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

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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 yrs) (98.9%) as compared to adult (>2 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

Table 1: Sex wise and age wise prevalence of GI parasites in sheep and goats

Animal species	Sex				Age			
	Male		Female		≤ 2 years		>2 years	
	Examined	Positive (%)	Examined	Positive (%)	Examined	Positive (%)	Examined	Positive (%)
Sheep	25	25 (100)	75	75 (100)	59	59 (100)	41	41 (100)
Goats	15	14 (93.3)	87	84 (96.5)	30	29 (96.7)	72	69 (95.8)
Over all	40	39 (97.5)	162	160 (98.8)	89	88 (98.9)	113	111 (98.2)

Figures in parenthesis show percentage.

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)
Strongyle	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 coccicidia in goats 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*

Table 3: Incidence of mixed GI parasites infection in sheep and goats

Animal	Infection type	Sex		Age		Total
		Male	Female	Young	Adult	
Goats	Negative	1 (6.6)	3 (3.4)	1 (4.2)	3 (3.4)	4 (3.9)
	Single	1 (6.6)	10 (11.5)	4 (13.3)	7 (9.7)	11 (10.8)
	Mixed	13 (86.7)	74 (85.1)	25 (83.3)	62 (86.1)	87 (85.3)
	Total examined	15	87	30	72	102
Sheep	Negative	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
	Single	0 (0)	1 (1.3)	0 (0)	1 (2.4)	1 (1)
	Mixed	25(25)	74 (98.7)	59 (100)	40 (97.6)	99 (99)
	Total examined	25	75	59	41	100

Figures in parenthesis show percentage.

Table 4: EPG of GI parasites in sheep and goats

Parasites	50-800 (Light)			800-1200 (Moderate)			>1200 (Heavy)		
	Overall	Sheep	Goats	Overall	Sheep	Goats	Overall	Sheep	Goats
Strongyles	46 (22.7)	15 (7.4)	31 (15.3)	43 (21.3)	15 (7.4)	28 (13.8)	109 (53.9)	70 (34.6)	39 (19.3)
Strongyloides sp.	29 (14.35)	13 (6.4)	16 (7.9)	—	—	—	—	—	—
Trichuris sp.	95 (47)	46 (22.8)	49 (24.3)	—	—	—	—	—	—

Figures in parenthesis show percentage.

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), Palamapalle *et al*. (2003) in Marthwada 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.

REFERENCES

Asif, M., Azeem, S., Asif, S. and Nazir, S. 2008. Prevalence of gastrointestinal parasites of sheep and goats in and around Rawalpindi and Islamabad, Pakistan. *J. Vety. Anim. Sci*., **1**: 14-17.

Bhat, S.A., Mir, M.R., Qadir, S., Allaie, I.M., Khan, H.M., Husain, I. and Sheikh, B.A. 2012. Prevalence of gastrointestinal parasitic infections in Sheep of Kashmir Valley of India. *Vety. World,* **5**(11): 667-671.

Biffa, D., Jobre, Y. and Chaka, H. 2006. Ovine helminthosis a major health constraint to productivity of sheep in Ethopia. *Anim. Health Res. Rev.,* **7:** 107-118.

Choubisa S.L. and Jaroli V.J. 2013. Gastrointestinal parasitic infection in diverse species of domestic ruminants inhabiting tribal rural areas of southern Rajasthan, India. *J. Parasit. Dis*., **37**(2): 271–275.

Gupta, A., Dixit, A.K., Dixit, P. and Mahajan C. 2013. Prevalence of gastrointestinal parasites in small ruminants in and around Jabalpur, India. *J. Vety. Parasitol.,* **27**(1): 59-60.

Gupta, R.P., Yadav, C.L. and Chaudhri, S.S. 1987. Epidemiology of gastrointestinal nematodes of sheep and goats in Haryana, India. *Vety. Parasitol*., **24**(1–2): 117-127.

Hansen, J. and Perry, B. 1994. The epidemiology, Diagnosis and control of helminth parasite of ruminants. A hand book, ILRAD, Nairobhi, Kenya, pp. 1-79.

Jatau, I.D., Abdulganiyu, A., Lawal, A.I., Okubanjo, O.O. and Yusuf, K.H. 2011. Gastrointestinal and haemoparasitism of sheep and goats at slaughter in Kano, northern-Nigeria. *J. Vety. Sci.,* **9**(1): 7-11.

