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Studies on prevalence of helminth infection in goats in Udaipur district (Rajasthan)

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Abstract

Goat farming is the great economic importance as a major source of income for small and the landless farmers in rural areas. A study on prevalence of helminths of goat in relation to age, sex, seasonal, tehsil and month-wise was studied at Udaipur district, Rajasthan from May 2016 to January 2017 by faecal examination. Out of a 390 faecal samples examined in which 296 (75.89%) in goat were positive for one or more species of helminth parasites. In goat *Strongyles sp.* were most prevalent (31.08%), followed by *Amphistome sp.* (23.31%), *Trichuris sp.* (15.20%), *Fasciola sp.* (7.77%), *Moniezia sp.* (2.70%) and *Strongyloides sp.* (0.67%). Mixed infection was (19.25%) in goat. In goat, seasonal analysis revealed highest prevalence in rainy season followed by winter and lowest in summer. Tehsil-wise prevalence showed highest prevalence in Mavli tehsil in goat. Sex-wise observations showed females were more infected with helminth infection than the males in goat respectively. The age-wise prevalence of helminths infection reported highest prevalence in age group more than 2 years followed by 1-2 year group and group 6 month to 1 year in goat. Month wise helminth infection showed higher prevalence in October Month in sheep.

Keywords: Prevalence, helminth parasites, Goat

Introduction

Goat farming is of great economic importance as a major source of income for small and the landless farmers in rural areas. Goat (*Capra*), a member of the *Bovidae* family and subfamily *Caprinae* is one of the oldest domesticated species. For thousands of years they have been used for their milk, meat, hair and skin over much of the world. Goat is generally reared to procure meat, milk and skin. Goat is often regarded as poor man's cow. The milk of goat is quite similar to that of cow milk and it is more easily digested because of smaller globules. It is richer in milk content with a high amount of calcium, phosphorus and chlorine. Goat dung is a natural source of organic fertilizer with nitrogen and potassium contents double than that of cattle dung, so goat manure is preferable for increasing the fertility of soil. The rearing of goat had the added advantage of filling an important ecological niche, being able to graze land on which sheep and cattle simply cannot thrive. Rearing of goat plays an important role in the economy of Rajasthan for sustainable livelihood of poor people, because of inherent risk involved in the crop farming due to uncertainty of rainfall and occurrence of recurrent droughts [1, 2]. Helminthiasis, especially parasitic gastroenteritis, pose a serious health threat and a limitation to the productivity of small ruminants due to the associated morbidity, mortality, cost of treatment and control measures [3]. Helminth infection remains one of the major constraints to small ruminant production in tropics [4]. Ecological conditions like weather, texture of soil, population density, type and amount of vegetation, management system, host species and age of the animals play an important role in the prevalence of parasites [5]. In grazing animals, parasitic stages enter the body from the contaminated pasture and water [6]. In western Rajasthan, where pasture is not luxuriant during all year goat get cumulative infection throughout the year due to their specific grazing habit, hence studies on seasonal fluctuation in egg output of gastrointestinal helminth parasites seem to be important. So in the present study the prevalence of helminth infection was studied in goat in Udaipur district of Rajasthan.

Material and Methods

The study was conducted from the month of May 2016 to January 2017 in six different

villages of Udaipur district in Southern Rajasthan. Goat was randomly selected and fecal sample were collected and subjected to qualitative and quantitative examination. A total of 390 faecal samples were collected from goat freshly during morning hours directly from the rectum of the each animal or during defecation with strict sanitation and placed in air and water tight polythene containers and then taken to the laboratory for routine examination. In the laboratory the samples were subjected to Flootation and Sedimentation technique to identify the eggs and Stoll's egg technique to count the number of eggs in each sample. The relevant information regarding place, rearing, age, sex, source of feed and water, deworming history, clinical signs etc. were also recorded. The prevalence studies were analyzed by Generalized Linear Model [7].

