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Prevalence of gastrointestinal nematodiasis in goats

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Abstract

368 goats that were presented to the Campus Veterinary Hospital and Ambulatory Clinical Services, Mylardevpally, College of Veterinary Science, Rajendranagar, Hyderabad, from December-2017 to June-2018 were selected and screened for gastrointestinal nematodal infestation by different techniques (gross, direct faecal smear, sedimentation and flotation), out of which 140 goats (38.04%) were found positive for gastrointestinal nematodal infestation. The different parasites reported with their respective prevalences were: 88 (62.86%) goats showed *Strongyles spp.*, 33 (23.57%) showed *Trichuris spp.* and 19 (13.57%) showed *Strongyloides spp.* on direct smear, sedimentation and flotation techniques. The prevalence of gastrointestinal nematodes with respect to age (categorized as 0 month -1 year, between 1-2 years, between 2-4 years and more than 4 years), and sex were studied.

Keywords: *Strongyle spp.*, *Trichuris spp.*, *Strongyloides spp.*, age, sex

Introduction

India, as a tropical country, has a wide range of climatic zones, which make it vulnerable for a diverse range of parasites of medical and veterinary importance, whose transmission and geographical distribution are closely linked to regional temperature, rainfall and humidity. Small ruminants like sheep and goat occupy an important economic and ecological niche in agricultural systems throughout developing countries (Devendra, 2005) [6].

Goats are one of the earliest domesticated ruminants, which have served mankind as food animal longer than cattle and sheep (Dubey *et al.*, 2012) [7]. Over 94% of the goat population of the world was distributed in two continents namely Asia and Africa (Acharya, 1992) [1].

South Asian countries specially India, Bangladesh and Pakistan are the major producers of goat milk and a well-developed dairy goat industry was observed in European countries like France, Greece, Spain and Italy.

Goats are considered as poor man's cow and has enormous potential to boost economy of developing countries like India and act as a major source of income especially to marginal farmers and landless labourers. However goats are vulnerable to various parasitic diseases that not only undermine their health but also play a role in lowering the overall production (Sanyal, 1996) and are responsible for causing heavy losses due to reduced production, morbidity and mortality in animals especially in developing countries (Nwosu *et al.*, 2007) [14].

Parasitic gastroenteritis caused by gastrointestinal nematodes pose a serious health threat and a limitation to the productivity of goats due to the associated morbidity and mortality (Nwosu *et al.*, 2007; Bandyopadhyay *et al.*, 2010) [14, 4]. Infestation in the gastrointestinal tract with parasitic nematodes is still one of the main constraints to dairy specially goat production (Rinaldi *et al.*, 2007) [17]. Further, goats are more susceptible to infestation with gastrointestinal nematodes than sheep (Jallow *et al.*, 1994) [10].

Materials and methods

The present investigation was carried out in the Department of Veterinary Medicine and collaboration with the Department of Veterinary Parasitology, college of Veterinary Science, Rajendranagar, Hyderabad.

Collection and analysis of faecal samples

Faecal sample of about 5 gm from each animal was collected in a zip lock cover from individual goats per-rectally with faecal scoop (Fig. 1). The collected samples were observed grossly for the presence of round worms followed by their qualitative examination for the presence of nematodal ova by taking small amount of faeces on to the glass slide, mixed with normal saline and prepared a thin smear and examined under low power by applying coverslip.

Then the sample was subjected to sedimentation and centrifugal flotation techniques (Sloss *et al.*, 1994) and eggs were identified by morphology (Soulsby, 1986).



Fig 1: Collection of faeces per rectally

The faecal samples of goats that were positive for nematodal eggs were considered for the present study.

