

An Overview of Monieziasis in goats

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Abstract: Gastrointestinal helminthiasis, particularly caused by *Moniezia spp.*, poses significant economic and health challenges in goats, especially in regions with high rainfall. This tapeworm primarily affects young ruminants, with infections being most common in the first year of life. *Moniezia spp.* has a complex life cycle involving oribatid mites as intermediate hosts, with seasonal infection peaks influenced by the mites' activity. Although light infections may cause minimal health impacts, heavy infestations can lead to severe complications, including intestinal impaction, growth retardation, reduced fertility, and mortality. Diagnosis is typically based on clinical signs, fecal examination for eggs or tapeworm segments, and sedimentation techniques, while serological tests remain less accessible. Treatment protocols include the administration of praziquantel, levamisole, or albendazole, along with supportive care, such as antidiarrheals, antibiotics, and fluid therapy in severe cases. Preventive strategies, though limited, include pasture management and strategic dosing. Addressing *Moniezia* infections is critical to reducing economic losses and ensuring the health and productivity of affected goat populations.

Key words: Gastrointestinal helminthiasis, *Moniezia spp.*, oribatid mites, praziquantel

Introduction

Goats with gastrointestinal helminthiasis experience indirect economic losses due to decreased food intake, weight gain, slower child growth, decreased fertility, decreased production, higher therapeutic expenses, and direct mortality in severely infected animals. The most significant health issue for goats raised in regions with high rainfall is helminthiasis. Infection with *Moniezia spp.* is more common in the first year of life in lambs and young and less common in young adults.

The occurrence and severity of different parasite infections in grazing animals are primarily determined by the distinct agroclimatic conditions, animal husbandry techniques, and pasture management. (Arambulo and Moran, 1981; Joshi, 1998 and Jithendran and Bhat, 1999). The summer or fall active periods of the oribatid mites, the intermediate host, determine the seasonal variation of *Moniezia spp.* infection in climates that are moderate. In small ruminants, the prevalence of cestodes varies. In certain instances, the prevalence of *Moniezia spp.* was higher in sheep (69.0%) than in goats (55.0%) (Kassaye *et al* 2014).

What is the etiology of the disease?

Monieziosis is caused by the genus *Moniezia*, order Cyclophyllidea, phylum Anoplocephalidae, a tapeworm that inhabits the small intestines of ruminants such as sheep, goats, and cattle. *Moniezia* can infect both domesticated and wild ruminants, with at least 12 different species known to do so. Among them, the only ones recognized as distinct species are *M. expansa* and *M. benedeni* (Guo, 2017).

What are the modes of transmission?

Moniezia, a type of tapeworm, mainly infects goats through a particular transmission process. Young animals are particularly susceptible, often experiencing various degrees of ill health or unthriftiness due to tapeworm infections. Its life cycle involves two hosts: ruminants such as goats serve as the definitive hosts, while oribatid mites act as the intermediate hosts. *Moniezia* eggs or proglottids, protected in the feces, are released into the environment. Oribatid mites, which live in pastures, ingest these eggs. To prevent drying out, the eggs must reach the mite's stomach within a day of being expelled (Yadav *et*

al., 2019). The mites consume the eggs by using their chelicerae to break the shell and ingest the developing embryo, or oncosphere. The oncosphere then penetrates the mid-gut wall and moves into the haemocoel, where it gradually develops into a cysticeroid over the course of one to four months (Soulsby, 1982, Urquhart *et al.*, 1987). Cysticeroids are infective stage.

This cycle continues as the infected goats pass more eggs into the environment, perpetuating the transmission.

What does the disease look like?

Although light infections of the *Moniezia* tapeworm generally pose minimal issues for goats, heavy infestations can lead to significant complications, including intestinal impaction, as large numbers of tapeworms accumulate in the small intestine. In severe cases, this can result in mortality, even in adult goats. Notable clinical signs included ruminal atony, dehydration, a rough coat, anaemia, oedema, generalized weakness, depression, growth retardation, and reduced productivity in both meat and milk yield. Additionally, the animal exhibited anorexia, impaired digestive function, severe debilitation, and an increased risk of mortality.

The accompanying Haemato-Biochemical changes

The haematological parameters, haemoglobin concentrations, TEC and PCV decreases in *moniezia* infected goats. The biochemical parameters such as total protein and albumin concentration decreases.

In what ways can the disease be diagnosed?

1. Based on the history and clinical signs, which are not particularly specific or conclusive.
2. The fecal sample was examined for egg detection using Sedimentation and centrifugation or flotation techniques (Lanes method) with a saturated sugar solution.
3. The fecal sample was analyzed for the presence of shed tapeworm segments.
4. Techniques have been developed to detect specific antibodies in serum or antigens in feces, but they are not yet widely accessible.

What are the recommended treatment protocols for managing the health of the affected goats?

1. Praziquantel @3.75 mg/kg B.W PO, OD is highly effective.
 2. Levamisole @7.5 mg/kg PO, OD FOR 3-4 days.
 3. Albendazole @7.5 mg/kg B.W is also effective
- If severe infection
Antidiarrheal powder neblon @ 20gm PO. mg/goat or spytoff bolus @ ½ bolus PO, OD, Antibiotics such as Enrofloxacin @ 5-7 mg/kg B.W, Vitamin-B complex, and fluid therapy (RL).

Potential Preventive Strategies

Controlling oribatid mites, the intermediate hosts, is impractical. However, their numbers can be decreased through plowing and reseeded of permanent pastures. Alternatively, stabling or strategic dosing at 6-10 weeks post-turnout and in autumn remain the only viable options.

Conclusions

Gastrointestinal parasitism by *Moniezia spp.* typically results in minor health issues in goats, but it can significantly impact the growth and productivity of susceptible animals, leading to economic losses for marginal farmers. Effective treatment involves a combination of praziquantel and levamisole, supplemented by supportive therapy and appropriate care and management.

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