

Research Application Summary

**Awareness and control methods of gastrointestinal parasites of merino sheep
among farmers of Maseru district, Lesotho**

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Abstract

This study evaluated the prevalence and control methods for gastrointestinal parasites (GIPs) in sheep in the two agro-ecological zones of the district of Maseru, Lesotho. Data were collected among 174 randomly selected farmers of Matsieng (lowlands) and Nyakosoba (foothills). The majority (80%) of farmers interviewed in both agro-ecological zones were aware of the GIPs problems with tapeworms being the most familiar and said to be occurring during warm seasons (summer and autumn) whereas liver flukes (trematodes) were said to predominate in dry seasons (winter and spring). In total 89% of farmers reported higher prevalence of GIPs in their herds and associated them with lamb mortality in summer and autumn. All farmers indicated that they use anthelmintics for treating GIPs in animals and 93% of them reported that these drugs were effective although some animals never recovered even when treated, thus suggesting existence of some drug resistance. Among those interviewed, 45% indicated that their sheep are kept in non-roofed enclosures which were cleaned only after rains to avoid the mud. Communal grazing is used as a main source of animal feeding of which different livestock species share the same rangelands. About 83% of farmers believed that grazing lands were the main source of GIPs for their sheep. The results of the present study reveal that farmers are aware of GIPs but have little knowledge on proper management skills.

Key words: Foothills, gastrointestinal parasites, lowlands, Maseru, merino sheep

Résumé

Cette étude a évalué la prévalence et les méthodes de contrôle pour les parasites gastro-intestinales (GIPs) chez les ovins dans les deux zones agro-écologiques du district de Maseru, au Lesotho. Les données ont été recueillies auprès de 174 fermiers choisis au hasard à Matsieng (plaines) et à Nyakosoba (pied des montagnes). La majorité (80%) des fermiers interrogés dans les deux zones agro-écologiques étaient au courant des problèmes de GIPs avec les ténias étant les plus familiers et dit se produire pendant les saisons chaudes (été et automne), alors que la maladie de foie (trématodes) était prédominante en saison sèche (hiver et printemps). Au total 89% des fermiers ont rapporté une prévalence plus élevée de

GIPs dans leurs troupeaux et leur associée à la mortalité des agneaux en été et en automne. Tous les fermiers ont indiqué qu'ils utilisent les vermifuges pour le traitement de GIPs chez les animaux et 93% d'entre eux ont indiqué que ces médicaments étaient efficaces, bien que certains animaux ne se remettaient jamais, même lorsqu'ils sont traités, ce qui suggère l'existence d'une certaine résistance aux médicaments. Parmi les personnes interrogées, 45% ont indiqué que leurs moutons sont gardés dans des enclos non couverts qui étaient nettoyés seulement après les pluies pour éviter la boue. Des pâturages collectifs sont utilisés comme une source principale d'alimentation des animaux, dont différentes espèces partagent les mêmes parcours. Environ 83% des fermiers ont estimé que les pâturages étaient la principale source de GIPs pour leurs moutons. Les résultats de la présente étude révèlent que les fermiers sont conscients de GIPs, mais ont peu de connaissances sur les compétences appropriées de gestion.

Mots clés: Pied de montagnes, parasites gastro-intestinaux, les plaines, Maseru, mouton mérinos

Introduction

Sheep play a very crucial role in the economy of Lesotho, especially among the rural poor. The Lesotho Bureau of Statistics report for 2013/14 shows that there were approximately 1,346,596 merino sheep in Lesotho of which 186,873 were in the Maseru district. Gastrointestinal parasites (GIPs) are a major constraint that limits sheep productivity globally (Jones, 2001). In Lesotho, GIPs are said to have caused 16,732 merino sheep deaths during the 2013/2014 period (Lesotho Bureau of Statistics, 2014). Over 32% of the recorded fatalities occurred in Maseru, making it one of the most affected districts in Lesotho. Susceptibility to GIPs is known to be influenced by the type of production system that small ruminants are kept or raised in (Thamsborg *et al.*, 1999). It is suspected that the GIP problem in Lesotho is exacerbated by the communal grazing that, often than not, tends to promote infection within similar livestock species from different herds as well as between different animal species. Rangeland management in Lesotho is a shared responsibility between chiefs and land allocation committees/community councils that together decide on range management principles and practices that enhance animal production and productivity (Motsamai, 1990). This study was part of a larger project aimed at evaluating the prevalence and control methods of gastrointestinal parasites in merino sheep in agro-ecological zones of Lesotho. The objective of the current study was to assess awareness and animal management practices of farmers with regard to GIPs in sheep.

