



Tikrit University
College of Veterinary Medicine



Nematoda

Subject name: Parasites

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Lecturers link
SCAN ME

Family : Spiruroidea

Habronema sp.

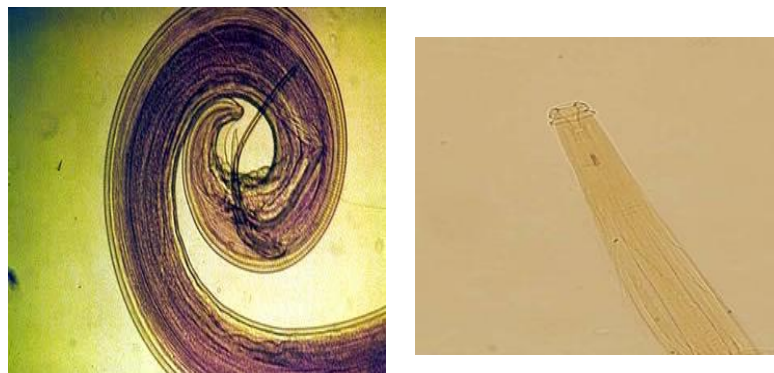
Main properties

Adult *Habronema sp.* are medium-sized worms, up to 3.2 cm in length, whereby females are about twice as long as males. *Habronema muscae* has a yellow to orange color, while other species are whitish.

The mouth of *Habronema* worms is provided with lip-like structures and has a cylindrical vestibulum.

Males have caudal **wings** (alae) and a copulatory bursa with **two unequal spicules** for attaching to the female during copulation.

Habronema muscae deposits **eggs** that are very small (~11x45 micrometers), thin-shelled and have an elongated form.



Life cycle

All *Habronema* species have an **indirect life cycle**, with several fly species and **intermediate hosts**, mainly [houseflies](#) (*Musca domestica*, mainly *Habronema muscae* and *Draschia megastoma*) and/or [stable flies](#) (*Stomoxys calcitrans*, mainly *Habronema microstoma*).

*Adult female worms lay **eggs** or release **L1-larvae** in the stomach of the horses that are passed with the **feces**. These larvae are ingested by **fly maggots** that develop in the horse **manure**.

*These larvae complete development to infective **L3** larvae inside the maggots within about 2 weeks. Once the fly maggots complete their development to adult flies, the infective L3 larvae migrate to the mouth of the flies from where they are **deposited on the final host** (horses, donkeys, etc.) visited by the flies. They are often deposited on **humid parts** of the host's body (eyes, nose, lips, genitalia, open wounds, etc.) to which many flies are attracted.

*Once on the final host, L3 larvae are swallowed and get into the stomach where they complete development to adult worms within about 2 months. Infective L3-larvae can also infect the hosts if they swallow flies (e.g. with the food), or while grooming when they lick their own wounds infected with L3-larvae.

*Larvae that do not reach the stomach but remain in the tissues (e.g. in the eyes, nostrils, lungs, genitalia, skin, etc.) do not complete development to **adult worms**.

Pathogenicity and clinical signs

Adult worms in the **stomach** (so-called **gastric habronemiasis**) of horses are usually not very pathogenic. In case of massive infections they can cause gastritis, colic, and other digestive disorders that can result in weight loss. *Draschia megastoma* can cause tumor-like swellings in the stomach wall that can burst and cause fatal peritonitis, but this is rather unusual.

Infective L3-larvae that are deposited on the **eyes** cause so-called **ocular, ophthalmic** or **conjunctival habronemiasis** that can cause inflammation of the eye envelopes (conjunctivitis) and the eyelids.

Infective L3-larvae deposited on **skin wounds** produce so-called **skin** or **cutaneous habronemiasis**, also known as "**summer sores**". They produce granulomatous skin reactions (erosions, swellings, etc.) that cause strong itching and are quite annoying for affected horses. Such infected wounds are difficult to heal, can become infected with secondary bacteria and may attract other fly species that can cause myiasis (e.g. [screwworms](#)).

Occasionally, infected L3-larvae deposited on the nostrils can migrate into the **lungs** of the host and cause so-called **pulmonary habronemiasis**.



Diagnosis

Diagnosis of gastric infections is difficult because the small eggs or L1-larvae passed in the feces are easily missed in fecal examinations. Non-healing skin wounds showing reddish to brownish color and containing rice-grain-like calcified material are typical for skin habronemiasis. Larvae may be found in scrapings of such wounds.

Treatment

Two major classes of anthelmintics are effective against *Habronema* worms and larvae in the gut Benzimidazoles (febantel, fenbendazole, mebendazole, oxbendazole, etc) and Macrocylic lactones (mainly ivermectin, moxidectin), broad-spectrum endectocides effective both against numerous roundworms and several external parasites as well.

Thelazia sp.

Thelazia sp. (eye worm) are a rare nematode parasite of dogs and cats, transmitted by fruit flies.



Life cycle

*Adult female *Thelazia* deposit embryonated **eggs** in the **ocular tears** of dogs and are ingested by the fruit fly (*Phortica variegata*)

*They develop into larvae in the fly's body cavity over a period of 2 - 4 weeks. Once developed to infective larvae (**L3**), they migrate via the internal organs into the fly's proboscis, where they are deposited onto the face of dogs while feeding.

*L3 larvae then migrate to the conjunctival sac, where they feed off bacteria within ocular secretions.

