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Epidemiology of gastrointestinal nematodosis in goats of Uttarakhand, India

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Gastrointestinal (GI) nematodosis seriously affects the growth performance and health status of the animals. There are numerous reports on the prevalence of the GI nematodosis in goats from different parts of country (Pal and Bandyopadhyay 2004, Yadav *et al.* 2006, Mamatha and D'Souza 2007 and Ram *et al.* 2007). Although, the disease is widely prevalent in goats of Uttarakhand, but the incidence on GI nematodosis in goats of this state has not been properly documented till date. Keeping this in mind, the present study was planned to carry out detailed investigations on the epidemiology of this disease in goats of Uttarakhand.

The epidemiological investigations were undertaken in 13 districts of Uttarakhand by randomly collecting faecal samples of goats during January 2001 to December 2006. Faecal samples (13 137) of goats (4 046 from hills and 9 091 from tarai) were collected monthly in polybags and were brought to the laboratory for faecal egg count (FEC) by modified McMaster technique. The samples were pooled, cultured at 27° C, L_3 separated by Baermann's technique and identified as per Soulsby (1965). Besides this, 476 GI tracts were procured from local slaughter houses (Pantnagar, Kichha and Rudrapur) over 6 years period.

The worms were separated, counted and identified as per Yadav and Tandon (1989). Also, pasture larval counts were estimated by harvesting the pasture from different grazing areas at Pantnagar and the larvae were separated for identification (Soulsby 1965).

The climatic condition of tarai and hill zone of the state differs significantly and data regarding monthly maximum and minimum temperature, mean monthly rainfall and maximum and minimum relative humidity (2001–2006) were obtained from Crop Research Center, Pantnagar and Indian Meteorological Department, Dehradun for tarai region while for hill region, the data was obtained from Vivekanand Parvatiya Krishi Anusandhan Sansthan, Almora.

Coprological prevalence of GI nematodosis: Out of 13 137 faecal samples examined, 7 429 (56.55%) were positive for eggs of different GI nematodes. Goats from tarai region had higher prevalence of 66.89% (mean EPG: 583.99, EPG range: 0–43000) as compared to the goats of hill region i.e. 33.31% (mean EPG: 114.626, EPG range: 0–7000). The prevalence of GI nematodosis in goats was highest during September (86.13%) in tarai while it was highest in hills during June (70.08%). However, the lowest prevalence rate was recorded during January (58.55%) and November (16.66%) in the goats of tarai and hill region, respectively. High prevalence of GI nematodes in goats at high altitudes of Uttrarkhand was reported by Ram *et al.* (2007). However, Pal and Bandyopadhyay (2004) reported highest and lowest prevalence of GI nematodes in goats of Sikkim in November and March, respectively. The variation in the prevalence might be due to changes in agroclimatic conditions, the timing of the onset of rainy season and differences in the managemental practices followed in the two states.

In the present study, the highest mean EPG was recorded in September (8023.28) and lowest during January (1268.94) with an EPG range of 0–43000 in tarai region. These findings justify the highest and lowest incidence of GI nematodes during September and January of the goats of tarai region. High EPG in goats during September and lowest in January was reported by Yadav and Tandon (1989). However, goats from hill region had highest mean EPG (1047.40) in September followed by June (939.0), while it was lowest in November (33.32) with an EPG range of 0–7000. This also coincides with our observations in the present study that the highest and lowest prevalence rates of infection in goats of hill region were during June and November, respectively. On the basis of present investigations, it is inferred that the animals of *tarai* and hill regions are at the highest risk of suffering from GI nematodosis in September-October and May-June, respectively. The high EPG value during rainy season (July-October) has also been reported from Jammu

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(Yadav *et al.* 2006). High rise in EPG during these months may be due to suitable temperature and humidity required for the development and survival of pre-parasitic stages (Soulsby 1982).

Coproculture examination: Coproculture studies revealed that *Haemonchus contortus, Trichostrongylus colubriformis, Oesophagostomum columbianum* and *Strongyloides papillosus* are the predominant GI nematodes of goats in tarai and hill region. Besides these parasites, *Ostertagia circumcincta* was also frequently recovered from the faecal samples of goats of hill region. In one of the goats of hill region, larvae of *Chabertia ovina* were also recorded. The infective larvae of the former 4 nematodes were recorded throughout the year. Among various recovered GI nematodes, *Haemonchus* sp. was the predominant parasite of goat as reported by Ram *et al.* (2007). This might be because of high fecundity of the parasite and ability of the infective larvae to survive for prolonged duration on pasture (Soulsby 1982).

