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Original Article**Integrated Parasite Management in Small Ruminant****Suchit Kumar¹, Manmohan Kumar¹, Dushyant Yadav¹ Birendra Kumar² and Ramesh Kumar Singh²**¹Department of Livestock Farm Complex, Bihar Veterinary College, BASU, Patna-14²Department of Animal Genetics and Breeding, Bihar Veterinary College, BASU, Patna-14*Corresponding author: suchitkumar636@gmail.com

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INTRODUCTION

There are a number of threats to sheep and goat health caused by parasite infestations, but one of the biggest threats to sheep and goat health is the barber pole worm, a gastrointestinal parasite. The parasite drains nutrients from its host and can lead to significant anaemia, reduced animal production and, in severe cases, death. The life cycle of the barber pole worm provides the foundation on which pasture management strategies are built. The adult barber pole worm lives inside the host and produces thousands of eggs daily, which are excreted in the goat's or sheep's faeces when they visit the pasture. Within 3-4 days, the eggs hatch and develop into the infective larval stage, which migrate several centimetres up the blades of grass to be eaten by the next hungry grazer

Parasite Control by;

1. Pasture management
2. Specific chemical dewormer
3. Selective Deworming
4. Alternative to chemical dewormer
5. Selection of parasitic resistance animals for animal health

Principles of pasture management for animal health

- Maintain proper forage height - To prevent parasite infections, leave at least four inches of forage in the fields when the animals move to the next field. Some producers rotate sheep or goats at taller heights. Most parasite larvae are found in the first two inches of forage growth. So the aim is to move the sheep and goats out of a field before they graze down to levels where parasite larvae to be ingested.

- Maintaining some 'clean grazing' areas - Annual replanting can be a big help in providing clean grazing areas for susceptible animals and provides the chance to establish permanent pastures that include areas of medicated forage and legumes to increase protein levels.

- Management of problem areas - Heavily contaminated pastures should be rested for a year or ploughed and reseeded with forage or crops. Very long rest periods are required in these areas to reduce the parasitic load on the pasture
- Maintaining an appropriate stocking rate- Use multispecies grazing- In general, sheep and goats should not share the same gastrointestinal parasites as cattle and horses. The infective larval stage of the barber pole worm cannot complete its life cycle after it is ingested by cattle or horses. Therefore, grazing sheep and goats on the taller grass first, then allowing cattle and/or horses to follow and graze the remaining few inches of grass can help manage internal parasites by “cleaning up” the pasture before the sheep and goats return to re-graze.
- Use leader-follower grazing (lead with susceptible classes, follow with less susceptible; for example, lead with lambs and follow with cattle or dry ewes)
- Offer diverse forages and browse
- Use rotational grazing with long rest periods- Progressively moving livestock to new pasture greatly decreases the exposure of the parasites

Strategies When Pasture Rotation Isn't Possible

Rotational grazing is an effective tool, but cannot be accomplished with all herds due to lack of land, fencing and time. Other pasture management strategies contributing to parasite control include:

- **Forage Browsing:** Animals should be allowed to browse in a wooded area encourages them to eat forage higher off the ground, thus preventing exposure to parasites. Plants containing higher levels of tannins — sericea lespedeza (Chinese bushclover), pine bark, birds foot trefoil and black locust trees — could inhibit parasitic larval development and reduce faecal egg counts of barber pole worms.
- **Immunity in Kid or Lamb:** Kid or Lamb stage of animals have very little immunity against internal parasites due to lack of exposure. They typically do not develop a robust immunity until around 4-9 months of age making them especially susceptible to parasitism. Allowing a young group to graze an area ahead of a group of mature animals will decrease the exposure of parasites to the younger, more susceptible group.
- **Leader-Follower System:** In general, sheep and goats do not share the same gastrointestinal parasites as cattle and horses. The infective larval stage of the barber pole worm cannot complete its life cycle after it is ingested by cattle or horses. Therefore, grazing sheep and goats on the taller grass first, then allowing cattle and/or horses to follow and graze the remaining few inches of grass can help manage internal parasites by “cleaning up” the pasture before the sheep and goats return to re-graze.

Specific chemical dewormer- Use of specific parasitic drugs for specific parasite and parasitic drugs also change time to time. Ideally, farmers should rotate families of drugs every year or two. This reduces the risk of resistance more than alternating drugs between treatments within a year.

Selective Deworming

- Deworm selectively by using of FAMACHA Chart Score. Remember FAMACHA© is only effective in the screening for *H. Contortus*. Famacha chart classifying animals based on levels of anaemia (according to eye mucous-membrane colour). Treat only animals with symptoms of anaemia. It can reduce the use of dewormers, which slows development of resistance and saves money.