Keith, R.K. 1953. The differentiation of infective larvae of some nematode parasites of cattle. *Australian J. Zool*., **1**: 223-235.

Kumari, S., Sinha, S.R.P., Sinha, S., Hoda, M.Z., Mandal, K.G. and Sharma, S.K. 2010. Incidence of gastrointestinal helminthosis in sheep and goats in Patna (Bihar). *J. Vety. Parasitol*., **24**: 97-99.

Lathamani, V.S, Ramesh P.T and Siddalingamurthy H.K. 2016. Studies on the prevalence of helminth infestation in small ruminants and the anthelmintic effectiveness in Tumkur District of Karnataka. *Int. J. Innov. Res. Sci. Eng. Technol*., **5**(2): 2169–2173.

Palampalle, H.Y., Deshpande, P.D. and Narladkar, B.W. 2003. Gastrointestinal nematodiasis in bovines of Marathwada region: faecal culture and egg count studies. *J. Vet. Parasitol*., **17**: 135-137.

Rafique, S., Qudoos, A., Alvi A.S. and Hayat C.S. 1997. Parasitic infection of sheep and goats in Quetta and Kalat areas of Balocidstan. *Pakistan Vet. J.*, **17**(2): 94-96.

Razzaq, A., Ashraf K., Maqbool, A., Islam, M., Hanan, A., Awais, M.M., Khetran, M.A., Jan, S., Shafee, M., Essa, M., kakar, H. 2014. Epidemiology, sero-diagnosis and therapeutic studies on nematodes infection in Balochirange-sheep at district Quetta, Balochistan, Pakistan. *Iranian J. Parasitol*., **9**(2): 169-180.

Satish, A.C., Nagarajan, K., Balachandran, C., Soundararajan, C., Arunaman, C.S., Thangapandian, M. and Sridhar, R. 2018. Prevalence of Gastrointestinal Parasites in Small Ruminants in and around Chennai, Tamil Nadu. *Indian Vet. J*., **95**(2): 78 – 79.

Sharma, R., Singh, S. and Vohra, S. 2015. Detection of anthelmintic resistance in gastrointestinal nematodes of sheep on government sheep breeding farm Hisar. *Haryana Vet.,* **54**(2): 147-149.

Singh E., Kaur, P., Singla L.D. and Bal, M.S. 2017a. Prevalence of gastrointestinal parasitism in small ruminants in western zone of Punjab, India. *Vet. World*, **10**(1): 61–66.

Singh V, Varshney P, Dash S.K, Lal H.P. 2013. Prevalence of gastrointestinal parasites in sheep and goats in and around Mathura, India. *Vet. World,* **6**(5): 260–262.

Singh, A.K., Shanker, D., Rout, P.K., Kumar, A. and Kumar P. 2017b. Seasonal incidence of coccidial infection in Barbari and Jamunapari goats of semi-arid region, India. *J. Entomol. Zool. Stud.,* **5**(6): 276-278.

Singh, D. and Swarnkar, C.P. 2007. Alternative methods of control of gastrointestinal nematodosis in small ruminants. In: Small Ruminants Emerging Diseases Containment under WTO Regime (Eds: V.S. Vihan, Ashok Kumar, V.K. Gupta and N.P. Singh), Satish Serial Publishing House, New Delhi, pp. 269- 303.

Singh, R. 2015. Epidemiology of gastrointestinal parasites of sheep and goats in central plain zone of Punjab. Ludhiana: M.V.Sc. Thesis Submitted to the Guru Angad Dev Veterinary and Animal Sciences University. pp. 1-72.

Soulsby, E.J.L. 1982. Helminths, arthropods and protozoa of domesticated animals. 7th Ed., ELBS, Bailliere Tindall, London, pp. 809.

Varadharajan A. and Vijayalakshmi R. 2015. Prevalence and seasonal occurrence of gastrointestinal parasites in small ruminants of coastal areas of Tamil Nadu. *Int. J. Sci. Res. Publ*., **5**(2): 1-4.

Vohra S., Singh S. and Poonia J.S. 2013. Efficacy of individual and combination of anthelmintics against gastrointestinal nematodes. *Haryana Vet*., **52**: 124-128.