Literature review

Globally, GIPs cost sheep farmers hundreds of millions of dollars each year because of treatment cost, increased level of management, loss of production and even mortality in severe cases (Brown and Tier, 2003; Khusro *et al.*, 2004). GIPs are categorized into worms (helminths) and oocyst-forming protozoa known as coccidia. Nematodes, trematodes and cestodes are the three major types of parasitic helminths of economic importance (Kusiluka and Kambarage, 1996). Nematodes are generally considered to be the most serious parasites

in terms of disease and production loss (Singh, 2013). Herbivorous hosts acquire infections by GIPs through consumption of eggs, cysts and larvae along with grass during grazing and subsequent GIPs adult stages attack various organ systems, including the liver and lungs, associated with the alimentary canal (Kusiluka and Kambarage, 1996). Damage to the attacked organs result in several symptoms such as anaemia, weight loss, lowered weight gain and fertility.

Successful management of GIPs require a thorough understanding of their seasonal and spatial dynamics both of which are determined by complex inter-relationships and interactions between sheep conditions as hosts, livestock management systems and climatic factors (Vlassoff *et al.*, 2001). Host factors that can determine its susceptibility to GIPs include its age, sex, immunity, breed (genetic resistance), and nutrition status (Roeber *et al.*, 2013). Livestock management system simply refers to animal husbandry practises such the type of grazing system, e.g. free-range communal vs. confined, overstocking, sanitation in animal housing/enclosures, use of appropriate anthelmintics at correct dosages (Smith *et al.*, 2009). Climatic factors such as temperature and moisture have direct influence on the development and survival rates of the free-living stages of the GIPs (Roeber *et al.*, 2013). Regional differences in climate also have major effects on the epidemiology of GIP infections and their geographic distribution. Information on all the above factors has to be known to the farmer if their sheep production system is to be successful. Access to such information can be through an active initiative by farmers or via an efficient veterinary extension service working in collaboration with research scientists.

Study area and methodology

This study was conducted in two agro-ecological zones; the lowlands and foothills of the Maseru district, Lesotho. Prior to selection of farmers, a brainstorming session was organised with the Director of Livestock Services and respective extension agents on the objectives of the study and farmers selection criteria. The Feed Assessment Tool (FEAST) methodology (ILRI 2015) was used to collect data. A total of 174 farmers were engaged in qualitative data collection. Each agro-ecological zone was randomly stratified into three villages. Each village was represented by 20 farmers for focus group discussions and among the 20 farmers; nine were selected to be engaged in individual interviews. Of the nine farmers that were interviewed, three were selected from those who kept <50 sheep per herd, the other three kept herds of between 51 and 100 sheep and the last three kept >100 sheep per herd.

Results

Socio-economic characteristics of sheep farmers. The average age of sheep farmers in the lowlands was 45 years and those at the foothills 27 years. The majority of farmers in both agro-ecological zones only had received primary education that is 74.1% for the lowlands farmers and 55.6% for the foothills. Virtually all farmers (99% in foothills and 100% in lowlands) were members of farmers' associations but fewer numbers (<50%) indicated that they derived any benefit from the attendance of training workshops organized by such associations.

Farmers' perceptions on GIPs. Majority of respondents (>88% in both agro-ecological zones) indicated that they considered high GIP infestations as the main challenge in the rearing of merino sheep as the GIPs affect the quality of wool, health of the animals, and lead to increased mortality rates. Most farmers (63% from lowlands and 77.8% from foothills) regarded lambs to be more vulnerable to death caused by GIPs compared to adult sheep. Farmers further indicated that their herds experience the highest GIP infections in summer and autumn and that they consider tapeworms (cestodes) to be the most prevalent type of GIPs (Table 1).