Use FAMACHA® to assess levels of anemia. Photo: Margo Hale, NCAT

Alternative control methods

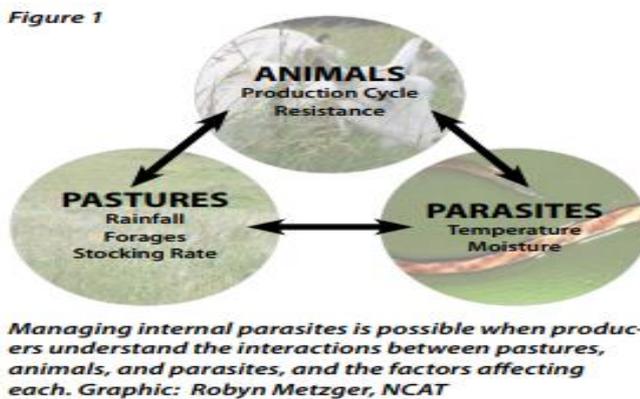
- Copper oxide wire particles have been found to reduce parasite loads in sheep and goats. (See ATTRA's Tools for Managing Internal Parasites in Small Ruminants: Copper Wire Particles)
- Forages with high levels of condensed tannins, such as sericea lespedeza, have been shown to reduce parasite loads. (See ATTRA's Tools for Managing Internal Parasites in Small Ruminants: Sericea Lespedeza)
- There are anecdotal claims that botanicals such as garlic, papaya seeds, pumpkin seeds, and herbal dewormers were effective means of parasite control. However, controlled research on these methods has shown they have no effect on parasites (O'Brien et al., 2012; Burke et al., 2009a, b)

Selection of parasitic resistance animals for future generation

Selection of resistant animal which could be useful tool to minimize parasitic load and improve production and reproduction performance of small ruminants.

Larva can survive for long periods, even as long as 120 days, when weather conditions are cool and moist. However, when the weather is hot and dry, those parasites can die very quickly. Therefore, the challenge comes when producers balance between these weather patterns to ensure that infective parasite larva is no longer present in the pastures. This can be much easier to write about than accomplish because the goal is to keep fields lush and growing, which creates a more ideal environment for the parasites. Harvesting fields for hay is one way to open up those areas to heat and sunlight in order to kill parasite larva. Another option is to have long rest periods so that the parasites die before the sheep return to that field to graze.

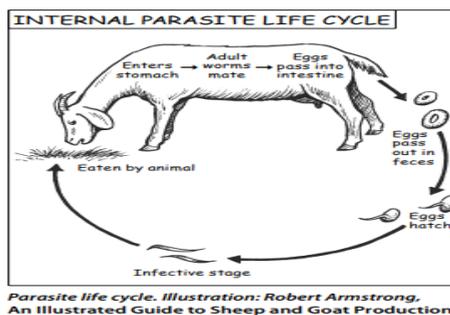
Parasites can also go into a hypobiotic or dormant state inside sheep or goats. Parasites can remain in this state until environmental conditions improve. Sheep and goat producers often see problems when this occurs during the summer. Animals graze pastures short during extended hot and dry weather conditions. Then, when weather conditions improve following a rain, a sudden parasite "bloom" occurs. Parasites that remained inside animals as well as parasites that remained in the egg stage develop very quickly to an infective state. This leads to very large numbers of infective parasites. Therefore, adequate rest periods of 65 days or more between grazing can be critical during the summer



PARASITE LIFE CYCLE AND WHAT AFFECTS IT

Factors:

- Temperature
- Moisture
- Time
- Season
- Animals and soil organisms
- Plant compounds
- Effective anthelmintics



Internal parasites increase with:

- Warm, wet weather
- Hosts with low resistance
- Numbers of hosts
- Long periods of the same grazing animals on the pasture, so there are repeated cycles of ingestion and maturity and release of more eggs

Internal parasites are vulnerable to:

- Dry heat
- Non-host and resistant animals
- Time (enough time to die a natural death)
- Effective dewormers, including bioactive forages
- Soil organisms, including earthworms, nemaphatogous fungi, and dung beetles

CONCLUSION

In addition to appropriate deworming strategies, proper pasture management can effectively control parasite exposure and reinfection.

Barber pole worms have developed a profound resistance to most of the deworming medications available, and in order to preserve the effective dewormers that we currently have, other methods of parasite control must be considered. With some planning, pasture management and to provide adequate nutrition for each stage of production and to avoid contact with infective internal parasite larvae will result in improved health and production for grazing animals. These factors can be a helpful tool in controlling your herd's exposure to parasites. Managing pasture and Pasture management is a vital component of a holistic parasite-management strategy.

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