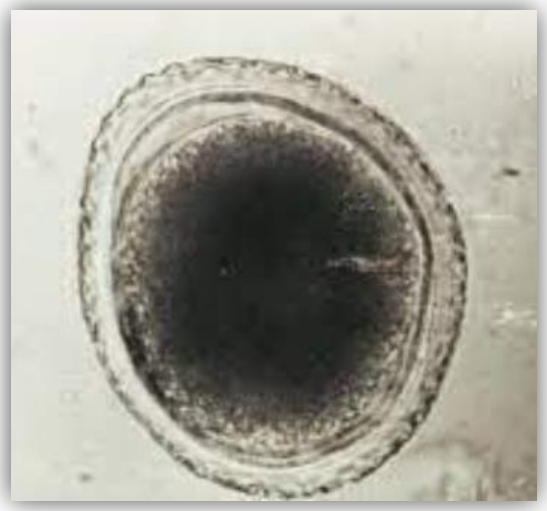
Cervical alae



Finger like


Toxocara canis
Toxocora cati
Notice the marked difference in cervical alae (wing like structure) between two specie

- Eggs: Sub globular in shape. Egg shell is thick, and provided with finely pitted structure with unsegment yolk



Life cycle of *Toxocara canis*

Types of life cycle

- Direct transmission
- Transplacental/ Transuterine/ Prenatal transmission
- Transmammary/ Transcolostral transmission
- Paratenic host involvement

Direct transmission

- Eggs developed to infective stage within 10 to 15 days.
- 3 months aged puppies may ingest infective eggs which hatched in their duodenum.
- The hatched out larvae L2 penetrate the intestinal wall and pass via the lymph stream to mesentric lymph nodes then by portal blood to the liver within 2 day post infection.
- The larvae than pass via hepatic vein, heart and pulmonary artery to the lungs.
- Maximum larvae reach the lungs about 5 DPI.
- From lungs, the larvae pass to the tracheal side and migrate into the alveoli, bronchioles and trachea.

- The L2 moult to become L3 in lungs about 10 days after infection.
- After reaching the intestine L3 moult to L4 in 2 weeks of infection.
- The L4 moult to L5 in about 5 weeks of infection.
- Tracheal route of migration occur only upto 3 months pup. If the pup is above 3 months, tracheal route is less frequent but somatic migration is common.

Transplacental/ Transuterine/ Prenatal Transmission

- After about a week of ingestion of infective egg the hatched out L2 larvae migrate to various tissues and organs like liver, kidney, brain and lungs.
- within the period, the larvae undergo no development and settle in the organ of the adult bitch.this is called somatic migration.
- The dormant larvae begins to migrate in the pregnant bitches about 3 weeks prior to whelping (after 42nd day of pregrancy) and enter into the foetus. When the larvae reaches the liver of the foetus, L2 moult to become L3.

- At birth L3 reach the lungs of puppy. During 1st week of birth L3 moult to L4 in the lungs, by the 2nd week of birth L4 moult to L5 and pass to the intestine.
- Eggs appear in the faeces 23 to 40 days after birth of the pup.

Transmammary Route / Transcolostral Transmission

- Larvae passed to suckling pups via colostrum. These larvae reach the intestine and directly develop to adult without migration.

Paratenic host

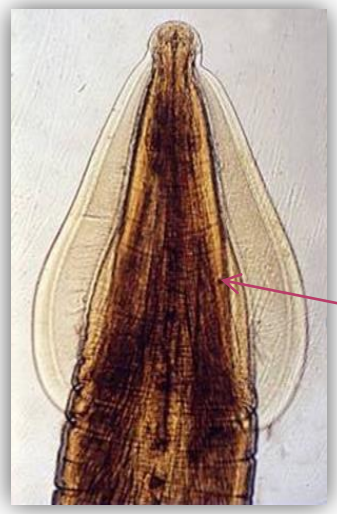
- Rodents may act as a paratenic host. Rodent may ingest the infected eggs. In which the liberated L2 distributed to various organs and remain dormant. Infection of dogs is by ingestion of paratenic host. In the intestine of dog larvae develop to adult directly without migration.

