Incidence and Severity of Gastrointestinal Parasites in Small Ruminants at Hisar, Haryana

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Received: 10 Aug, 2018
Revised: 08 Dec., 2018
Accepted: 10 Dec., 2018

ABSTRACT

The present study was conducted to detect the incidence and severity of parasitic infection in small ruminant at Goat and Sheep Breeding Farms of Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Haryana. For this, faecal samples of 202 animals (100 sheep and 102 goats) were screened for qualitative (floatation and sedimentation), quantitative (McMaster) and coproculture examination. Faecal sample examination revealed significantly higher (p<0.01) infection in sheep (100%) as compared to goats (96%). The eggs of strongyle, Strongyloides, Trichuris, amphistome, Moniezia and coccidian oocyst were observed as 100%, 13%, 46%, 29%, 15% and 90% in sheep, respectively and 96.1%, 15.7%, 7.8%, 17.6% and 87.2% in goats, respectively. Majority of animals had the infection of strongyles with EPG more than 1200 and were also harbouring light infection of coccidia. The coproculture revealed the predominance of Haemonchus contortus along with other nematodes.

Keywords: Gastrointestinal parasites, goats, incidence, severity, sheep

Small ruminants are important source of income for rural communities whose livelihood is largely based on livestock production (Sharma et al., 2015). These animals produce milk, wool, manure, leather and meat with minimum maintenance charges. They are also source of cash income for farmers at the time of need. As these animals are grazed on common land, thus predisposing them to various parasitic infections. Gastrointestinal (GI) parasites results in major production losses and represent an important animal welfare problem worldwide. Parasitic gastroenteritis is not only associated with direct harms like anaemia, diarrhoea, poor growth, reduced production but also associated with other complications like impaired immunity and secondary infections (Singh and Swarnkar, 2007). In addition, the diverse agroclimatic conditions, animal husbandry practices and pasture management largely determine the incidence and severity of various parasitic diseases in a geographical area.

In Haryana, limited studies have been undertaken to provide information on the epidemiology of GI infections in small ruminants of Haryana (Gupta et al., 1987). Epidemiological knowledge is essential for the control and prevention of parasitic infections. Therefore, the present study was planned to know the incidence and severity of GI parasites in sheep and goats at Hisar, Haryana.

MATERIALS AND METHODS

The study was undertaken at Goat Breeding Farm and Sheep Breeding Farm, Lala Lajpat Rai University of Veterinary and Animal Sciences (LUVAS), Hisar. The animals were being kept under permanent grazing system. The study was carried out in 202 (100 sheep and 102 goats) randomly selected animals. Fresh faecal sample was collected from each animal, placed in plastic vial, labelled, brought to laboratory and processed. Floatation technique was used for demonstrating nematode and cestode egg’s as well as coccidian oocysts, while sedimentation technique was used for detecting the trematode egg’s. The ova/eggs of parasites were identified from their morphological characters (Soulsby, 1982). Egg per gram (EPG) of infection
was determined by the modified McMaster technique to an accuracy of one egg counted representing 50 EPG. The infection of nematodes was further categorised as light (50-800), moderate (800-1200) and heavy (> 1200) as per Hansen and Perry (1994). Pooled faecal samples were subjected to coproculture using petridish method. Faecal samples mixed with charcoal were kept at 27±2°C for 7 days to recover infective larvae (L3). The infective larvae were identified as per criteria of Keith (1953). The data was analysed using chi square test and significant difference was considered if \( P < 0.05 \).

**RESULTS AND DISCUSSION**

Out of 202 goats and sheep examined, 198 (98%) were positive for eggs of one or more species of GI parasites (Table 1). The incidence of parasitic infection was significantly \( (p< 0.01) \) higher in sheep (100%) as compared to that of goats (96%). Higher incidence in sheep than goats was also observed by Singh et al. (2017a) from Punjab, Singh et al. (2013) from Mathura and Varadharajan and Vijayalakshmi (2015) from coastal areas of Tamil Nadu. Higher prevalence of GI parasitic infections in sheep as compared to goats may be due to difference in their grazing behaviour. Sheep grazes very close to the ground so risk of ingestion of parasitic larvae is comparatively more than the goats, as they are browsers (Lathamani et al., 2016). In contrast to the present findings, higher rates of infection in goats than sheep were reported by Choubisa and Jaroli (2013) from Rajasthan. This variation in findings might be due to the difference in the number of animals examined, period of study, geo-climatic conditions (temperature, rainfall and humidity) of the area that favours the survival of infective stages of the parasites, management conditions, deworming practice employed and availability of susceptible host.

Overall, sex wise prevalence of GI parasites was slightly higher in females (98.8%) as compared to that of males (97.5%) but difference was non significant \( (p>0.05) \). In sheep, both male and female were 100% positive for GI infection while in goats 93.3% male and 97.7% female were having infection with one or other type of GI parasites. The almost similar percentage of infection in both male and female might be due to similar area visited by these animals during grazing. A higher infection in female (25.33%) as compared to male (20.5%) was also observed in sheep by Razzaq (2014) from Balochistan, Pakistan.

Age-wise distribution of gastro-intestinal parasites is given in Table 1. Incidence of parasites was slightly higher in young \( (< 2 \text{ yrs}) \) (98.9%) as compared to adult \( (>2 \text{ yrs}) \) (98.2%) but the difference was non significant \( (p>0.05) \). Higher incidence of infection in young could be due to more susceptibility to the infection because of lower immunity. Lower prevalence of infection in adult animals could be attributed to body resistance as they might have developed immunity due to repeated natural infections. Similar were the finding of Bhat et al. (2012) who observed highest prevalence rate of GI parasites in younger age groups of sheep of Kashmir Valley.

