

ASCARIDIDA

Phy.: Nematelminthes

Cls.: Nematoda

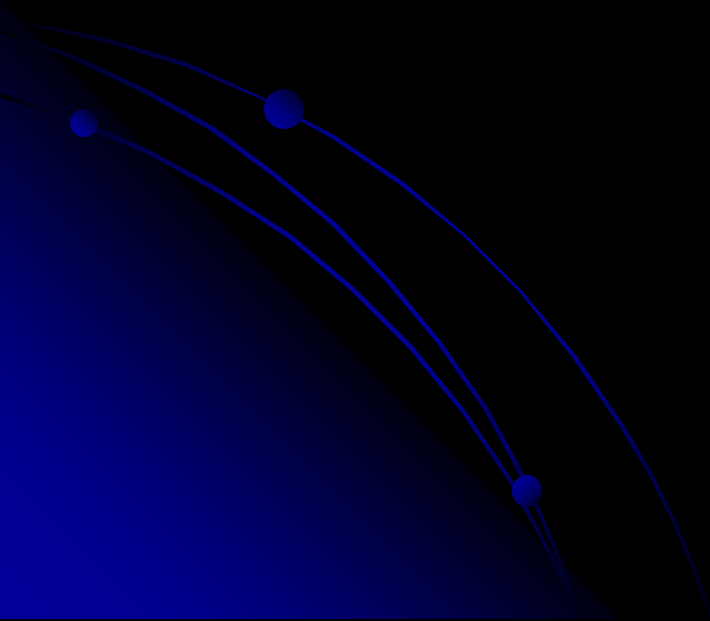
Ord: Ascaridida

Fam.: Ascarididae

Toxocaridae

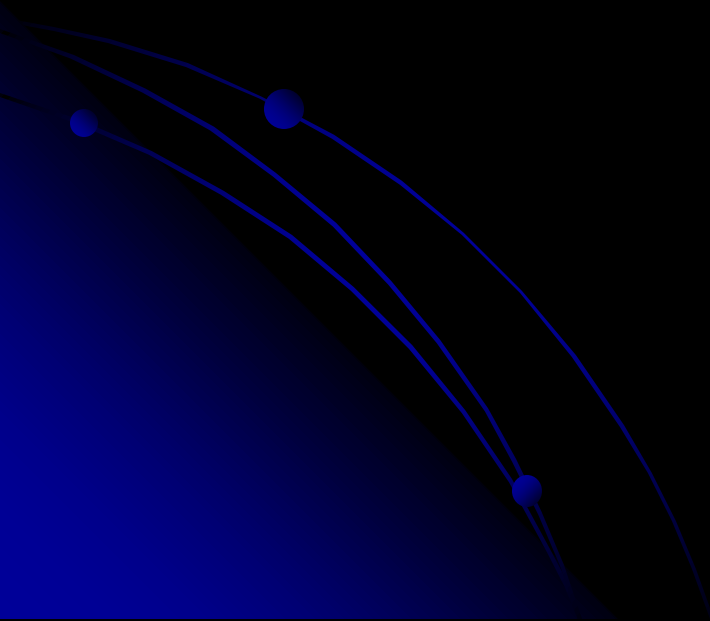
- Parasites in the small intestine
- ❖ Equide, Carnivor, Ruminant, Pig, Human