Results and Discussion

Out of a total of 390 faecal samples of goat, 296 (75.89%)

samples were found positive for an overall prevalence for helminth infection in goat (Table 1). The study is in accordance with several other investigators who have reported similar findings from various parts of India with (69.70%) overall prevalence from Ladakh [8], (68.75%) overall prevalence from Mathura [9] and Udaipur [10] respectively. The prevalence was reported to goat (75.89%) and it is in agreement with the findings of who has reported 65.94% [11]. Among various overall helminth infections reported in the present study, *Strongyles sp.* (31.08%) were the most prevalent gastrointestinal helminth which is in agreement to the previous findings of who has reported 69.7% *Strongyles* from Rajasthan. [12] The increase in *Strongyle* population may be attributed to the fact that the life cycle is direct and they are getting appropriate climatic factors to grow and perpetuate in soil easily. The variability for overall prevalence of helminth infection in goat was found to be significant ($p < 0.05$).

Table 1: Overall prevalence of helminth infection in goat

Species	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
Goat	390	296 (75.89)	57 (19.25)	92 (31.08)	69 (23.31)	45 (15.20)	23 (7.77)	8 (2.70)	2 (0.67)

In goat, seasonal analysis revealed highest prevalence in rainy season (81.66%), followed by winter (71.11%) and lowest in summer (70.83%). which is on similar lines to the findings of highest seasonal prevalence during rainy season (84.21%) but followed by winter (73.9%) and summer season (52.8%) [13, 14]. By rainy season provides favourable climatic conditions for hatching, development, dissemination and

survival of the larvae on to the pasture [15]. This may be the reason of higher prevalence in rainy season. Higher temperature and rainfall cause stress to the animal which lowers its immunity and predisposes it to a heavy infection [16]. The variability for seasonal prevalence of helminth infection in goat was not found to be significant ($p < 0.05$).

Table 2: Season-wise Prevalence of helminths in goat

Season	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
Summer	120	85 (70.83)	17 (20.0)	24 (28.23)	20 (23.52)	12 (14.11)	7 (8.23)	3 (3.52)	2 (2.35)
Rainy	180	147 (81.66)	25 (17.0)	47 (31.97)	35 (23.80)	24 (16.32)	12 (8.16)	4 (2.72)	0
Winter	90	64 (71.11)	15 (23.43)	21 (32.81)	14 (21.87)	9 (14.06)	4 (6.25)	1 (1.56)	0
Total	390	296 (75.89)	57 (19.25)	92 (31.08)	69 (23.31)	45 (15.20)	23 (7.77)	8 (2.70)	2 (0.67)

The tehsil-wise prevalence of helminths infection showed that highest prevalence is in Mavli tehsil (76.59%) in goat, village Gadriyavas (95.12%), Navania (88.37%), Kikawas (68.75%) has highest prevalence followed by Piprauli (63.04%), Khemli (61.66%), Tarawat (61.53%), respectively with the decreasing rate of prevalence. It is observed that the difference among these Villages of Mavli and Vallabhagar tehsil in Udaipur

district is due to variation in animal husbandry practices and pasture management of goat in these two different tehsils where large number of uneducated population thrives. The variability for tehsil and village-wise prevalence of helminth infection in goat was found to be highly significant ($p < 0.01$), where $p = 0.00$.

Table 3: Tehsil and Village-wise Prevalence of helminths in goat

Tehsil	Village	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
(Vallabhagar)	Navania	86	76 (88.37)	13 (17.10)	24 (31.57)	14 (18.42)	15 (19.73)	8 (10.52)	2 (0.26)	0
	Kikavas	64	44 (68.75)	8 (18.18)	13 (29.54)	11 (25.0)	6 (13.63)	3 (6.81)	2 (4.54)	1 (2.27)
	Tarawat	52	32 (61.53)	7 (21.87)	10 (31.25)	9 (28.12)	4 (12.5)	2 (6.25)	0 (0)	0
	Total	202	152 (75.24)	28 (18.42)	47 (30.92)	34 (22.36)	25 (16.44)	13 (8.55)	4 (2.63)	1 (0.65)
(Mavli)	Gadriyavas	82	78 (95.12)	16 (20.51)	23 (38.33)	17 (21.79)	12 (15.38)	6 (7.69)	3 (3.84)	1 (1.28)
	Khemli	60	37 (61.66)	7 (18.91)	12 (32.43)	10 (27.02)	5 (13.51)	2 (5.40)	1 (2.70)	0
	Piproli	46	29 (63.04)	6 (20.68)	10 (34.48)	8 (27.58)	3 (10.34)	2 (6.89)	0 (0)	0
	Total	188	144 (76.59)	29 (20.13)	45 (31.25)	35 (24.30)	20 (13.88)	10 (6.94)	4 (2.77)	1 (0.69)

Higher prevalence was noted in female (77.09%) than in male (73.04%) in goat. The results are in accordance with those of

with female (94.1%) and male (87.8%). [17] Sex plays a significant role in the preponderance of helminth infection but

environmental, managements and climatic conditions have a greater role to play on the onset of helminth infection in sheep and attributed to genetic predisposition and differential

susceptibility owing to hormonal variations. The variability for sex-wise prevalence of helminth infection in goat was found to be highly significant ($p < 0.01$), where $p = 0.00$.