Results and Discussion

Out of 368 goats examined for gastrointestinal nematodal parasitic infestation by screening the faecal samples for the presence of nematodal parasitic ova, 140 goats were found positive, with an incidence of 38.04% in the present study. These findings were almost in accordance with Nabi *et al.* (2014) [13], who reported that the overall incidence of gastrointestinal nematodal parasite was 40.67% in goats of Pakhtunkhwa, Pakistan. However Akhter *et al.* (2011) [3] reported 43.10% of overall incidence of gastrointestinal nematodal infestation in goats, which was slightly higher than the present study. Yadav and Tandon (1989), Yusof *et al.* (2016) [24] and Tariq *et al.* (2010) [22] reported that the incidence of gastro intestinal nematodal infestations as 86.8%, 52.3% and 54.3%, respectively, which were found to be much higher than the incidence in the present study.

The differences in overall incidence of gastrointestinal nematodal infestations might be due to variation in agro-ecology, which could affect survival and development of infective larval stage of nematode parasites. Variation in the use of anthelmintics and grazing practices might also contributed for the difference in the incidence (Getachew *et al.*, 2017) [9].

Among the 140 goats found positive for parasitic ova, 88 (62.86%) goats were showed positive for *Strongyles spp.*, 33 (23.57%) were positive for *Trichuris spp.* and 19 (13.57%) were positive for *Strongyloides spp.* on direct smear, sedimentation and flotation techniques. During the present study, *Strongyles spp.* (fig. 2) infestation was found more common in goats followed by *Trichuris spp.* and *Strongyloides spp.* (fig. 3 and 4), and similar findings were reported by Akhter *et al.* (2011) [3], Tariq *et al.* (2010) [22], Nabi *et al.* (2014). On contrary to the present findings Singh *et al.* (2015) [20] reported that the prevalence of *Stongyloides spp.* was more than *Trichuris spp.* in goats.

Out of 140 positive samples for nematodes in the present study 119 (85%) samples had single nematodal parasitic infestation, whereas 21 (15%) had mixed nematodal parasitic infestation. In the present study the single gastrointestinal nematodal infestation was found more than mixed infestations

and similar findings were reported by Akhter *et al.* (2011) [3] and Zeryehun *et al.* (2012) [25]. However, Pant *et al.* (2009) observed mixed gastrointestinal nematodal infestations were more in goats.

Among the 119 goats with single nematodal parasitic infestation in the present study, 72 (60.50 %) were *Strongyles spp.*, 27 (22.69 %) were as *Trichuris spp.* and 20 (16.81 %) were *Strongyloides spp.*, among 21 mixed nematodes parasitic infestations, *Strongyles spp.* +

Trichuris spp. was noticed in 13 (61.90%) goats and *Strongyles spp.* + *Strongyloides spp.* in 08 (38.1%) goats. In the present study the prevalence of mixed infestation of *Strongyles spp.* and *Trichuris spp.* was found to be higher when compared to the other mixed gastrointestinal nematodal infestation. Which was in agreement with that of Zeryehun *et al.* (2012) [25] and Akhter *et al.* (2011) [3], who also recorded similar higher prevalence of mixed infestation of *Strongyles* and *Trichuris* (3.38%), when compared with other mixed gastrointestinal nematodal infestations.

Hence, it may be prudent to conclude that goats might harbour more than one species of gastrointestinal nematodal parasites and treatment should be aimed at mixed gastrointestinal nematodal infestations on proper identification of parasites.

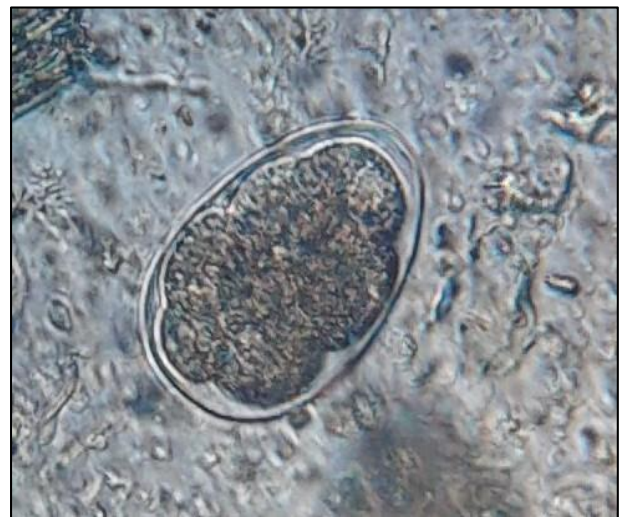


Fig 2: *Strongyle spp.* ova (40X)