Species which are pathogenic to dogs include:

- *Thelazia callipaeda*
- *Thelazia rhodesi*

Pathogenicity and clinical signs

Both the larvae and adults are involved in the pathogenesis of ocular disease. Clinically infected dogs present with mild exudative conjunctivitis, blepharitis, epiphora, periocular pruritus and in severe cases, corneal edema and keratitis, due to the mechanical trauma of the larvae^[8]. Blindness may eventually result if left untreated.

Ophthalmological examination usually reveals bulbar and nictitating membrane conjunctival hyperemia with serous discharge noted at the left medial canthus.

Diagnosis

Diagnosis is based on presenting clinical signs and identification of eggs or adult worms in ocular secretions.

Treatment

It is relatively effective with mechanical removal of worms and administration of oral or subcutaneous [doramectin](#) or [ivermectin](#).

Capillariidae

***Capillaria* spp**

Capillaria is a genus of parasitic roundworms that infects chickens, turkeys, ducks, geese, grouse, quails, pheasants, guinea fowls and other domestic and wild birds. They belong to the group of hairworms or

threadworms.

The most relevant species for poultry are:

- *Capillaria annulata* found mainly in chicken, turkey and wild gallinaceans
- *Capillaria bursata* found mainly in chicken, turkey, pheasants
- *Capillaria contorta* found mainly in ducks, geese, but also in chicken, turkey and many wild birds, worldwide.
- *Capillaria caudinflata* found mainly in chicken, turkey, geese, pigeons and many wild birds

Main properties

Adult *Capillaria* worms are very thin worms (hairworms), up to 8 cm long (depending on the species) and of a whitish color. Females are longer than males. Males have a rudimentary bursa with **only one spicule** (with species-specific size and morphology) for attaching to the female during copulation.

Capillaria **eggs** are ovoid, about ~30x70 micrometers (species-specific sizes), with a thick shell, two polar plugs, and contain a single cell (i.e. they are not embryonated when shed).



Life cycle

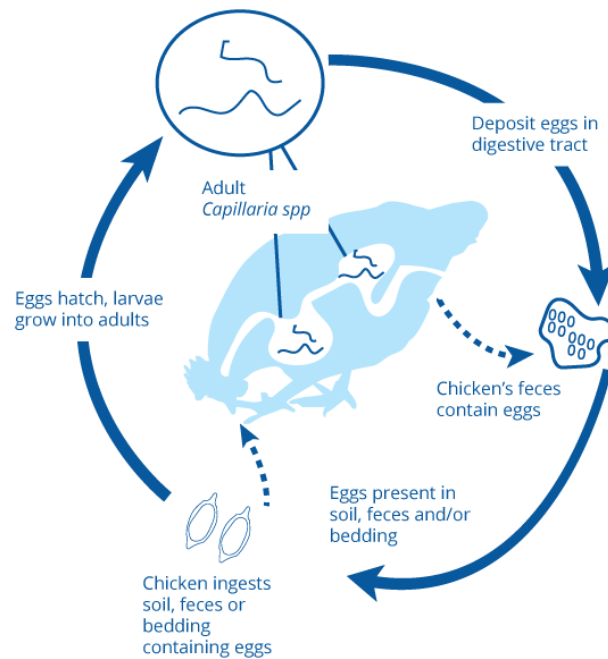
+ Some *Capillaria* species (e.g. *Capillaria anatis*, *Capillaria obsignata*) have a direct life cycle, i.e. there are no intermediate hosts involved. Larvae develop inside the eggs passed in the feces and become infective in 7 to 50 days. Domestic and wild birds ingest these infective eggs with contaminated food or water. These eggs can remain infective in the environment (soil, litter, etc.) for months and can survive frost.

+ Other species (e.g. *Capillaria annulata*, *Capillaria bursata*, *Capillaria caudinflata*) have various **earthworm** species (e.g. *Lumbricus*, *Eisenia*, etc.) as obligate **intermediate hosts**. These earthworms ingest the eggs, and the eggs release the larvae inside the worms. These larvae become infective in 2 to 4 weeks. Inside the earthworms infective larvae can survive for years.

+ *Capillaria contorta* can complete development **both directly** and **indirectly** with **earthworms** as facultative intermediate hosts.

- Once in their final hosts, infective larvae reach their predilection sites rather quickly.
- Larvae of some species penetrate into the gut's wall and spend part of their development there, before returning the gut's lumen where they complete development to adult worms and reproduce.
- Larvae of other species do not penetrate the gut's wall but complete their whole development to adults in the gut's lumen.

Capillaria Worm Life Cycle



PoultryDVM

Pathogenicity and clinical signs

Capillaria annulata and *Capillaria contorta* are the most damaging species. They can seriously harm the lining of the crop and the esophagus, especially in turkeys and pheasants, but also in chicken up to 4 months old. The lining of the crop and the esophagus becomes inflamed and swollen, which can make swallowing impossible for affected birds. Fatalities are frequent in cases of heavy infections.

The species in the intestine get into the villi and even into the intestinal glands, and in case of heavy infections they can cause enteritis and fibrosis.

Predominant clinical signs, mainly in young birds are diarrhea (mucous or even liquid), anemia, apathy, ruffled feathers, loss of appetite and

weight, reduced egg production in layers, etc. Affected ducklings may not properly swim.

Diagnosis

Faecal flotation can be carried out to identify the typical barrel-shaped eggs.

Treatment

Fenbendazole, mebendazole and ivermectin have been used and efficacy of therapy should be checked through repeat faecal flotation tests.