- ❖ Large (15-50 cm) , white opaque worms
- ❖ Inhabit the small intestine

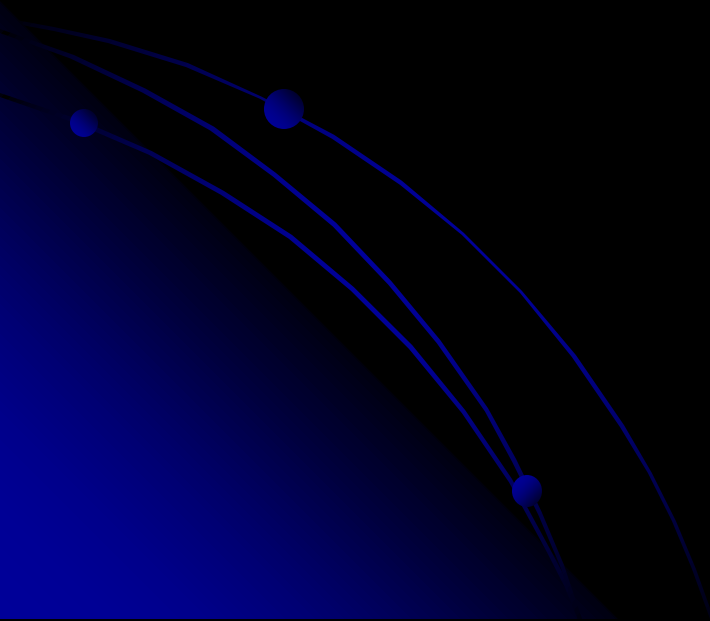


- ❖ Small mouth,
- ❖ No buccal capsule
- ❖ Mouth surrounded by 3 lips
- ❖ Cervical allae (Wing like structure)

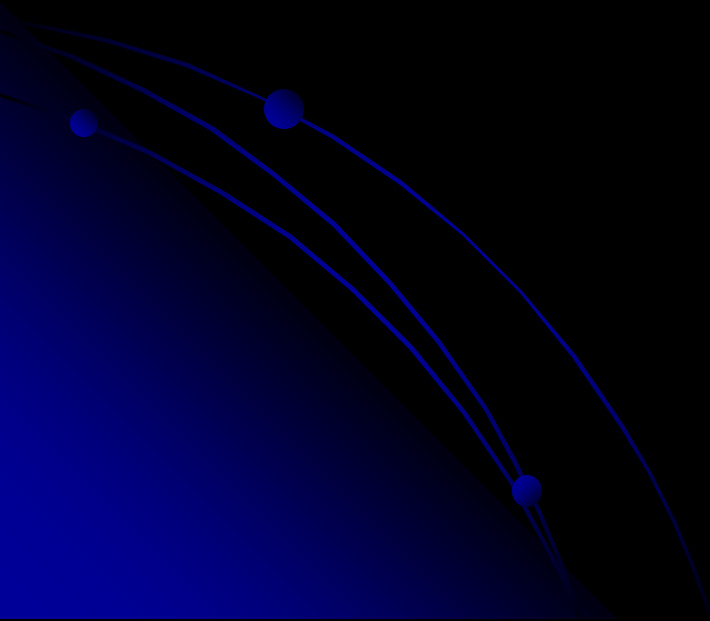
T.canis



- ❖ Direct development - Infection by L_2 in eggs (1,2,3) and parasite lives in small intestine (4) .
- ❖ Transplacental and transmammary routes (5) and consequently, adult places in small intestine (6).



- ❖ Indirect development (intermediate host / paratenic host)
- ❖ *It* can also be transmitted through ingestion of paratenic hosts: eggs ingested by small mammals (e.g., rabbits) hatch and larvae penetrate the gut wall and migrate into various tissues where they encyst (**7**). The life cycle is completed when dogs eat these hosts (**8**).