Toxocara cati

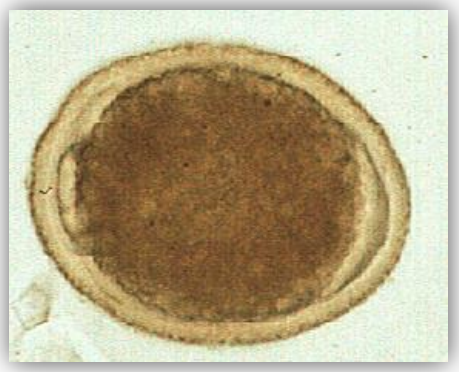
- Host: Cat and wild felids
- Predilection site: Small Intestine

General characters

- Males are 3 to 6 cm and Females are 4 to 10 cm long
- Anterior end is bent ventrally.
- Cervical alae is broad and striated.
- Tail of male worm bears Pointed tail end.
- Eggs: Sub globular in shape. Egg shell is thick and provided with finely pitted structure with unsegment yolk



Cervical alae



Egg

Life cycle of *Toxocara cati*

- Prenatal infection is absent. But transmammary route of infection is seen.
- Direct and paratenic host cycle commonly occurs in cat.

Direct

It occurs in 3 months and below age groups.

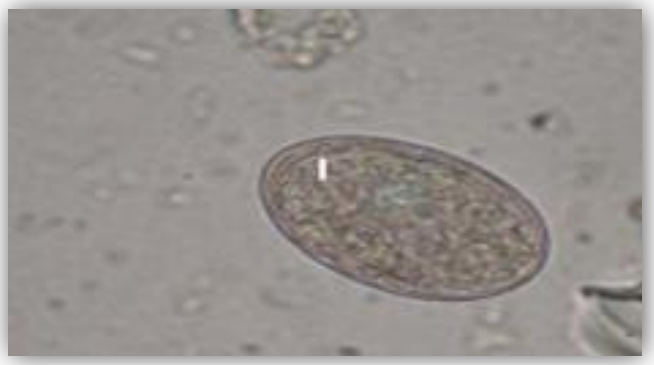
- On ingestion of infective eggs, the hatched out L2 larvae migrate through stomach wall, liver and lungs and by 5 day post infection the larvae reach the lungs including trachea.
- The larvae then reach the stomach by 10 day post infection.
- They moult to become L3 stage and mostly found in stomach wall.
- L4 stage occurs in stomach, intestinal wall.
- All larvae do not migrate

Paratenic host

- On ingestion of infected rodents, the L2 stage larvae are released in the stomach and develop to adult stage in the small intestine from 21 day post infection.
- Earthworm, cockroach, chicken and sheep may act as a paratenic host.
- There is no migration of larvae.

Toxascaris leonina

- Host : Dog and cat
- Males are 7 cm and Females are 10 cm long
- Anterior end is bent dorsally.
- Cervical alae is lengthy.
- Tail of male worm bears pointed tail end.
- Eggs: Oval in shape. Egg shell is thick and smooth.



Life cycle of *Toxascaris leonina*

- Prenatal and transmammary route of infection is absent.

Direct

- Ingestion of infected eggs hatch in the intestine
- The liberated L2 enter into the intestinal wall where L2 moult to become L3
- L3 moult to become L4 in about 10 days and 5 weeks of infection.
- The L4 comes to the lumen and moults to become L5 in 6 weeks after infection. Prepatent period is 74 days.

Paratenic host

- Mice acts as a paratenic host.
- In mice L2 are distributed to various organs and remain dormant until eaten by dogs and cats.
- Following ingestion of infected mice by dog, larvae are released in the intestine and develop to adult without migration.

Ascaris of dog and cat

Pathogenesis

- Heavy infection occurs in young pups due to poor hygienic condition of kennels.
- Heavy prenatal infection leads to death of whole litters of puppies.
- The migrating larvae causes pneumonia in pups and heavy infection causes vomition and diarrhoea.
- Death occurs about 2 to 3 weeks of birth.
- Adult worm causes mucoid enteritis.
- Sometimes the adult worms enter into aberrant site like bile duct causes serious pathogenic effect.

Ascaris of dog and cat

Clinical signs

- Unthriftiness
- dullness
- harsh coat
- pot belly appearance may occur.
- Emaciation and anaemia are common

Diagnosis

- By clinical signs
- Confirmation by finding the eggs in the faeces.

