Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2017; 5(5): 876-878

Received: 24-07-2017
Accepted: 25-08-2017

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Coproculture study of strongyle infection of goats from Malwa region of Madhya Pradesh

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Abstract
The coproculture study on strongyle infection of goats was carried out from slaughter house of Mhow, Madhya Pradesh during the period from Nov. 2015 to March 2016. Out of a total of 200 samples, 130 were found positive for strongyle with an overall prevalence rate of 65% Strongyle positive faecal samples were separately pooled and subjected to coproculture. Thus, larvae obtained were identified up to the level of genera. Upon coproculture of those faecal samples found positive for strongyle type, seven genera of parasites were recognized. *Haemonchus sp.* (32.33%) was the predominant gastrointestinal nematode followed by *Oesophagostomum sp.* (22.51%), *Trichostrongylus sp.* (18.67%), *Cooperia sp.* (15.03%), *Nematodirus sp.* (12.65%), *Ostertagia sp.* (3.34%) and *Bunostomum sp.* (3.12%). *Haemonchus* was the most common type of strongyle encountered in 32.33% goats, while *Bunostomum* was the least recovered from 3.12% goats. The finding of this examination shows that strongyle disease is one of the real issues that could hamper wellbeing and efficiency and there is requirement for outline a program to limit and control strongyle contamination in goats in the study area.

Keywords: Strongyle, Coproculture, Goat, Slaughter house

Introduction
Goat contributes basically to the agrarian economy, particularly in spaces where crop and dairy creating are not spared. India has 140.5 million goats [1] which account 16.53 per cent of the total global population. India positions second in goat population in the world. The cost of goat production in the present system of goat rearing is indeed low and the monetary gains through the sale of its products like meat, fiber and skin are high enough to prompt the goat owners to switch over the practices followed over the ages [2]. Moreover, goat production adds to about Rs. 2443.3 crore per annum to the national income [3]. However, various helmintic diseases are responsible for causing heavy losses due to reduced production, morbidity and mortality. Goats are vulnerable to various parasitic diseases that not only undermine their health but also play a role in lowering the overall production [4]. Gastro-intestinal (GI) parasitism in animals is common and one of the noteworthy issues in India. It causes anemia, debilitating, feebleness, oedema, deficiency, and death [5]. Since, the work of direct fecal examination alone may not be adequate to offer a correct picture of the prevalence of GI parasites, gives a record of coprological culture has likewise been widely surveyed [6, 7, 8]. The Overall prevalence of GI helminth in sheep and goat was 82% from Patiala and its adjoining area and recorded genera were *Trichostrongylus* sp. (78.57%), *Haemonchus* sp. (64.29%), *Strongyloides* sp. (57.14%) and *Oesophagostomum* sp. (42.86%) [9]. Prevalence of *Hamonchus* (64.19%), *Trichuris* (35.48%), *Nematodirus* (13.00%), *Trichostrongylus* (4.51%) and *Strongyloides* (3.22%) in goat from Rawalpindi and Islamabad in Pakistan was reported by [10]. However, scanty information is available on the prevalence of strongyle in goats in Mhow of M.P. Therefore, the present work has been designed to study various genera of strongyle of goat for developing worm management strategies for control of parasitic diseases.

Materials and methods
Faecal samples were collected randomly from slaughter house Mhow where animals are brought to slaughter from different region of Malwa. Freshly laid or rectal faecal samples were collected in an individually labeled polythene bags from the selected animals [11]. The faecal samples were collected daily from slaughter house of Mhow over a period of five months (Nov. 2015-March 2016).

These faecal samples were taken to the laboratory at the earliest for further examination.

The faecal samples positive for strongyle infection were pooled and culture in the laboratory by glass tumbler (300 ml capacity) method. About 75-100 grams of pooled strongyle positive faecal samples was thoroughly mixed with activated charcoal in 3:1 ratio and water sufficient to get a pasty consistency, using pestle mortar and placed in a glass tumbler of 300 ml capacity. After cleaning the inner margin of the tumbler, its mouth was covered with aluminium foil and then it was incubated at 25 to 28ºc for 7 days. The culture tumbler was checked once daily in the morning for optimum wetness in the sample. On the 8th day, the tumbler was taken out of the incubator, its aluminium foil was removed and lukewarm water was then filled up till a convex surface was formed at the brim. A glass petridish of 4 inches size was placed on to the mouth of the tumbler with precaution that no air bubbles should be trapped within. The whole preparation was then so inverted that the tumbler stood in the petridish and kept in little slanting position under artificial light. After 4-6 hrs, the water in the petridish was withdrawn and centrifuged at 1000 rpm for 2 minutes. After discarding the supernatant, 10% hot formaldehyde was added to the sediment containing larvae so as to preserve them stretched as per the procedure of [12].