ASCARIDIDA

Species

Final Host

Ascaris suum

Pig

Parascaris equorum

Equidae

Toxocara vitulorum

Cow, buffalo

Toxocara canis **

Dog

Toxocara cati **

Cat

Toxascaris leonina **

Cat, Dog

Ascaris lumbricoides

Human

Ascaridia galli

Poultry

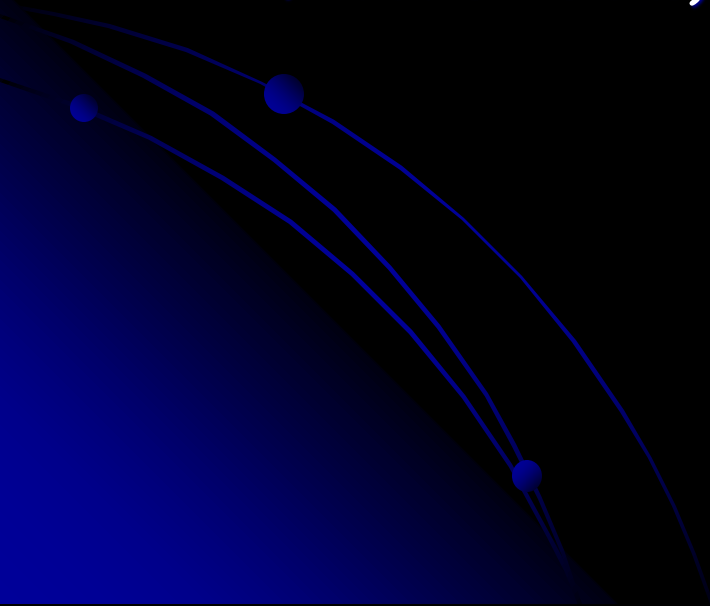
Heterakis gallinarum

Poultry

Ascaris suum

- 15-30 cm
- Direct or indirect development
- **Direct** - Infection is by ingestion of egg containing L2
- **Indirect**- Paratenic Host (earthworm, coprophagous insects)
- **Tracheal migration = Liver → Lung → Stomach → Sml.Int.**
 - In liver (L3), Lung, Trachea, Pharynx, Sml.Int. (L4, L5, mature)
- Prepatent period 6-8 weeks
- Severe disease in piglets (4-6 month)
- Rare transmission - ruminant
- and human

Pathogenesis

- Mature; Intestinal obstruction, icterus due to obstruction of the ductus choledochus, catarrhal enteritis
 - Migration larvae;
 - Pneumonia
 - On the surface of liver - "**milk spot**" lesions up to 1 cm diameter. (Focal inflammatory response and later whitish fibrotic lesions)
- 

Clinical signs and Identification

- **Clinical signs**

- Emphsema, icterus (jaundice)
- Diarrhea,
- Retardation in growth

- **Necropsy**

- Milk spot
- Pneumonia
- Mature in sml.int.

- **Egg in the stool**

- Ovale/round, thick shell, pitted shelled eggs, brown colour, one blastomere, 50-75 X 40-60 μm

- **Treatment:** Bensimidazole, doramectin, dichlorvos, levamisole

Parascaris equorum

- 15-50 cm
- Direct development
- Ingestion of the L₂ in the eggs
- Tracheal migration
 - Liver- L3
 - Lung, Trachea, Pharynx, Sml.int. (L4, L5, mature)
- Prepatent period 10-12 weeks

Pathogenesis and clinical signs

- Severe disease in 2-6 months animals
- **Migration larvae;**
 - Liver
 - Milk spots
 - Non clinical signs
 - Lung
 - Pneumonia
 - Cough
 - Dirty and mucoid nasal flow
- **Mature**
 - Smelly and gasy diarrhea
 - Obstruction and perforation in intestinum
 - Develommental disorder, muddiness in hairs
 - Peritonitis and dying

Epidemiology and identification

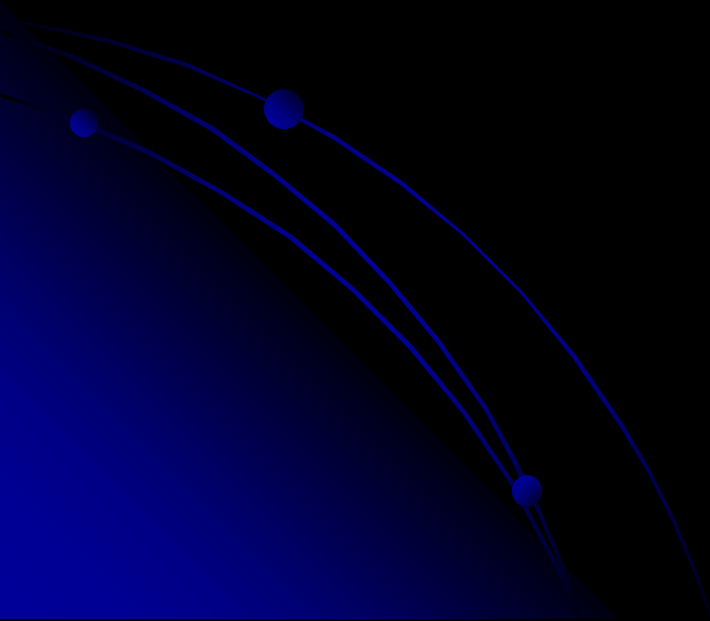
- Female 200.000 egg/day
- Eggs can live pasture and padoks for years.
- Enfektive larvae < 2 weeks
- Colt-mature horse seasonal contamination
- **Identification:** Eggs are passed out with feces.
- round shape, thick and pitted shelled,
brown colour, 90-100 μm , 1 or 2 blastomere

