



Parasitic Diseases in Small Ruminants: Symptoms, Diagnosis and Control

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Parasitic diseases are a major constraint to the health, productivity, and profitability of small ruminant farming. Sheep and goats are commonly affected by endoparasites, including gastrointestinal nematodes, liver flukes, and rumen flukes, as well as ectoparasites such as lice, ticks, and mites. Gastrointestinal nematode infections may cause anaemia, diarrhoea, weight loss, poor body condition, and submandibular oedema. Fasciolosis results in liver damage, while paramphistomosis, particularly due to immature flukes, can cause severe diarrhoea, dehydration, and mortality. External parasites cause irritation, hair loss, anaemia, skin lesions, and may transmit infectious diseases. Accurate diagnosis through faecal examination, skin examination, and appropriate laboratory investigations is essential for effective management. Integrated parasite control includes strategic deworming, pasture management, environmental hygiene, regular monitoring, and appropriate ectoparasite treatment. Rational anthelmintic use and monitoring of treatment efficacy are crucial to minimise drug resistance and improve livestock health, welfare, and farm productivity.

Keywords: Small ruminants, Parasitic diseases, Gastrointestinal parasites, Ectoparasites, Parasite control.

Introduction

Parasites affecting livestock can be divided into two major groups based on their location in the animal's body. Parasites found inside the body are called endoparasites, whereas those found on the body surface are called ectoparasites. Diagnosing diseases caused by endoparasites is often difficult because these parasites live inside the animal and produce clinical signs only after the disease has progressed. In contrast, ectoparasites can often be observed directly on the animal's body, making identification easier. Their adverse effects can be reduced or eliminated through timely identification, appropriate treatment and control measures. For the convenience of livestock farmers, the following sections describe the major diseases caused by internal parasites, followed by external parasitic infestations and their control.

Roundworm Infection (Parasitic Gastroenteritis)

Roundworm infection, also known as parasitic gastroenteritis, is particularly dangerous in young lambs and goat kids. However, adult sheep and goats are also susceptible. Important roundworms affecting grazing animals include *Haemonchus*, *Trichostrongylus*, *Bunostomum*, *Oesophagostomum* and *Strongyloides* species. These worms are generally thread-like or hair-like, and males and females may differ in appearance. Infection mainly affects the stomach and intestines. Animals may become infected with one or more worm species simultaneously, or at different times. The severity of the disease depends on the number of worms present and the pathogenicity of the species involved. When adult worms live in the digestive tract, they produce eggs that are passed out in the faeces. Under suitable environmental conditions, the eggs develop into infective larvae within approximately two to three weeks. Grazing animals

ingest these larvae with contaminated grass, thereby continuing the infection cycle. Some species can also infect animals through skin penetration. Certain worms may be transmitted through the milk of the mother, infecting newborn animals.

Clinical signs

Affected animals may show:

- Anaemia and pale mucous membranes.
- Thin or watery faeces.
- Loss of body weight and poor body condition.
- Accumulation of fluid beneath the jaw (bottle jaw).

Diagnosis may be difficult during the early stages of infection, but faecal examination can help identify the infection.

Fasciolosis (Liver Fluke Infection)

Fasciolosis is a parasitic disease affecting grazing ruminants, including cattle, buffaloes, sheep and goats. It is caused by the liver fluke *Fasciola gigantica* or *Fasciola hepatica*, which are trematode parasites.

Life cycle and transmission

Part of the life cycle of the parasite occurs in freshwater snails belonging to the genus *Lymnaea*, which act as intermediate hosts. Eggs passed in the faeces of infected animals contaminate water and allow the parasite to continue its life cycle. The infective stage, known as the metacercaria, develops on grass and other vegetation. Animals become infected when they consume contaminated grass or vegetation. After ingestion, the immature flukes penetrate the intestinal wall and migrate to the liver, where they cause tissue damage. They feed on liver tissue and blood, producing inflammation and injury. Mature flukes eventually reach the bile ducts.

Clinical signs

The severity of fasciolosis depends on the number of metacercariae ingested by the animal. Common clinical signs include:

- Liver enlargement and damage.
- Severe abdominal pain due to tissue injury and parasite migration.
- Swelling beneath the jaw, particularly during the early stages.
- Hard faeces and constipation in some affected animals.
- Sudden death in cases of severe infection.

Diagnosis

Diagnosis during the early stages is difficult because the parasites have not yet matured and may remain within the liver tissue. Approximately 14 weeks after infection, adult flukes may begin producing eggs that pass through the bile ducts into the intestine and are subsequently excreted in the faeces. Diagnosis can be made by:

1. Faecal examination: Detection of characteristic yellowish, golden or brownish fluke eggs.
2. Post-mortem examination: Identification of liver damage, migration tracks and lesions caused by the parasites.
3. Examination of the bile ducts: Detection of adult liver flukes.