Table 4: Gender-wise Prevalence of helminths in goat

Gender	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
Male	115	84 (73.04)	16 (19.04)	22 (26.19)	21 (25.0)	14 (16.66)	8 (9.52)	3 (3.57)	0
Female	275	212 (77.09)	41 (19.33)	70 (33.01)	48 (22.64)	31 (14.62)	15 (7.07)	5 (2.35)	2 (0.94)
Total	390	296 (75.89)	57 (19.25)	92 (31.08)	69 (23.31)	45 (15.20)	23 (7.77)	8 (2.70)	2 (0.67)

The age-wise prevalence of helminths infection reported highest prevalence in age group of more than 2 year (84.66%) followed by 1-2 year group (73.07%) and 6 month to 1 year group (67.27%) in goat, which is on similar lines to the findings of the infection in which it was higher in adults (54.4%) than young animals (35.3%) as reported [18]. The reason for variation of helminthic infection in adults compared to young in our study may be because adult animals may acquire immunity to parasites through frequent challenge

and expel the ingested parasites before they establish infections [19, 20]. Age is an important factor in the onset of infection because immunity plays a great role in the establishment of parasites in the host body. The low level of parasitism reported in adult animals is due to the development of significant immunity, which is initially low but increases with the intensity and duration of exposure of infection. The variability for age-wise prevalence of helminth infection in goat was not found to significant ($p < 0.05$).

Table 5: Age-wise prevalence of helminths in goat

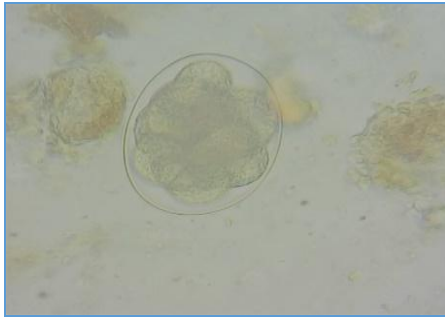
Age	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
(6 month to 1 year)	110	74 (67.27)	15 (20.27)	24 (32.43)	18 (24.32)	9 (12.16)	5 (6.75)	2 (2.70)	1 (1.35)
(1 to 2 year)	130	95 (73.07)	18 (18.94)	29 (30.52)	23 (24.21)	15 (15.78)	7 (7.36)	3 (3.15)	0
(More than 2 year)	150	127 (84.66)	24 (18.89)	39 (30.70)	28 (22.04)	21 (16.53)	11 (8.66)	3 (2.36)	1 (0.78)
Total	390	296 (75.89)	57 (19.25)	92 (31.08)	69 (23.31)	45 (15.20)	23 (7.77)	8 (2.70)	2 (0.67)

In goat helminth infection showed higher prevalence in October Month (80.76 %), followed by September month (80.61%), August month (78.04%), May month (77.27%), November month (75.0%), June Month (72.5%), July Month (69.44%), December month (66.66%) and January month (63.15%). The studies by other investigators [21-24] showed

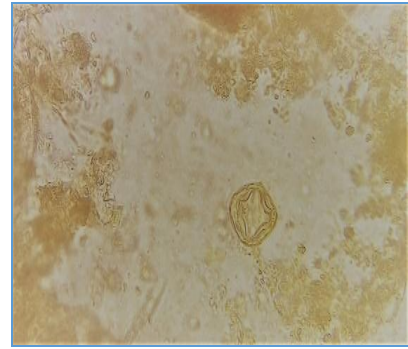
that though rainy season has highest prevalence but the month are not in accordance to our study as the climatic conditions varies in different regions of the country. The variability for month-wise prevalence of helminth infection in goat was found to be highly significant ($p < 0.01$), where $p = 0.00$.