Treatment

Active substance	Affective period	Dose, type of delivery
Ivermectin*	Mature, L4,L3	0.2 mg/kg p.o.
Fenbendazole	Mature, L4	7.5-10 mg/kg p.o.
Mebendazole	Mature, L4	10 mg/kg p.o.
Oxibendazole	Mature, L4	10 mg/kg p.o.
Pyrantel pamoate	Mature, L4	19 mg/kg p.o.
Thiabendazole	Mature, L4	88-100 mg/kg p.o.
Cambendazole	Mature, L4	20 mg/kg p.o.
Febantel	Mature, L4	6 mg/kg p.o.
Albendazole	Mature, L4	5.5-10 mg/kg p.o.
Piperazin	Mature, L4	88-100 mg/kg p.o.
Moxidectin	Mature, L4	0.4 mg/kg p.o.

Ascariasis Infection in Dogs

	<i>Toxocara canis</i>	<i>Toxocara cati</i>	<i>Toxascaris leonina</i>
Final Host	Dog	Cat	Dog, Cat
Localisation place		Small Intestine	
Size	10-15 cm	3-10 cm	7-10 cm



Morphological Differences

T. canis

T. cati

T. leonina

Cervical Alae
Male post.end

Spearhead
Finger-shaped



Arrowhead
Finger-shaped



Spearhead
Tapering-shaped



Oesophagus

Posterior bulb (+)

Posterior bulb (+)

No bulb(-)

Egg

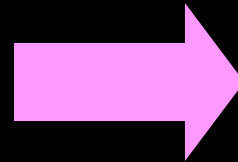
Dark brown
thick shell and
pitted, 75X90 μ
one blastomer

Light brown
thick shell and
pitted, 65X75 μ
one blastomer

Oval, thick
and smooth shell
one blastomer
75X85 μ

Biological differences in carnivore ascaridiasis

- Development occurs in intermediate host

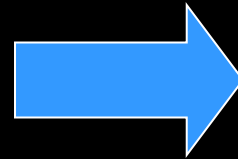


Toxascaris leonina

- Migration doesn't occur in host

- Use paratenic host

- Tracheal/somatic migration occurs in host



Toxocara canis/cati

- Intrauterine and intramammary contamination

Other differences in life-cycle

Species	Paratenic host	Int. Host	Prepatent period (week)
T. canis	Rodent, poultry, earthworm sheep, cattle, pig	-	Egg/par.host → 4
			intra-mamal → 2
			Intra-uterin → 3
T. cati	Rodent, earthworm, poultry roach	-	Egg/par.host → 8
			Intra-mamal → 6
T. leonina	-	Mice	Egg → 10-11
			Inter. host → 8

Life cycle

Toxocara canis

Up to 3 months

After 6 months

Egg
Paratenik host

Intrauterin
(L2)

Intramamal (L3)
Up to 35 days

Egg
Paratenik host

Tracheal Migr.

Tracheal Migr.

