



Studies on Prevalence of GI Nematodes of Buffalo in Udaipur, Rajasthan

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Author's contribution

The sole author designed, analyzed, interpreted and prepared the manuscript.

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ABSTRACT

GI nematodes are very common in India and worldwide. The climate in India is highly suitable for growth of GI nematodes. To assess the situation in Udaipur, the present study was conducted from Sept 2020 to January 2021 in and around Udaipur district (Rajasthan). The Overall prevalence of GI nematode infection in buffalo was 260 (85.24%). Among various GI nematode infections reported in the present study, *Strongyles* 120 (46.15%) were the most prevalent gastrointestinal nematode followed by *Trichuris*, *Toxocara* and *Strongyloides*. In buffalo seasonal analysis revealed highest prevalence in rainy season 195 (96.05%) and lowest in winter 65 (63.72%). Females (89.04%) were more infected with GI nematode infection than the male (76.84%) buffalo. The age wise prevalence of GI nematode infection reported highest prevalence in age group below 3 years 142 (93.42%) followed by 3-5 years age group 91 (91%) and above 5 years age group 27 (50.94%) in buffalo. Month wise GI nematode infection showed higher prevalence in September Month 113 (91.13. %). The study indicated that GI parasites are more prevalent in young females below 3 years of age. Rainy season suits the growth and propagation of GI parasites.

Keywords: GI parasites; prevalence; parasitic infection.

1. INTRODUCTION

“Parasitic infection is very common in tropical and sub-tropical regions of the World and causes

major economic losses to the livestock industry” [1]. India is a tropical country and tropical climate is highly suitable for growth and propagation of common diseases and carrier or vectors leading

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to increase in the incidence of vector borne diseases [2]. In India there are 109.85 million domestic buffalo which constitute approximately 57.80% of total world buffalo population (Livestock Census, 2019). Parasites present in the gastrointestinal tract (GIT) of animals cause may lead clinical or sub clinical parasitism. "Gastrointestinal (GI) parasites are ubiquitous, taxonomically diverse, and cause mortality, or declines in condition and/or reproduction in a variety of livestock" [3,4]. "GI parasites can affect their hosts by directly consuming host resources or indirectly by damaging intestinal function, altering host behavior" [5] or "disrupting the control of co-infecting parasites" [6]. Internal parasites are a significant threat to health of cattle and buffalo. Problems associated with parasites, particularly those of the gastrointestinal tract of cattle and buffalo can cause irreversible damage or even death of the animal, reduced performance and economic losses for the farmer. Animals that are overburdened with parasites can be hindered in their reproductive performance, experience reduced growth rates and become less productive overall, whether their purpose be milk, meat and draft. The harmful effects on these animals range from gastroenteritis, anorexia, abdominal distention, diarrhoea, emaciation, all of which result in serious economic losses to the farmer particularly and nation in general. Interaction of various risk factors influences the prevalence of gastrointestinal nematodes. The climate of the certain areas of Rajasthan province is quite different from many tropical, and temperate regions of the world and arid areas of India. Information on the epidemiology of gastrointestinal nematodes of large ruminants (domestic cattle and buffaloes) from this region is not available. A number of helminth species are known to infect cattle worldwide. The most important ones include nematodes like Strongyle species (*Haemonchus*, *Ostertagia*, *Trichostrongylus*, *Cooperia*). "The problem is however much more severe in tropical countries due to very favorable environmental conditions for helminth transmission, poor nutrition of the host animal" [7] and "poor sanitation in rural areas" [8]. "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" [9]. "In grazing animals, parasitic stages enter the body from the contaminated pasture and water" [10]. The diagnostic formulations mainly rest on a tripod consisting of clinical history, Physical

examination and laboratory investigation. Peripheral blood film is a basis and a highly informative haematological tool at the clinician's disposal in screening, diagnosis and monitoring of disease progression and therapeutic response. Diagnosis of haemoprotozoan mainly relies on wet blood film examination, blood smear examination, haematological investigation and molecular studies [11]. They conducted the study to determine the prevalence of haemoprotozoan parasites from South Western Gujarat (Junagadh).