Fig 3: *Trichuris spp.* ova (40X)



Fig 4: *Strongyloides spp.* ova (40X)

In the present study, the goats were divided into 0-1, 1-2, 2-4 and >4 years age groups. Among the 140 goats found positive for gastrointestinal nematodes, 64 (45.71%) were in 0-1 year, 39 (36.79%) in 1-2 years, and 24 (34.29%) in 2-4 years and 13 (25%) in > 4 yrs. age groups. Thus the incidence of gastrointestinal nematodes was found to be highest in between 0 month-1 year of age and least in above 4 years of age (Table 1). Similar observations were made by Singh *et al.* (2010)^[21], Tariq *et al.* (2010)^[22], Zeryehun (2012)^[25], Muluneh *et al.* (2014)^[12] and Nabi *et al.* (2014)^[13]. Raza *et al.* observed 73% of gastro intestinal nematodes in kids compared to 40% in adult goats (2012), However, Admasu *et al.* (2014)^[2] reported incidence of gastrointestinal nematodes in relation to age of goats was non-significant and all ages of goats were prone to gastrointestinal nematodes infestations.

Table 1: Age-wise incidence of gastrointestinal nematodal infestation in goats (n=140)

Age	No. of goats examined	No. of animals positive for GI nematodes.	Percent positive (%)
0 month-1 year	140	64	45.71
Between 1-2 years	106	39	36.79
Between 2-4 years	70	24	34.29
>4 years	52	13	25
Total	368	140	38.04

Table 2: Sex-wise incidence of gastrointestinal nematodal infestation in goats (n=140)

Sex	No. of goats examined	No. of animals positive for GI nematodes	Percent positive (%)
Male	188	75	39.89
Female	180	65	36.11
Total	368	140	38.04

Conclusion

The present study revealed prevalence of *Strongyles spp.* was higher than *Trichuris spp.* and *Strongyloides spp.*, Below 1 year aged animals had higher prevalence than others and male goats had higher prevalence than females. Proper preventive and control measures should be prepared based on these finding to control gastrointestinal nematodes in goats.

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In the present study, higher prevalence of gastrointestinal in young animals might be due to contaminated environment, poor hygiene, overstocking and lack of immunity. However, gradually as the exposure to nematode infestations increases, the immune system of host animals builds up against these nematode parasites. The low level of parasitism reported in the adult animals might be due to the development of immunity during the course of time (Tariq *et al.*, 2010 and Nabi *et al.*, 2014)^[22, 13].

Among the 140 goats positive for nematodes, 75 (39.89%) were males and 65 (36.11%) were females (Table 2). High prevalence of nematodes in males compare to females and almost similar observations were made by Nabi *et al.* (2014)^[13] who documented gastrointestinal nematodes was higher in male goats (46.66%) compared to females (34.66%). Raza *et al.* (2012)^[16], Muluneh *et al.* (2014)^[12] and Zvinorova *et al.* (2016)^[26] also observed slightly higher prevalence of nematodes in males compared to females.

On contrary Khajuria *et al.* (2013)^[11] reported a higher prevalence of gastrointestinal nematodal infestation in females (73.33%) than in males (61.14%). However, Tariq *et al.* (2010)^[22] did not found any significance difference in prevalence of gastrointestinal nematodes in relation to age of the goats. Barger (1993)^[5] reviewed the effects of sex on the resistance level against gastrointestinal parasites and reported that differences in resistance levels were significant, after puberty. The differences in resistance levels after puberty were due to estrogen stimulatory effect on immune responses against gastrointestinal nematodes as androgens were found to suppress the immune responses (Seli *et al.*, 2002)^[19] and thus males were more susceptible to infectious diseases including nematode parasites than females.

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