Treatment

- Piperazine compounds – 200 mg/Kg b wt.
- Diethyl carbamazine – 50 mg/Kg b wt.
- Pyrantel pamoate – 5 mg/Kg b wt.
- Mebendazole – 10 mg/Kg b wt. Twice daily for 2 days.
- Fenbendazole – 100mg/Kg b wt. Single dose or divided over five days.

Control

- Hygienic maintenance of kennel and catteries.
- Regular treatment of pups and pregnant bitches.

VISCERAL LARVA MIGRANS [VLM]

- Visceral larva migrans (VLM) is a zoonotic infection usually caused by **dog** or **cat ascarids** of the **Toxocara** genus.
- The infected eggs are ingested and then hatch into larvae, which penetrate the intestine and start migrating to various visceral organ like liver, lungs, kidney, brain and eyes. Because humans are not the definitive host, the larvae cannot mature, and so continue migrating for months or years.
- Sometime the eyes are affected by the larvae is called as **OLM** (**Ocular larva migrans**).
- VLM / OLM commonly occurs in 1 to 5 years age group children. Because of the habit of dirt eating.

Pathogenesis

- Hepatomegaly, eosinophilic granulomatous lesions in the liver, intermittent fever, persistent coughing, pulmonary infiltration and loss of appetite. The eye lesion may resemble retino blastoma.

Diagnosis

- Based on clinical signs
- Hepatomegaly
- Leucocytosis
- Eosinophilia
- Immuno diagnosis
- Demonstration of larvae in biopsy

Toxocara vitulorum

- The worms commonly occur in the small intestine of newly born buffalo and cow calves.

Morphology

- Mouth: Surrounded by 3 lips. Base of the lip is broad.
- Males are 25 cm and females are 30 cm Long.
- The cuticle is thin and transparent, hence internal organs can easily be seen.
- Tail has terminal spike like process in male.
- The spicules are equal, similar and 1-1.25 mm long.
- Vulva is situated anteriorly.
- The eggs are sub-globular, colourless pitted structure. It contains unsegmented yolk.

Life cycle of *Toxocara vitulorum*

- Adult worms are exclusively found in calves. Transmammary route is the major source of infection to calves.
- Eggs develop into infective stage in about 15 days.

Transmammary route

- Ingestion of embryonated eggs by neonates, juvenile or adult does not directly lead to patent infection.
- After hatching of eggs in the intestine, L2 are distributed to various organs and tissues where they remain dormant until later part of the pregnancy of animals (8th month).

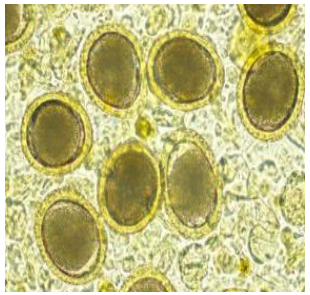
- During 8th month of pregnancy the larvae migrate to mammary gland and occurs in colostrum after parturition.
- The calf acquire infection by ingestion of larvae along with colostrum, larvae reach stomach, intestine and attain maturity in 4 weeks.
- The natural expulsion of adult worm occurs in about 38 days after birth and by 4 – 6 months no adult parasite remain.

Pathogenesis & clinical signs of *T. vitulorum*

- Coughing and pneumonia.
- Rough hair coat and anorexia.
- Anaemia in severe cases
- Loss of musculature & thigh muscles become thin.
- Diarrhoea along with steatorrhoea having foul smell.
- Malabsorption results in pot-belly condition
- Emaciation and death.

Diagnosis

- Clinical signs
- Detection of typical eggs in feaces of calves.



Treatment

- Pyrantel pamoate - 250 mg/Kg b wt. orally.
- Piperazine compounds – 250 mg/Kg b wt..
- Fenbendazole – 7.5 mg/Kg b wt.
- Levamisole – 7.5mg/Kg b wt.

Control

- Calf must be dewormed within 10 to 15 days of birth.
- Infected animal should be kept separately from other healthy calves.
- Byers should be kept clean, dry and disinfected.
- Faeces of all dairy animals should be disposed off properly far away from animal sheds.


Thank you ...