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted from the month of Sept 2020 to January 2021 in and around Udaipur district in Southern Rajasthan. Udaipur is located at 24.525049°N 73.677116°E. The city covers an area of 64 sq. km (25 sq mi) and lies at an altitude of 598.00 m (1,962 ft) above sea level. It is located in the southern region of Rajasthan, near the Gujarat border. The city lies 403 km (250 mi) southwest of the state capital, Jaipur and 250 km (155 mi) northeast from Ahmedabad. Udaipur city has a hot semi-arid climate. The three main seasons, summer, monsoon and winter respectively, dominate the city of Udaipur. Being located in the desert lands of Rajasthan, the climate and weather of Udaipur is usually hot. The summer season runs from mid-March to June and touches temperature ranging from 23°C (73°F) to 44°C (111°F) in the months of March to June. Monsoons arrive in the month of July heralded by dust and thunderstorms.

2.2 Study Population

A total of 305 faecal samples were collected from buffalo of different age group and sex of local origin. The records were maintained regularly for month and season of faecal sample collection.

2.3 Study Methodology

Cross-sectional study method was followed in this study. Faecal samples were collected from buffalo freshly during morning hours directly from the rectum. The collection of samples in air and water tight polythene containers and then taken to the laboratory for routine

examination. In the laboratory the samples were processed by Flootation and Sedimentation techniques.

2.4 Statistical Analysis

The prevalence studies were analysed by Chi-square test.

3. RESULTS AND DISCUSSION

3.1 Overall Prevalence of Nematode Infection in Buffalo

Overall prevalence for nematode infection in buffalo, were 260 (85.24%) which was found to be found significant ($p < 0.05$). Among the various nematode infections in buffalo the highest overall prevalence was noted in *Strongyle sp.* 120 (46.15%). Gupta et al. [12] who recorded 68.93% overall prevalence in cattle and buffaloes, 73% in buffaloes and 65% in cattle of Madhya Pradesh.

3.2 Season Wise Prevalence of Nematode in Buffalo

Significant ($p < 0.05$) highest prevalence was observed in rainy season (96.05%) and lowest in winter (63.72%). Among the various nematode infections highest prevalence was of *Strongyle sp.* 94 (48.20%) in rainy and 26(40%) in winter season. Ganguly et al. [13] recorded (37.26%) in rainy season and (26.37%) in winter season. Patel et al. [14] also found highest prevalence in rainy season (51.54%) followed by winter (34.02%).

3.3 Prevalence of Nematode in Buffalo According to Sex

Out of 95 male, 73 (76.84%) were found to be positive for nematode infection whereas out of

210 females 187 (89.04%) were positive. Nematode infection showed higher prevalence in female (89.04%) in comparison to male buffalo (76.84%). In females, among various nematode, *Strongyle sp.* was noted in 90 (48.13%) which was highest whereas in male *Strongyle sp.* was found in 30 (41.09%). The results are in accordance with the studies of Raza et al. [15] who found prevalence of female (71.72%) and male (34.46%). Maharana et al. [11], also reported prevalence of 31.97% and 29.03% in females and males respectively.

3.4 Prevalence of Nematodes in buffalo According to Age

In age wise prevalence, three groups were classified as below 3 years, 3-5 years and above 5 years. The total number of animals examined in above three groups were 152, 100 and 53 respectively. Highest significant ($p < 0.05$) prevalence of nematode infection was noted in age group of below 3 years 142 (93.42%) followed by 3-5 years group 91 (91.0%) and with 27 (50.94%) in above 5 years group. The prevalence of *Strongyles sp.* was higher in all three age groups of buffalo. Mamun et al. [16] reported similar lines to the findings of the nematode infection significantly higher (65.85%) in young animals aged < 2.5 years than in adult buffalo aged 2.5 to 5 years (63.16%) and in older animals aged > 5 years (59.66%).