In the present study, single parasitic infection was observed in 6% sheep and 4.9% goats, while mixed infection was observed in 94% sheep and 95.1% goats. The results for different GI infections are presented in Table 2. Among nematodes, the incidence rate of strongyle was 100% and 96.1%, *Strongyloides* spp. was 13%, and 15.7%, *Trichuris* spp. was 46%, and 48% in sheep and goats, respectively. The finding of predominant strongyle eggs in small ruminants was in agreement with Bhat et al. (2012) in Kashmir, Gupta et al. (2013) in Jabalpur, Madhya Pradesh and Singh (2015) in central plain zone of

| Animal species | Sex | Age ≤ 2 years | Age > 2 years |
|----------------|-----|---------------|---------------|
|                |     | Examined | Positive (%) | Examined | Positive (%) | Examined | Positive (%) | Examined | Positive (%) |
| Sheep          | Male| 25       | 25 (100)     | 75       | 75 (100)     | 59       | 59 (100)     | 41       | 41 (100)     |
|                | Female| 75       | 75 (100)     | 84       | 84 (96.5)    | 30       | 29 (96.7)    | 72       | 69 (95.8)    |
| Goats          | Male| 15       | 14 (93.3)    | 87       | 84 (96.5)    | 30       | 29 (96.7)    | 72       | 69 (95.8)    |
|                | Female| 87       | 84 (96.5)    | 162      | 160 (98.8)   | 89       | 88 (98.9)    | 113      | 111 (98.2)   |

Figures in parenthesis show percentage.
Gastrointestinal infection in sheep and goats at Hisar Punjab. In trematodes, the prevalence of amphistome was 29%, and 7.8% in sheep and goats, respectively. As per the available literature, this is the first report of amphistome infection from western Haryana.

Table 2: Incidence of different GI parasites in sheep and goats

| Parasite/species | Sheep (n=100) | Goats (n=102) | Overall (n=202) |
|------------------|---------------|---------------|-----------------|
| Strongylus sp.   | 100 (100)     | 98 (96.1)     | 198 (98)        |
| Strongyloides sp.| 13 (13)       | 16 (15.7)     | 29 (14.4)       |
| Trichuris sp.    | 46 (46)       | 49 (48)       | 95 (47)         |
| Amphistome       | 29 (29)       | 8 (7.8)       | 37 (18.3)       |
| Moniezia spp.    | 15 (15)       | 18 (17.6)     | 33 (16.3)       |
| Coccidia spp.    | 90 (90)       | 89 (87.2)     | 179 (88.6)      |

Figures in parenthesis show percentage.

However, the infection of amphistome in small ruminants has been reported by Singh et al. (2017a) from western zone of Punjab and Choubisa and Jaroli (2013) from Rajasthan. The only cestode observed in this study was Moniezia spp. with the prevalence of 15% in sheep and 17.6% in goats. A lower prevalence of 6.02% in sheep and 8.51% in goats was reported by Choubisa and Jaroli (2013) from Rajasthan. The variation in the prevalence might be due to the availability and exposure of free-living soil mites on pasture. Eimeria spp. was 90%, and 87.2% in sheep and goats, respectively. High prevalence was also reported (71.18%) by Satish et al. (2018) in small ruminants in and around Chennai, Tamil Nadu. Singh et al. (2017b) also reported 96.62% infection of coccidiosis in sheep of semi-arid region of India.

Mixed GI parasite infection was significantly higher (p<0.05) in sheep (99%) than goats (85.3%) (Table 3). Higher incidence of mixed infection was also documented by Rafique et al. (1997) and Jatau et al. (2011). The further study revealed that the difference in mixed infection between young and adult sheep and goats was non significant (p< 0.05).

The quantification of infection in sheep and goats by estimating EPG/OPG of faeces is depicted in Table 4. The results revealed maximum animals with heavy infection of strongyles. Strongyloides, Trichuris and Moniezia parasites were present as light infection only. However, strongyles were 22.7%, 21.3% and 53.9% with light, moderate and heavy infection, respectively. Out of the total population screened for strongyles 34.6% (n=70) and 19.3% (n=39) of sheep and goats, respectively had heavy infection (Table 4). The present finding revealed the high intensity and severity of strongyle infection in sheep over goats. Similar was the finding of Jatau et al. (2011) and Asif et al. (2008). From the present findings of nematode infection, it may be concluded that majority of animals have heavy infection, thus reducing their productivity and need immediate treatment with anthelmintic drugs. The Moniezia eggs were present in 15% and 17.6% of sheep and goats, respectively. The coccidian oocysts were 90% and 86.3% in sheep and goats, respectively. Majority of animals were having light infection of coccidiosis and are sub-clinical carrier and source of infection for young flock.

The coproculture results of pooled faecal samples revealed the infective larvae of Haemonchus contortus, Trichostrongylus sp., Oesophagostomum sp., Bunostomum
sp. and Strongyloides sp. as 91%, 1%, 2%, 1% and 5%, respectively in sheep and 90%, 2%, 3%, 1% and 4%, respectively in goats. The results revealed predominance of H. contortus in both sheep and goats. Similar were the findings of Kumari et al. (2010) at Patna (Bihar), Palampalle et al. (2003) in Marathwada region of Maharashtra, Vohra et al. (2013) in goats and Sharma et al. (2015) in sheep at Hisar (Haryana).

**CONCLUSION**

High infection of strongyles, followed by light infection of coccidiosis was observed in sheep and goats in the present study. Coproculture revealed that among strongyles, H. contortus was the predominant parasite. Amphistome infection was detected for the first time in western Haryana. Therefore, such studies are of paramount importance in devising control strategies.

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