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Prevalence of gastrointestinal parasites in small ruminants in Udgir area of Marathwada

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Abstract

Fecal examination of 753 sheep and 740 goats, revealed *Strongyles* sp, *Strongyloides* sp, *Trichuris* sp, *Moniezia expansa*, *Moniezia benedeni*, *Eimeria* sp, mixed infection. The overall prevalence of parasites was observed as 52.32% in sheep and 51.89% in goats. In case of sheep & goats peak infection observed in monsoon followed by winter & lowest during the summer. Age-wise analysis of gastrointestinal parasitic infections in sheep (57.30%, 56.68%, and 50.09%) and goat (45.00%, 48.25%, 54.32%) of all ages showed non-significant slight variation trends of infection in kid, young and adults age group respectively. Sex-wise analysis higher infection was recorded in males than females. Breed-wise analysis for gastrointestinal parasitic infection in sheep and goat showed slight variation in prevalence of parasites which was non-significant. Osmanabadi and Non-descript goats hold the infection of 52.89% and 48.93% respectively. In sheep infection of 52.57% observed in Deccani and Non-descript showed 52.57% of infection.

Keywords: Sheep, goat, marathwada, gastrointestinal parasite

Introduction

Small ruminants play important role in rural economy by supporting marginal and landless farmers substantially. Even their existence in rural households exert a cushioning effect in the event of crop failures due to various reasons including climatic vagaries. Especially in arid or semi-arid drylands sheep and goats proved immensely helpful for livelihood security of these sections. Among constraints in sheep and goat husbandry contributing to production losses, gastrointestinal parasites constitute a major share. Due to the browsing habit of these animals and nomadic nature of husbandry, these animals are much prone to parasitic infestations.

The gastrointestinal tract (GIT) of animals harbor a wide variety of parasites like helminthes, coccidia *etc.* which causes clinical and sub clinical parasitism. The GI nematodes are considered as major constraints affecting the production performance of sheep and goats throughout the world including India (Kumar *et al.*, 2008) ^[1]. Due to this reason the epidemiology of gastrointestinal nematodosis in sheep and goats were studied almost in all agro-climatic regions of India (Katoch *et al.*, 2008, Dhanalakshmi *et al.*, 2001, Mamatha and D'souza, 2007, Singh *et al.*, 2015) ^[2, 3, 4, 5] Gastrointestinal parasites not only affect the health but also affect the productive and reproductive performance of the animals which includes loss in body weight, poor reproductive performance, digestive disturbance, emaciation for longer period and increased susceptibility of animals to other infections.

Prevalence of gastrointestinal parasite infection in livestock varies according to the existing climatic condition and managerial practices (Kumar *et al.*, 2016) ^[6]. The environmental factors like temperature, rainfall and humidity play an important role in the development and survival of pre-parasitic stages ^[1]. Therefore it is needed to estimate the possible variation in parasitic infection of each host species of animals in different geographic regions and which could help to design an effective control measures against the parasitic diseases. The current study was undertaken to record the clinical and subclinical GI parasitic profile of small ruminants in and around Udgir, a semi-arid tropical area of Marathwada in Maharashtra state.

Materials and Methods

The study area *i.e.* Udgir lies in Marathwada region of Maharashtra state in India which has semi-arid tropical climate. Faecal samples of the sheep and goats were collected throughout year during August 2015 to July 2016 comprising of all three seasons of the year from the Teaching Veterinary Clinical Complex of college, adopted villages, clinical camps and from

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animals in small/marginal farms nearby Udgir area. These samples were processed in the laboratory by standard methods Flotation and Sedimentation techniques (Soulsby, 1982) [7]. Samples were examined under low and high power microscopic fields for presence of round worm eggs, tape worm proglottids, eggs of fluke and oocysts of enteroprotezoan. The eggs/oocysts so detected were further examined for morphology to know the specification of fluke eggs, tape worm, round worm and entero-protozoa.