Use of commercial anthelmintic drugs is the most common method of controlling GIPs by farmers in both agro-ecological zones (>90%). However, some farmers (18.5% and 7.4% from the foothills and lowlands, respectively) were of the view that anthelmintics do not work, as their sheep still died even when on drug treatment. As indicated in Table 2, the frequency of administering anthelmintics to sheep varied greatly from farmer to farmer.

Grazing and management practices. Responses revealed that >70% of farmers regard rangelands as the major source of GIPs transmission due to the fact that animals share the same rangeland (communal grazing). Most farmers in the lowlands (81.5%) and foothills (66.7%) use none roofed kraals for housing their animals. Farmers in the lowlands (37%) and foothills (52%) did not regularly clean their animal shelters, only doing so after rains to remove the mud.

Table 1. Awareness of different types of GIPs by farmers from the two agro-ecological zones of Maseru (in percentages)

GIPs observed	Agro-ecological zone	
	Lowlands(%)	Foothills(%)
Nematodes	14.8	3.7
Trematodes	11.1	0.0
Cestodes	25.4	33.3
More than one Type	7.4	59.3
None	40.7	3.7

Table 2. Farmers' frequency of anthelmintics use in the two agro-ecological zones of Maseru (in percentages)

Frequency of Anthelmintics use	Agro-ecological zone	
	Lowlands (%)	Foothills (%)
Once per year	3.7	14.8
Seasonally	33.3	18.5
More than four times	29	22.2
When necessary	33.3	44.4

Discussion

In both agro-ecological zones, farmers perceived GIPs as a major threat to sheep production and considered lambs to be severely affected. It is believed that the susceptibility of sheep to internal parasites is caused by the ability of faecal pellets to disintegrate very easily thus releasing the worm larvae on the pasture, thereby enhancing the spread (Susan, 2013). Furthermore, sheep become more vulnerable because they graze very close to the soil hence easily pick up the hatched larvae and oocysts. The severity of GIPs effect seen mainly in lambs is usually associated with high mortality rates. Joseph (2013) associated lambs mortality with severe diarrhoea caused by coccidiosis and continued to say that coccidiosis is generally seen in young animals because their immune system have not developed the ability to combat heavy infections. This would explain the high lamb mortality in this study. Lambs most probably get exposed to the parasites from their mothers during sucking soiled teats since farmers rarely clean the kraals. Therefore older sheep serve as a source of infection for lambs.

The fact that farmers are aware of some GIP species as indicated in Table 1 suggests that the control of GIPs should not be a difficult task as a solution to a problem can only be found when the problem is known. However, there is still a concern as some farmers admitted to administering anthelmintics to animals as a matter of routine, i.e., without seeing any sign or a predisposing factor to GIPs (Table 2). Routine administration of drugs can result in their underuse/under-dosage or overuse/over-dosage both of which lead to the development of resistance by GIPs (Roeber *et al.*, 2013). Some farmers reported using numerous ethnic drugs to prevent mortality and improve the health of their livestock. In many cases, these medications do have apparent rationale and beneficial effects (Getchell *et al.*, 2002). Ethno-veterinary medicine is gaining popularity in developing countries because it is readily accessible, easy to prepare and administer, and available at little or no cost to the farmer (Tabuti *et al.*, 2003; Njoroge and Bussmann, 2006).

Farmers also believed that GIPs prevalence was a big challenge for sheep production in summer and autumn. This suggests that GIPs prevalence varies depending on temperatures and rain fall patterns. This argument is in line with Singh *et al.* (2013) who indicated that variation in prevalence of parasitic infestation depends upon difference in agro climatic condition and availability of susceptible host. Many farmers consider communal grazing to be a serious problem on management and control of animal diseases. In support of these results Tsotetsi and Mbatlali (2003) demonstrated that communal grazing favoured the development and scattering of GIPs.

Conclusion

Farmers in Lesotho are aware of GIPs and do apply control methods to combat the GIPs in Merino sheep. However, there is still a need for them to be empowered with skills for improving management systems and the knowledge on how the GIPs behave in different times of the year and in different agro-ecological zones. This will assist them in adhering to the dosing schedule as drawn by the animal health experts.

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