Sml. intestine

Somatic Migr.
inhibition (L₃) in
tissues

Life cycle

Toxocara cati

Up to 6 months

After 6 months

Egg
Paratenik host

Intramamamal
(L3)

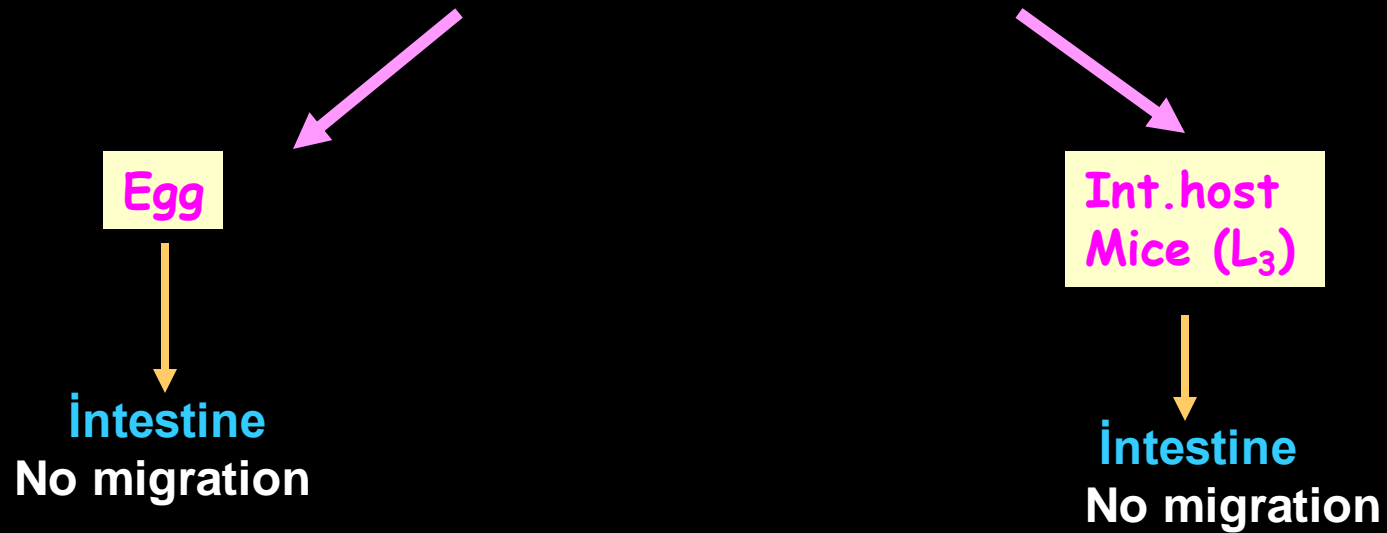
Egg
Paratenik host

Tracheal migration

Small intestine

Somatic Migration
inhibition (L₃) in
tissues

Life cycle *Toxascaris leonina*



Clinical signs and identification

- **Mature** ➔ (T. canis, T. cati, T. leonina)
 - Diarrhea, abdominal bloating and swelling, growth retardation, pets may pass worms in stool or vomit.
- **Larvae** ➔ (T. canis)
 - Respiratory distress, pneumonia, pulmonary edema, cough, foamy nasal discharge, epilepsy-like symptoms
- **Diagnosis**
 - Necropsy
 - Eggs are passed out with feces.

Treatment

Active substance	Animals	Dose, type of delivery
Piperazin	Dog, cat	200 mg/kg p.o.
Fenbendazole	Dog, cat	50 mg/kg 3 days / 20-25 mg/kg 5 days p.o.
Flubendazole	Dog, cat	22 mg/kg 2-3 days / 44 mg/kg 3 days p.o.
Mebendazole	Dog, cat	100-200 mg/host 5 days....22 mg/kg days p.o. Hepatic necrosis risk in dogs
Oxibendazole	Dog, cat	15 mg/kg 2 days p.o.
Pyrantel pamoate	Dog, cat	14.4 mg/kg p.o. 57.6 mg/kg p.o.
Pyrantel base	Dog, cat	5 mg/kg p.o. 20 mg/kg p.o.
Nitroscionate	Dog	50 mg/kg p.o. while hungry
Febantel	Dog	15 mg/kg p.o.
Selamectin	Dog, cat	6 mg/kg p.o. or spot on
Levamisole	Dog, cat	7.5 mg/kg p.o. 5 mg/kg p.o.

