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Haemonchus contortus : A Hazard To Small Ruminant Industry

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INTRODUCTION:

Haemonchus contortus also known as Barber's pole worm or twisted stomach worm or wire worm is the nemesis of the small ruminant sector in the tropical and subtropical region of the world. This species, prevalent in tropical and warmer temperate countries, causes the disease known as Haemonchosis. Haemonchus *spp*. belonging to the family Trichostrongylidae are voracious bloodsuckers occurring primarily in the abomasum of the sheep. In India, where there is a variable climate in addition to the unhygienic and malnutrition, the animals are frequently exposed to this parasite, causing Haemonchosis. *H. contortus* infects mainly grazing small ruminants. This nematode, during its residence in GIT, causes high morbidity and mortality as well in sheep and goat especially in their young ones. *Haemonchus contortus* is a highly pathogenic nematode that localizes in the abomasum of affected animals and exerts its pathogenicity by blood-sucking activity, adversely affecting the health and productivity of animals.

KEY WORDS: *Haemonchus contortus*, small ruminants, parasite, larva.

LIFE CYCLE:

Haemonchus spp. has a direct life cycle. It is transferred horizontally through grazing on pasture lands and grasses by third-stage (L_3) larvae.

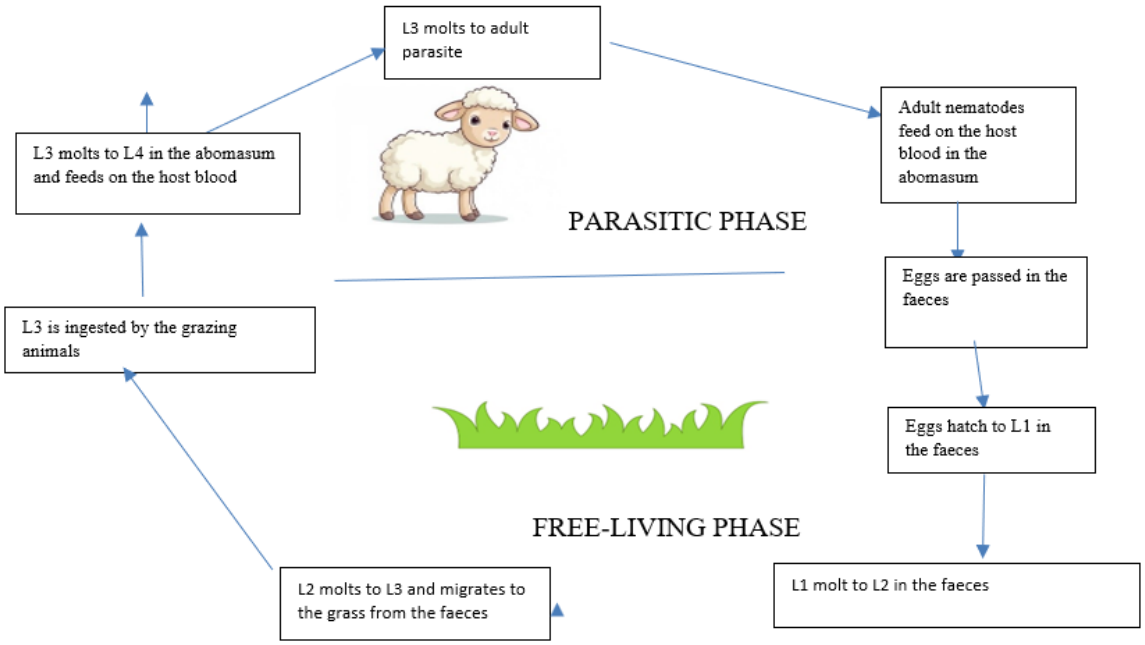


Fig. Larvae under 40x Light microscope

It has a two-phase life cycle, a parasitic and a free-living within the abomasum of the host. The eggs reach ground via faeces of the infected ruminants, thus infecting grasses. Then, the eggs break to first stage larvae (L_1), followed to second stage larvae (L_2). The third stage larvae (L_3), which is known to be infective form of this nematode, is the next stage. After L_3 larvae have been ingested by host, they migrate to the preferable site, i.e., the abomasum, where they turn to adult parasites, showing their blood-sucking activity. Additionally, important is the ability of the fourth larval stage of *H. contortus* to undergo hypobiosis (arrested development), contributing to their ability to survive in cold or arid environmental conditions.