Results and Discussion

During the study, the fecal samples; 753 from sheep and 740 from goats in and around the Udgir region of Latur District of Maharashtra State were collected. The overall prevalence of gastrointestinal parasitic infections were determined in terms of data was analyzed as per the different parameters of study and are depicted in tables percentage and it was observed as 52.32% in sheep and 51.89% in goats (Table 1)

Table 1: Over all prevalence of gastrointestinal parasites in small ruminants of Udgir region during the year 2015-2016

Host	Goats	Sheep
Parasite	%	%
<i>Strongyle sp</i>	29.86	30.41
<i>Strongyloides sp</i>	5.13	7.43
<i>Trichuris sp</i>	3.24	4.24
<i>Moniezia expansa</i>	2.56	2.39
<i>Moniezia benedeni</i>	0.13	0
<i>Eimeria sp</i>	5.94	2.52
Mixed infections	5	5.31
Total number of animals examined	740	753
Total positive and percentage	384 (51.89)	394 (52.32)

Season wise prevalence

In goats percent infections observed were 75.86%, 66.93% and 21.67% during monsoon, winter and summer seasons, respectively. Statistically significant difference in parasitic infection was noted amongst all three seasons. However, except *Strongyles sp.* All other species of parasites recorded includes *Strongyloides sp.*, *Trichuris sp.*, *Moniezia expansa*,

Moniezia benedeni sp., *Eimeria sp.* and mixed infections showed negligible difference during monsoon and winter season compared to summer in which prevalence was extremely low. The observations from this study are in confirmation with those of Misra *et al.* (2010) [8] and Khajuria *et al.* (2013) [9].

Table 2: Season wise prevalence of gastrointestinal parasites in small ruminants

Host	Goat			Sheep		
	Summer	Monsoon	Winter	Summer	Monsoon	Winter
Strongyle spp	12.23	44.33	38.24	10.91	43.51	40.86
<i>Strongyloides sp.</i>	2.79	6.89	6.37	5.63	9.62	7.39
<i>Trichuris sp.</i>	1.74	4.92	3.58	1.76	5.02	6.52
<i>Moniezia expansa</i>	1.04	4.43	2.78	1.76	2.92	2.6
<i>Moniezia benedeni</i>	0.34	0	0	0	0	0
<i>Eimeria sp.</i>	0.69	7.88	10.35	0.35	3.76	3.91
Mixed infections	2.79	7.38	5.57	2.81	7.53	6.08
Total number of animals examined	286	203	251	284	239	230
% Positive	*21.7	*75.86	*66.9	*23.23	*72.38	*67.39
	Chi-square calculated - 83.77 (1%-9.21, 5%-5.99)			Chi-square value calculated was 74.26 (1%-9.21, 5%-5.99)		
*Highly significant difference was noted						

Percent infection of GI parasitism was found as higher during monsoon followed by winter and still lower summer (Table 2). The percent prevalence rate noted were 72.38% in monsoon, 67.39% in winter and 23.23% in summer. Infection was almost equal during monsoon and winter season, while it was substantially low during summer season. Helminth parasites includes *Strongyles sp.*, *Strongyloides sp.*, *Trichuris sp.*, *Moniezia expansa*, *Moniezia benedeni* whereas, *Eimeria sp.* and mixed infections have showed the higher prevalence during monsoon, slightly less during winter and still lower during summer. Statistically significant differences were noted amongst all three seasons. These results are in agreement with Swarnkar and Singh (2014) [10] and Molla and Bandyopadhyay (2016) [11].

Age wise prevalence

When analyzed for age wise prevalence of gastro intestinal parasitism in sheep (Table 3) the prevalence noted was 57.30% in lambs (age group I), 56.68% in young (age group

II) and 50.09% in adult (age group III). From the table, it can be assessed that there was no much difference in the prevalence rates of parasitic infections amongst three age groups. Similarly no significant differences were noted amongst three age groups in regards to overall gastrointestinal parasitic infections too. *Strongyles sp.* infection was found more in lambs (age group I), followed by in adult sheep (age group III) and in young adults (age group II). Infection of *Strongyloides sp* and *Trichuris sp* also tends to show negligible variation amongst three groups. *Moniezia expansa* was noted in lamb (age group I) and young (age group II) sheep. Mixed infections were found more prevalent in age group I and group II than age group III.