Slaughter house prevalence of GI nematodes: Examination of 476 GI tracts of goats of tarai showed an overall mean worm count of 482.59. The highest mean worm count (979.54) was observed in December. Similar findings were also reported by Gupta *et al.* (1987). The worm population revealed that *H. contortus, T. colubriformis, O. columbianum* and *Tichuris ovis* were the predominant parasites throughout the study period. *Bunostomum trigonocephalum* was also observed in February and April. Although *B. trigonocephalum* is not prevalent in the study areas as revealed by coproculture studies and parsture larval composition studies, occasional presence of this parasite in GI tracts of slaughtered goats may be due to the fact that the butchers purchase the animals from nearby states where the parasite may be prevalent. The mean EPG in slaughtered goats was the highest in September (4768.64) and lowest in January (981.52). This observation also coincided with highest and lowest prevalence of GI nematodes in goats on coprological examination of tarai region during September and January, respectively.

Pasture larval burden: The highest larval (L_3) burden of GI nematodes was recorded in September (32.44/kg of grass) and lowest in December (7.12/kg of grass) comprising predominantly *Haemonchus, Trichostrongylus, Oesophagostomum* and *Strongyloides* spp. throughout the year. However, larvae of *Oesophagostomum* sp. in March, April and June, and *Trichostrongylus* sp. during December were not recorded. This may be due to the ecology of these parasites and the micro-environmental conditions, which may not be suitable for the survivability of the larval stages of these parasites on the pastures during these months (Soulsby 1982). The high incidence of pasture larval burden in September showed positive correlation with incidence of GI nematodosis on coprological examination and slaughter house prevalence of GI nematodes during September. Almost similar findings were also reported by Sharatkumar *et al.* (2007).

Correlation of epidemiological findings with meteorological data: Our findings revealed that the temperature (21.9–30.1°C), RH (71±5 to 92±1%) and high rainfall (274 mm) in tarai region have high positive correlation with the prevalence of GIN during September. The higher prevalence of GIN under these environmental conditions might be due to higher survivability of larvae on pasture. The higher prevalence of GIN in goats of hill region was recorded during June at 23.7–33.3°C (min.-max. temp.), 56–79% (min-max RH) and 186 mm rainfall. Yadav *et al.* (2006) reported higher rate of GIN infection in sheep and goats of Jammu at temperature of more than 18°C and high rainfall (>50 mm) during monsoon. Heavy rainfall and high relative humidity act as predisposing factors of gastrointestinal nematodes.

The results of the present investigations suggested that goats of Uttarakhand state were highly susceptible to GI nematodosis throughout the year. This warranted a need to formulate an effective control programme against GI nematodosis for which these epidemiological findings are being utilized.

SUMMARY

Detailed investigation on the epidemiology of gastrointestinal nematodosis was carried out. Coprological prevalence of GI nematodosis, coprological examination, slaughter house prevalence and pasture larval burden were studied. Correlation of epidemiological findings with meteorological data were studied. The results reveald that goats of *tarai* region are highly susceptible to GI nematodosis throughout the year.

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REFERENCES

Gupta R P, Yadav C L and Chaudhri S S. 1987. Epidemiology of gastrointestinal nematodes of sheep and goats in Haryana, India. *Veterinary Parasitology* **24**: 117–27.

Mamatha G S and D'Souza P E. 2007. Gastrointestinal parasitism in sheep and goats from different districts of Karnataka. *Intas Polivet* **8**: 112–14.

Pal P and Bandyopadhyay S. 2004. Prevalence of gastrointestinal nematodosis in goats in Sikkim. *Journal of Veterinary Parasitology* **18** (2): 127–30.

Ram Hira, Sharma A K, Singh S K, Meena H R and Rasool T J.

2007. Seasonal nematode egg output in goats at high altitude of Uttaranchal, India. *Journal of Veterinary Parasitology* **21**: 73–74.

Sharatkumar S, Dhanachand C H and Mohilal N. 2007. Pasture larval contamination in the common grazing field. *Indian Veterinary Journal* **84** (1): 88–89.

Soulsby E J L. 1965. Helminths. *Textbook of Veterinary Clinical Parasitology*. Vol. **1**, 279–305. Blackwell Scientific Publication, London.

Soulsby E J L. 1982. *Helminths, Arthropods and Protozoa of Domesticated Animals*. 7th edn, pp. 809. ELBS and Baillere Tindal, London.

Yadav A K and Tandon V. 1989. Gastrointestinal nematode infections of goats in a sub tropical and humid zone of India. *Veterinary Parasitology* **33**: 135–42.

Yadav A, Khajuria J K and Raina A K. 2006. Seasonal prevalence of gastrointestinal parasites of sheep and goats of Jammu. *Journal of Veterinary Parasitology* **20** (1): 65–68.