MORPHOLOGICAL CHARACTERS:

Adult male worms are approx 10-20 mm long and uniformly shows reddish-brown colour whereas female worms are 18-30 mm long and can be easily characterised by the 'barber pole' appearance of the white ovaries and uteri twisting for the length of the worm around a red blood-filled intestine (Love and Hutchinson, 2003). Posterior end of the female H. contortus is characterized by a vulval flap, which covers the vulva and it is a small cuticular knob type. Under the light microscope, the larvae, when seen under 40x, show the anterior one-third esophagus and long tail. The eggs are 70 – 85 µm in length and 41 - 48 µm in width. The anterior end of *H. contortus* is characterized by a small funnel-shaped buccal capsule, a spine-like pair of cervical papillae, and a transversely striated cuticle.

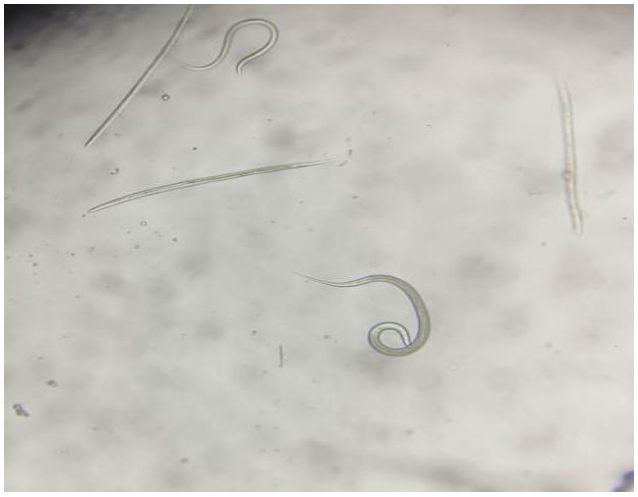
Clinical Signs:

Regarding the degree of infection and the response of the immune system of the host, haemonchosis can be divided into three forms: Hyperacute, acute and long-standing.

Forms of disease and it's clinical signs:

PATHOLOGICAL LESIONS:

- Abomasal mucosa shows severe congestion, pin point petechial haemorrhages, watery bloody contents with numerous minute hair like *H. contortus* worms.
- Small intestinal and caecal mucosa is found to be congested. Few worms can also be found.



Acute	Low burden of worms, lethargy, weakness, increased respiratory and heart rates, hypoproteinemia, hypoalbuminaemia Stage 1: Mild anaemia in surviving animals and death can also occur Stage 2: Temporary recovery can be seen Stage 3: Severe and consistent anaemia
Hyperacute	Rare and occurs only if the animal is exposed to the heavy burden of larvae, Severe anemia, death in affected animals, weakness, unwillingness to move, subcutaneous edema, dark and hard feces, distinct paleness of the mucous membrane, especially in conjunctiva.
Long-standing	Remains clinically unrecognized, Malnutrition, Decreased growth rate and Body condition score, reduced milk, meat, and wool production

- Abomasal villi shows eosinophilic infiltration as well as desquamation.
- Spleen reveals hemosiderosis and encapsulated cyst with homogenous eosinophilic material lined by thick fibrous wall.
- Bile duct hyperplasia, degeneration of hepatocyte and mononuclear cell infiltration in Liver.
- Lungs can show mild emphysema and cellular infiltration in interalveolar septa.
- Heart shows separation and mild degeneration of cardiac muscle fibres due to edema.

ECONOMIC EFFECTS:

Sheep and goats are small ruminants that have enormous potential to boost the economy, and this may be a major source of income, especially for marginal farmers and landless laborers. If the sheep gets infected with the parasite, then each adult parasite can suck about 30 to 50 µL of its blood per day. Therefore, a sheep infected with 1000 adult *Haemonchus* spp. would lose daily up to 50 mL of blood. This can lead to mortality. If the animal is a survivor and the infection is prolonged, it ultimately leads to decreased milk production and average daily gain of the animals and reduced wool production.

CHALLENGE:

Due to the persistent absence of commercial vaccines, the applicaton of broad-spectrum anthelmintics has been a primary method of treatment to control this neamtode in sheep for over 50 years. The main challenge and emerging that is observed right now is that the parasite has already developed its resistance towards the Antihelminthics. Antihelmnthic Resistance can be stated as a genetically transmissible trait in which the population of worms become insensitive to particular drugs over time, hence the host has stopped responding to the antihelminthics because the parasite has become resistant to them leading to the successful infection of the parasite. The scientists are now working towards nullifying this factor so that the host can become resistant to the parasite.

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