Paramphistomosis (Rumen Fluke Infection)

Paramphistomosis is a parasitic disease affecting grazing ruminants, including cattle, buffaloes, sheep and goats. It is caused by trematodes belonging to the amphistome group, commonly known as rumen flukes.

Life cycle and transmission

The life cycle involves freshwater snails as intermediate hosts. The parasites develop in the snails, and infective metacercariae are released and attach to vegetation. Animals become infected when they consume contaminated grass. The immature parasites migrate through the digestive tract and temporarily reside in the small intestine, where they cause significant damage. After approximately three to ten weeks, they migrate to the rumen, where they mature and generally cause less damage.

Clinical signs

The immature flukes are responsible for most of the severe clinical signs. Affected animals may show:

- Acute inflammation of the small intestine.
- Severe, foul-smelling, watery diarrhoea.
- Loss of appetite and repeated drinking of water.
- Passage of large quantities of intestinal contents without adequate digestion or absorption.
- Dehydration and fluid accumulation beneath the jaw in prolonged cases.
- Weakness, weight loss and, in severe cases, death.

Diagnosis

There is no reliable diagnosis based solely on the presence of adult flukes in the rumen during the early stage of disease. Diagnosis is supported by the clinical signs and identification of immature flukes in faecal samples. During later stages, faecal examination may reveal the characteristic eggs of adult amphistomes. These eggs are generally whitish or pale in colour.

External Parasitic Infestation

Small ruminants may be affected by several external parasites, including lice, ticks, mites, mosquitoes and other biting or blood-sucking arthropods.

A. Lice infestation

Lice are harmful ectoparasites and may cause several problems in livestock. Infestations are particularly common during the winter season.

Clinical signs include:

- Anaemia, itching and restlessness.
- Excessive scratching and rubbing.
- Hair breakage and hair loss.
- Formation of matted hair.
- Skin irritation and secondary infections.

Diagnosis can be made by observing adult lice and their eggs attached to the animal's hair.

B. Tick infestation

Ticks suck blood from animals and may transmit several infectious diseases. Clinical signs include:

- Anaemia and weakness.
- Restlessness and irritation.
- Reduced productivity.
- Skin damage at attachment sites.

Ticks can be identified by examining the skin and hair coat, particularly around the ears, neck, udder, groin and other preferred attachment sites.

C. Mite infestation

Mites may cause skin diseases, including mange. Certain mites burrow into the skin, while others inhabit the skin surface or hair follicles. Clinical signs include:

- Intense itching and irritation.
- Hair loss and skin lesions.
- Restlessness and reduced feeding.
- Anaemia, weakness and poor body condition in severe infestations.

Mites can also contribute to the spread of secondary bacterial infections and other diseases.

Control of Parasitic Diseases in Small Ruminants

The timing of deworming in grazing animals is an important management decision. It depends on the type of parasite, the prevalence of infection in the area, grazing practices, season and the results of faecal examinations. Parasite populations and the risk of infection are influenced by environmental conditions. High temperatures and dry conditions may reduce the survival of certain parasite stages, whereas rainfall, humidity and waterlogging can favour the development and survival of others. Therefore, parasite control should be planned according to local climatic conditions and the life cycle of the parasite concerned.

Recommended deworming schedule

Administering anthelmintic treatment three times per year, at intervals of approximately four months. Suggested periods are:

- May–June
- September–October
- January–February

These periods should be adjusted according to local epidemiological conditions, grazing patterns and veterinary advice rather than followed as a universal schedule.

General precautions when using anthelmintic drugs

1. Select the anthelmintic after faecal examination and assessment of the likely parasite involved.
2. Evaluate treatment effectiveness and monitor for possible drug resistance.
3. Determine the drug, dosage, duration and repeat-treatment interval in consultation with a veterinarian.
4. Avoid sending treated animals to pasture for a few days if advised by the veterinarian or product label, particularly when necessary to manage environmental contamination and drug resistance.
5. Use anthelmintics cautiously in pregnant animals, lactating animals and animals intended for slaughter. Observe the prescribed milk and meat withdrawal periods.

Summary

Disease or infestation	Causative agent	Major clinical signs	Common diagnostic method
Roundworm infection	Gastrointestinal nematodes	Anaemia, diarrhoea, weight loss, bottle jaw	Faecal examination
Fasciolosis	Fasciola species	Liver damage, abdominal pain, bottle jaw	Faecal examination, antigen tests or post-mortem examination
Paramphistomosis	Amphistome flukes	Severe watery diarrhoea, dehydration, weakness	Faecal examination and identification of immature flukes
Lice infestation	Parasitic lice	Itching, hair loss, anaemia	Direct examination of hair and skin
Tick infestation	Parasitic ticks	Blood loss, irritation and possible disease transmission	Direct examination of the skin
Mite infestation	Parasitic mites	Itching, mange, skin lesions and hair loss	Skin scraping and microscopic examination

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