Table 6: Month-wise Prevalence of helminth infection in goat

Month	Examined	Infected	Mixed	<i>Strongyles sp.</i>	<i>Amphistome sp.</i>	<i>Trichuris sp.</i>	<i>Fasciola sp.</i>	<i>Moniezia sp.</i>	<i>Strongyloides sp.</i>
May	44	34 (77.27)	2 (5.88)	14 (41.17)	8 (23.52)	5 (14.70)	3 (8.82)	1 (2.94)	1 (2.94)
June	40	29 (72.5)	4 (13.79)	11 (37.93)	7 (24.13)	4 (13.79)	2 (6.89)	0	1 (3.44)
July	36	25 (69.44)	6 (24)	9 (36)	5 (20)	3 (12)	1 (4)	1 (4)	0
August	82	64 (78.04)	10 (15.6)	26 (40.62)	16 (25)	9 (14.06)	4 (6.25)	1 (1.56)	0
September	98	79 (80.61)	7 (8.86)	31 (39.24)	18 (22.78)	14 (17.72)	7 (8.86)	2 (2.53)	0
October	26	21 (80.76)	1 (4.76)	10 (47.61)	5 (23.80)	3 (14.28)	2 (9.52)	0	0
November	24	18 (75)	1 (5.55)	8 (44.44)	4 (22.22)	3 (16.66)	1 (5.55)	1 (5.55)	0
December	21	14 (66.66)	4 (28.57)	5 (35.71)	3 (21.42)	2 (14.28)	0	0	0
January	19	12 (63.15)	4 (33.33)	5 (41.66)	2 (16.66)	1 (8.33)	0	0	0
Total	390	296 (75.89)	38 (12.83)	120 (40.54)	68 (22.97)	43 (14.52)	19 (6.41)	6 (2.02)	2 (0.67)



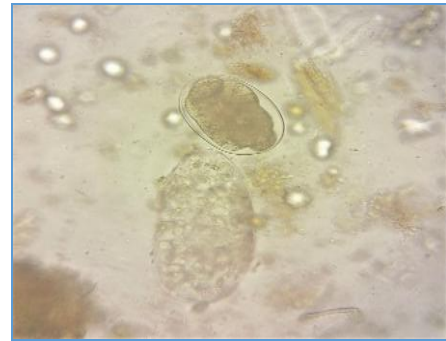
Photomicrograph of ova of *Strongyle sp.*



Photomicrograph of ova of *Moniezia sp.*



Photomicrograph of ova of *Trichuris sp.*



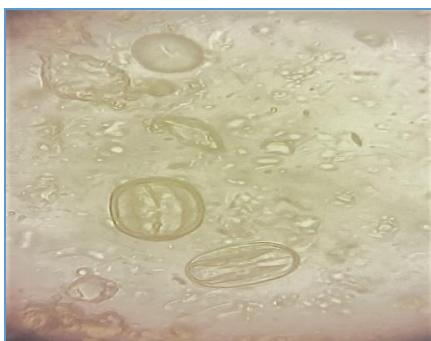
Photomicrograph of mixed infection with ova of *Strongyle sp.* and *Amphistome sp.*



Photomicrograph of ova of *Fasciola sp.*



Photomicrograph of ova of *Paramphistomum sp.*



Photomicrograph of larvae of *Strongyloides sp.*

Conclusion

The present study revealed that the infection status by the various species of helminth parasites was very high. The prevalence of helminth parasite of goat at Udaipur district, Rajasthan shows high susceptibility to helminth infection. The overall higher incidence of *Stronglye sp.* infection in the areas surveyed could be attributed to lower immunity of hosts and the life cycle is direct. All the livestock in the area under investigation largely depend on grazing. Sex-wise, tehsil and village-wise, and month-wise prevalence of helminth infection in goat is highly significantly ($P < 0.01$). The study also revealed that maximum helminth infection was observed in females as compared to males. Therefore, geographical and climatic conditions of this region favors for helminth infection. It is observed that the variation in animal husbandry practices and pasture management of goat in these two different tehsils where large number of uneducated population thrives affects prevalence rates. Further study should be carried out to determine the economic losses due to helminthiasis of goat and to develop effective control measures against it. It is therefore suggested that two annual anthelmintic treatments would help to minimize the infection and optimum growth and productivity of goat in the region.

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