Control and Protection

- ❖ Parasite control in dogs and cats, rodent control
 - ❖ Removing the feces from the environment, floor disinfection in kennel
(1% sodyum hipoklorit, pressurized steam)
 - ❖ Do not let animals into children's parks and gardens
-
- ❖ **2 weeks to 3 months old animals**
 - ❖ For galactogenic and prenatal infection: Animals should be treated every 2 weeks for 2 mounts (2,4,6,8): (This application also prevents egg infections)
- ❖ **3-6 months old animals**
 - Mature and larval-acting medicines should be used once a month against egg infection
 - **6 months old male and non pregnant female**
 - Once in 3 mouths for mature and developing larvae
 - Ivermectin, Moxidectin0.2 mg/kg
 - Milbemycine oxime..... 0.25 mg/kg
 - Piperazine200 mg/kg
 - Selamectin6 mg/kg
- ❖ **Pregnant and lactating dogs**
 - On the 40th day of pregnancy ..Doramectin or Ivermectin 1 mg/kg s.c.
 - 40th day of pregnancy to 14th day after birth.....Fenbendazole 50 mg/kg

Visceral Larvae Migrans

T.canis / T.cati

- Dog/cat ascarite
- People take ascarit eggs randomly
- There is larval migration in tissues, no maturation
- The settlement and the number of migrating larvae determine the severity of the disease
- **Eosinophilic granuloma** ranging in diameter from 0.1 to 1.5 cm in the liver, lung, eyes and brain
- Hepatomegaly, cirrhosis, meningitis, encephalitis, endophthalmitis, retinitis
- Fever, chronic eosinophilia, wheezing cough, pneumonia, abdominal pain, muscle-articular pain, blurred vision or blindness

L₃ in cyst (human)

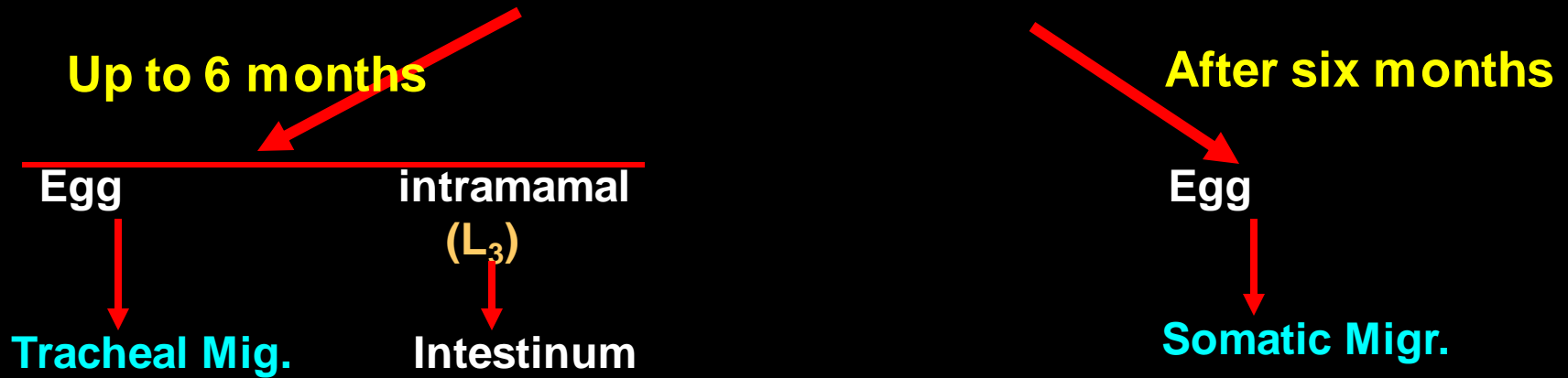
Larvae of T.canis,
Detachment in retina (human)

eosinophilia
papular-erythematous lesions

TREATMENT

- **Anthelmintic**
- **Steroids for inflammatory reactions**
- **Eye laser application**

Toxocara vitulorum



- Important up to 6 months old
- Prepatent period 4-6 weeks
- Diarrhea, weakness, intestinal perforation
- Butyric acid (garlic) odour in breath.
- Important- intramamamal infection

Identification, Eggs are passed out with feces.
Ovally shaped, thick and pitted shelled,
brown colour, 69-95X60-70 μ , 1 blastomere