Present observations are in agreement with the reports of Emiru *et al.* (2013) [9] and Molla and Bandyopadhyay (2016) [12] who have also observed the higher prevalence in lambs than the adult sheep and reason might be due to more susceptibility or less development of immunity in lambs against parasitic infections.

Table 3: Age wise prevalence of gastrointestinal parasites in small ruminants

Host	Sheep			Goat		
	Age group I	Age group II	Age group III	Age group I	Age group II	Age group III
Strongyle spp	29.21	21.09	33.53	14	19.58	36.01
<i>Strongyloides</i> sp	7.86	7.64	7.29	10	6.99	3.62
<i>Trichuris</i> sp	4.49	6.36	3.55	6	2.79	2.81
<i>Moniezia expansa</i>	2.24	10.19	0	3	2.09	2.61
<i>Moniezia benedeni</i>	0	0	0	0	0.69	0
<i>Eimeria</i> sp	4.49	2.54	2.16	3	7.69	6.03
Mixed infections	8.98	8.91	3.55	9	8.39	3.21
Total number of animals examined	89	157	507	100	143	497
% positive	57.3	56.68	50.09	45	48.25	54.32
	Chi-square value calculated was 1.83 (1%-9.21, 5%-5.99)			Chi-square value calculated was 1.46 (1%-9.21, 5%-5.99)		
	Age Group 1 – 0-4 months	Age group 2 – 4 months to 1 year		Age group 3 – above 1 year		

As regards in goats, prevalence rate of overall percent parasitic infections amongst three different age groups was 45% in kid (age group I), 48.25 in young adult (age group II), adult and 54.32% in adult (age group III) (Table 3). It is evident from the percent infections that, though, statistically there exist no significant difference in different age groups of goats, adult goats appeared to be more susceptible to parasitic infections as compared to kid and young goats. Strongyles prevalence was recorded more in adult goats, followed by young adults and kids. Prevalence of *Strongyloides* sp and *Trichuris* sp were noted more in kids, followed by young adult and adult goats. *Moniezia expansa* was noted more in kid (age group I) i.e.3%, while it was noted with negligible variation in young adult (age group II) i.e.2.09% and adult (age group-III) i.e.2.61%. *Eimeria* sp prevalence was reported higher in young adults (age group II) i.e. 7.69% and adult (age group III) i.e.6.03% in comparison with kids (age group I) as 3.0 percent. Mixed infections has showed more favourism towards kids (age group I), followed by young adult (age group II) and adult (age group III).

Similar observations were reported by Sharma *et al.* (2013) [13] and Raza *et al.*, (2014) [14], who have observed that, age of

the animals did not show any significant association with the prevalence of the parasites. However, in spite of above inference drawn, Sharma *et al.* (2013) [13] noted significant difference between young and adult goats, in which, young goats showed higher parasitic infection than adults.

Sex wise prevalence

In sheep (Table 4) no significant differences were observed in prevalence rate of gastrointestinal parasitic infections between males and females. Male sheep were found more susceptible to infection as compared to females. Percent infection noted were 53.28% in males and 52.07% in females. Parasitic species *Strongyles* sp. and *Moniezia expansa* were found slightly higher in female sheep in comparison to male sheep while, species such as *Strongyloides* sp, *Trichuris* sp, *Eimeria* sp and mixed infections were slightly higher in males against their counterpart females. Similar observation has been recorded by Mulatu *et al.* (2012) [15] i.e. in male (62.75%) and in female (55.71%). It could be due to the grazing practices in Udgir region, wherein, males and females were grazed together on same pasture land, having equal opportunity of infection.

Table 4: Sex wise prevalence of gastro intestinal parasites in small ruminants

Sex	Sheep		Goat	
	Male	Female	Male	Female
Strongyle spp	23.02	32.27	29.3	29.98
<i>Strongyloides</i> sp	9.21	6.98	12	3.62
<i>Trichuris</i> sp	4.6	4.15	5.26	2.8
<i>Moniezia expansa</i>	1.97	2.49	2.25	2.63
<i>Moniezia benedeni</i>	0	0	0	0.16
<i>Eimeria</i> sp	2.63	2.49	6.01	5.93
Mixed infections	11.84	3.66	9.77	3.95
Total number of animals examined	152	601	133	607
% positive	53.28	52.07	*64.66	*49.09
	Chi-square value was 0.033 (1%-6.63, 5%-3.84)		Chi-square value noted was 5.09 (1%-6.63, 5%-3.84)	
	*- Significant difference was noted			

In Goats, the overall prevalence of gastrointestinal parasitic infections indicated that, the infection occurs more frequently in males as compared to females. The respective percent infection noted were 64.66% in males and 49.09% in female goats. Statistically there was significant difference noted between two sexes. Percent infection of *Strongyloides* sp., *Trichuris* sp., *Eimeria* sp. and mixed infection were found slightly more in male goats in comparison to female goats.