A drop of preserved sediment containing larvae was placed on a glass slide, mixed with a drop of Lugol's iodine or aqueous Safranin and then examined under dry magnifications of the compound microscope after applying a cover slip over the preparation. 100 L3 parasites were counted and identification of strongyle larvae was done with the help of the key and plates provided by [13].

Results and discussion

The larvae of strongyle nematodes recovered from coprocultural examination, were identified up to the level of genera to which they belonged. Out of 200 faecal samples collected from goats, 130 samples (65%) were found positive in strongyle eggs. Higher prevalence of strongyle was also recorded earlier from India and abroad [14, 15]. This may be due to their direct life cycle and the typical grazing habit of small ruminants facilitating the transmission of the parasite.

The percentage of each strongyle species were determined by identifying at least 20 strongyle larvae harvested from the pooled faecal cultures from a slaughter house. Upon coproculture of those faecal samples found positive for strongyle type, seven genera of parasites were recognized. *Haemonchus sp.* (32.33%) was the predominant gastrointestinal nematode followed by *Oesophagostomum sp.* (22.51%), *Trichostrongylus sp.* (18.67%), *Cooperia sp.* (15.03%), *Nematodirus sp.* (12.65%), *Ostertagia sp.* (3.34%) and *Bunostomum sp.* (3.12%) (Table- 1). The contribution of agro ecology and climatic parameters proposed to play an important role in the development and survivility of infective stages of strongyle nematodes on pasture. The collective predominance of *Haemonchus* sp. to be found on copro-culture in the present study and well agreement with those reported by [16, 17, 18]. However, highest prevalence of *Haemonchus* sp. might be due to high biotic potential to acquire faster resistant than other nematodes. It's pathogenecity is known to be more important than other nematode. The prevalence of *Bunostomum* sp. was the lowest in our present study. Similar findings were also reported by [19]. However, the present finding is in contrast to those of [20] from Parbhani and [21]. from Kenya who reported the predominance of *Trichostrongylus* during rainy season. The pre-parasitic stage preferred cooler months for its development and survival [22]. The above two areas have only to extreme climate i.e. summer and rainy season and therefore, the larvae of *Trichostrongylus* spp. got favorable environment only around rainy season.

The Study of coproculture examination showed the existence of polyparasitism which indicate animals had more than one type of parasitic eggs corroborates with the finding of [23]. Morbidity and loss of production in goat in the study area might be due to interactions and compromization of the immune system of the host by polyparasitism. This can be supported by the fact because most of goats brought to slaughter house suffering from debilitated body conditions. Premature slaughter and rejection of some parts of meat inspection due to parasitic infection responsible for direct losses and indirect losses include the reduction in production [24].

Table 1: Mean generic composition (%) and characteristic features of strongyle nematode larvae recovered from copro-culture.

Genera	Overall mean (%)	Characteristic features of strongyle nematode larvae
Haemonchus	32.33	Slender larva, tail of seath of medium length tapering to a point and often kinked. Tail of seath very short, conical
Oesophagostomum	22.51	Larva of medium size, 32 pentagonal gut cells, lumen of gut wavy
Trichostrongylus	18.67	Small larva bearing one or two tuberosities or indistinctly rounded
Cooperia	15.03	Oval bodies at anterior end of larva. Tail of larva rounded
Nematodirus	12.65	Tail of larva is forked
Ostertagia	3.34	Long, conical, "finger like" tail sheath
Bunostomum	3.12	Very small larva with 16 guts cells

Acknowledgement

The authors are thankful to the Dean, College of Veterinary Science and A.H., Mhow for providing all facilities to carry out the present investigation.

Conclusion

The overall composition of the coprocultural larvae revealed that *Haemonchus* was the predominant nematode, followed by *Oesophagostomum*, *Trichostrongylus*, *Cooperia*, *Nematodirus Oestertagia* and *Bunostomum*. These parasites are responsible for causing heavy losses due to reduced production, morbidity and mortality. Since polyparasitism is a common problem therefore strategic deworming of animals using broad spectrum anti-helminthics are required and for this professional input of veterinarians is desired. Therefore it is concluded that the proper deworming schedule of animals, when conditions are more favourable for development and survival of strongyle larvae on the pasture. Rotational grazing pattern is used at interval and avoid the infected herd with healthy herd. Hence, proper pasture and animal management could improve the control of gastrointestinal nematode infections in goat in small holder farmer.

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