Tedavi

Active substance	Dose, type of delivery
İvermectin	0.2 mg/kg s.c.
Fenbendazole	7.5-10 mg/kg p.o.
Mebendazole	10-25 mg/kg p.o.
Oxfendazole	4.5 mg/kg p.o.
Levamisole	7.5 mg/kg p.o. / 0.5 mg/kg i.m.
Netomibin	7.5 mg/kg p.o.
Doramectin	0.2 mg/kg s.c.
Febantel	7.5 mg/kg p.o.
Albendazole	7.5 mg/kg p.o.
Piperazin	200-300 mg/kg p.o. 1 hafta arayla 2 kez
Moxidectin	0.2 mg/kg s.c.
Tetramizole	15 mg/kg p.o.
Pyrantel tartrate	12.5 mg/kg p.o.

Ascaris lumbricoides

- Human, small intestine
- ♂ 15-31cm, ♀ 20-49cm (200.000 eggs/day)
- Infective stage (egg containing L₂)
- Tracheal Migration
- Clinical signs

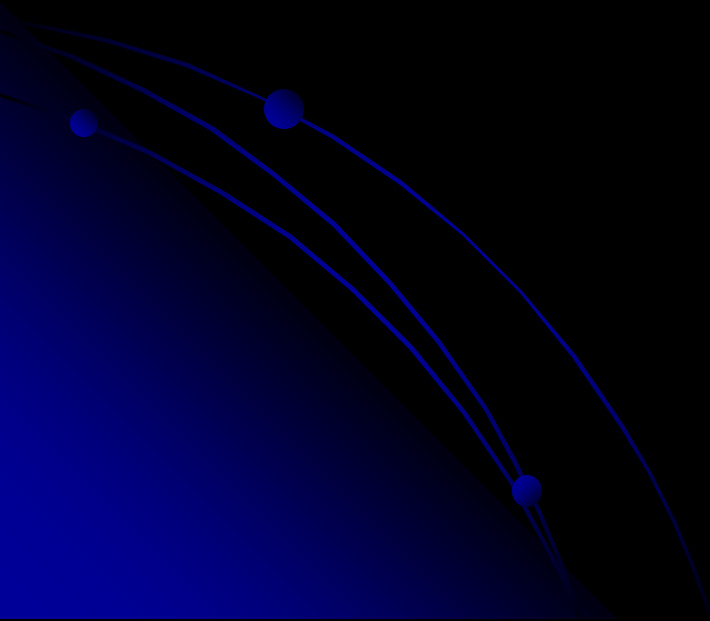
Mature → Obstruction, abdominal pain,
vomiting, nausea

Migration larvae → Cough, pneumonia,
inflammation, eosinophilia


Identification looking for eggs in the
stool


Egg; 45-75X35-50 μ, ovale, thick and
pitted shell, brown colour.

- Eggs live long time in the tropical season and the humid area and soil.
- Eating the raw vegetable with the parasite eggs
- The children especially infected with eggs when they take the toys or their dirty finger into their mouth.



Ascaridia galli

Egg
Transport host  Intestinum
No migration

- Poultry
- Small Intestine, 12 cm
- Infective stage  Egg containing L₂
Transport host-earthworms
- Prepatent period 5-8 weeks
- Generally no clinical signs
- Rarely obstruction, enteritis, loss in weight, inactivity, important in young animals.
- Identification: egg in the stool
 - Ovale, thick shell, light colour in poles, swelling side-Wall, 75-80X45-50μ

Treatment

Piperazine, Levamisole

Heterakis gallinarum

- Poultry, in cecum
- 1-1.5 cm
- Infection with eggs or transport host (earthworm)
- Infective stage(egg containing L2)
- All development take place in the intestinum
- No clinical signs or less
- Histomonas meleagridis is carried with H. gallinarum eggs and larvae from hos to host.
- **Blackhead** disease seen mostly in turkey
- **Identification: Eggs in the stool**
Ovale, thick shell, straight side-wall,
63-75X36-48μ

Treatment

Piperazine, Levamisole