3.5 Monthly Prevalence of Nematode Infection in Buffalo

Highly significant ($p < 0.01$) prevalence was noted in September month 113 (91.13%) followed by October, 82 (90.10%) November, 32 (74.41%) December, 20 (71.43%), and January 13 (68.42%) were infected. Marskole et al. [17] recorded higher prevalence in Sept. (81.81%) followed by lowest prevalence in Dec (61.11%).

Table 1. The overall prevalence of nematodes of buffalo in Udaipur

Species	No. of samples	Infected	Mix infection	Strongyle	Trichuris	Toxocara	Strongyloides
Buffalo	305 (59.30)	260 (85.24)	57 (21.93)	120 (46.15)	45 (17.30)	33 (12.69)	5 (1.93)

Table 2. Seasonal Prevalence of nematode in buffalo

Season	Examine	Infected	Mix infection	Strongyle	Trichuris	Toxocara	Strongyloides
Rainy	203	195 (96.05)	39 (20.0)	94 (48.20)	33 (16.92)	25 (12.82)	4 (2.05)
Winter	102	65 (63.72)	18 (27.69)	26 (40)	12 (18.47)	8 (12.30)	1 (1.53)
Total	305	260(85.24)	57 (21.93)	120 (46.15)	45 (17.97)	33 (12.41)	5 (1.93)

Table 3. Nematode prevalence according to age of buffalo

Gender	No.of samples	Infected	Mix infection	Strongyle	Trichuris	Toxocara	Strongyloides
Male	95	73 (76.84)	16 (21.92)	30 (41.09)	16 (21.92)	9 (12.33)	2 (2.73)
Female	210	187 (89.04)	41 (21.93)	90 (48.13)	29 (15.50)	24 (12.84)	3 (1.61)
Total	305	260 (85.24)	57 (21.92)	120 (46.15)	45 (17.30)	33 (12.69)	5 (1.92)

Table 4. Age wise prevalence of nematode in buffalo

Age	No. of samples	Infected	Mix infection	Strongyle	Trichuris	Toxocara	Strongy- loides
Below 3 years	152	142 (93.42)	27 (19.01)	71 (50)	21 (14.79)	20 (14.08)	3 (2.11)
3-5 Years	100	91 (91.0)	25 (28.47)	42 (46.15)	12 (14.18)	10 (10.99)	2 (2.21)
Above 5 years	53	27 (50.94)	5 (18.52)	7 (25.92)	12 (44.44)	3 (11.12)	0 (0)
Total	305	260 (85.24)	57 (21.93)	120 (46.15)	45 (17.30)	33 (12.41)	5 (1.93)

Table 5. Monthly prevalence of nematode infection in buffalo

Month	Examine	Infected	Mix infection	Strongyle	Trichuris	Toxocara	Strongyloides
Sept	124	113 (91.13)	29 (25.67)	47 (41.59)	20 (17.70)	15 (13.28)	2 (1.76)
Oct	91	82 (90.10)	11 (13.42)	46 (56.10)	13 (15.85)	10 (12.19)	2 (2.44)
Nov	43	32 (74.41)	10 (31.25)	13 (40.62)	4 (12.50)	4 (12.50)	1 (3.12)
Dec	28	20 (71.43)	5 (25)	9 (45)	4 (20)	2 (10)	0 (0)
Jan	19	13 (68.42)	2 (15.38)	5 (38.47)	4 (30.77)	2 (15.38)	0 (0)
Total	305	260 (78.22)	57 (20.17)	120 (46.15)	45 (18.11)	33 (13.03)	5 (1.62)

4. CONCLUSION

From the study it is concluded that there significant prevalence of GI nematodes in buffalo of Udaipur. The prevalence varies from season to season with maximum prevalence in rainy season. Further it is concluded that age and gender has significant effect on the prevalence of GI nematodes in buffalo.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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