Percent infection of *Strongyles* sp., *Moniezia expansa* showed slight variation in prevalence between two sexes and were marginally higher in females as compared to males sexes. Similar observation was noted by Raza *et al.* (2014) [14], i.e. 81.1% in bucks and 77.3% in does.

Breed wise prevalence

In the present study two goat breeds i.e. Osmanabadi and ND

(Non-descript) were investigated for prevalence of gastrointestinal parasites. Overall prevalence noted was 48.93% in ND (Non-descript) and 52.89% in Osmanabadi and statistically there was no significant difference exists between the breeds. Parasitic infections of the species such as *Strongyles*, *Moniezia benedeni* and *Strongyloides sp.* found more in Osmanabadi than ND (Non-descript). *Eimeria* and *Moniezia expansa*, noted more in ND (Non-descript) than Osmanabadi with negligible difference in prevalence rate. Mixed infections noted as in ND (Non-descript) than Osmanabadi, which was 7.44% and 4.16% respectively. Two breeds i.e. Deccani and ND (Non-descript) which were

found in Udgir region investigated in the present study for recording the prevalence of gastrointestinal parasites. Overall prevalence rate was to the tune of 52.57% in ND (Non-descript) and 52.28% in Deccani, which was statistically non-significant. Mixed infection was found more in ND (Non-descript) i.e. 13.40% than in Deccani i.e. 4.11%. Similar type of variation was also seen with regards to *Moniezia expansa* and *Strongyloides sp* infection with slightly higher in ND (Non-descript) than Deccani. Rest of the parasitic species such as *Strongyle sp.*, *Trichuris sp* and *Eimeria sp* were found more in Deccani than ND (Non-descript) sheep.

Table 5: Sex wise prevalence of gastro intestinal parasites in small ruminants

Breed	Sheep		Goat	
	ND	Deccani	ND	Osmanabadi
<i>Strongyle spp</i>	22.68	31.55	27.65	30.61
<i>Strongyloides sp</i>	10.3	7.01	3.19	5.79
<i>Trichuris sp</i>	2.06	4.57	2.12	3.8
<i>Moniezia expansa</i>	3.09	2.28	2.65	2.53
<i>Moniezia benedeni</i>	0	0	0	0.18
<i>Eimeria sp</i>	1.03	2.74	6.38	5.79
Mixed infections	13.4	4.11	7.44	4.16
Total number of animals examined	97	656	188	552
% positive	52.57	52.28	48.93	52.89
Chi-square value was 0.002 (1%-6.63, 5%-3.84)			Chi-square value was 0.422 (1%-6.63, 5%-3.84)	

The variation in the susceptibility to the infection of a particular parasite largely depends on the genetic makeup of a particular breed and to some extent on environment. Hence, there seems to be variation in the susceptibility to gastrointestinal parasitic infections by different breeds of domesticated animals. Susceptibility to any infection also depends on management practices followed and type of environment, of the geographic area, whether favorable or adverse for parasitic development. Hence, difference between breed wise prevalence rates in a particular geographic area can only be explained on the genetic make-up of a particular breed of a particular host species.

It is therefore concluded that the gastrointestinal parasites are prevalent to a considerable extent in the small ruminants of this area and more detailed investigations with regards to pattern of occurrence and other epidemiological factors need to be carried out by adopting advanced techniques so that a comprehensive parasite profile of livestock will be available. It is also evident from these observations that small ruminants, due to their feeding habits and management issue, are prone to harbor the gastrointestinal parasitism and therefore it warrants the formulation and implementation of strategic treatment and control programme in this dry land areas.

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