

# Prevalence of Parasitic Infections in Buffaloes in and around Ludhiana District, Punjab, India: A Preliminary Study

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**Abstract:** A total of 598 buffaloes were sampled for both coprological (210) and haematological (388) investigations at the Large Animal Clinics, GADVASU, Ludhiana, Punjab, India. Coprological examination revealed that the overall prevalence of gastrointestinal (GI) parasitic infections was 23.33% (49/210). Among the revealed parasites, amphistomes, *Fasciola* spp., *Eimeria* spp., *Balantidium coli* and strongyles were in 4.29, 3.33, 0.95, 2.86 and 15.71% of the examined buffaloes. Except coccidiosis, there was no significant variation of GI infections in relation to sex. *Eimeria* spp. was significantly higher in males. The present work emphasized that strongyles were the most prevalent gastrointestinal parasites found during coprological examination of buffaloes in Punjab, India. Examination of Giemsa-stained peripheral blood smears exhibited that 4.9% (19/388) of buffaloes were infected with haemoparasites comprising *Theileria annulata* (2.32%), *Trypanosoma evansi* (1.8%), *Babesia bigemina* (0.26%) and *Anaplasma marginale* (0.77%). Mixed infection appeared in one (0.26%) animal. Trypanosomosis was predominant in elder animals with no infection recorded in males.

**Keywords:** Amphistomes, *Anaplasma marginale*, *Babesia bigemina*, *Balantidium coli*, buffalo, *Eimeria*, epidemiology, fasciola, Punjab, strongyle, *Theileria annulata*, *Trypanosoma evansi*.

## INTRODUCTION

The global population of buffaloes (*Bubalus bubalis*) is estimated to be approximately 177.247 million of which 97% (171 million) are found in Asia [1]. India has 98.7 million buffalo heads which constitute approximately 55.7% of the total world buffalo population. Buffaloes are raised as economically important animals because they are multipurpose; providing milk, meat and good quality hides. They are also used as draft animals ("tractors" in Southeast Asia) in agriculture farms, means of transportation, and their dung act as a good fertilizer [2].

Gastrointestinal (GI) parasitic infections of buffaloes are common, which cause considerable global economic losses to the buffalo industry and farming communities as a consequence of mortality in infected animals, reduced weight gain and the condemnation of the affected organs during meat inspection in slaughterhouses [3-6]. Vector-borne haemoprotozoan infections such as babesiosis, trypanosomosis and theileriosis are also recognized as a cause of severe clinical illness in buffaloes. Many reports from India exhibited a wide variation in the prevalence of parasitic infections as a result of discrepancies in climatic conditions and the availability of vectors in case of vector-borne infections [7-10].

The present study highlights on the prevalence and diversity of parasitism caused by helminths and haemoprotozoa in buffaloes in and around Ludhiana, Punjab, India.

## MATERIALS AND METHODS

A total of 598 clinical samples, 210 faecal and 388 blood samples were examined from buffaloes presented at Large Animal Clinics, GADVASU, Ludhiana from 2004 to 2009. Faecal samples collected per-rectally from the animals with a history of gastrointestinal disturbances, were processed using faecal floatation and sedimentation techniques [12]. Blood samples from animals presented with a history of persistent high fever, were collected aseptically from jugular vein in vials containing anticoagulant (EDTA). To make a thin blood film, a drop of blood was placed on a clean glass slide, air-dried, fixed in methanol, stained with Giemsa dye [11] and examined under light microscope by using the oil immersion objective. Data obtained were statistically analyzed by applying Chi-Square test using SPSS 13.0 software in order to estimate significant discrepancies in parasites detection.

## RESULTS AND DISCUSSION

Coprological examination of faecal samples revealed that the prevalence of GI parasitic infections was 23.33% in buffaloes (Table 1). Results indicated that strongyles were the most prevalent GI parasite of buffaloes followed by amphistomes, *Fasciola* spp.,

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**Table 1: Prevalence of Gastrointestinal Parasitic Infections in Buffaloes from Ludhiana District, Punjab, India**

Parameter	Category	Number examined	Positive (%)	Amphistome (%)	<i>Fasciola</i> spp. (%)	<i>Eimeria</i> spp. (%)	<i>Balantidium coli</i> (%)	Strongyles (%)	Mixed infection (%)
Age	< 6 M	5	2 (40)	-	-	1 (20)	-	1 (20)	-
	> 6 M	205	47 (22.93)	9 (4.39)	7 (3.41)	1 (0.48)	6 (2.92)	32 (15.60)	8 (3.9)
	$\chi^2$ value		0.79	0.23	0.18	19.7*	0.15	0.07	0.20
Sex	Male	13	4 (30.77)	-	1 (7.69)	1 (7.69)	-	2 (15.38)	-
	Female	197	45 (22.84)	9 (4.57)	6 (3.05)	1 (0.51)	6 (3.05)	31 (15.74)	8 (4.06)
	$\chi^2$ value		0.43	0.62	0.82	6.67**	0.41	0.001	0.55
	Total	210	49 (23.33)	9 (4.29)	7 (3.33)	2 (0.95)	6 (2.86)	33 (15.71)	8 (3.81)

\*M means Month \*\*p<0.01\*\*p<0.05.

*Balantidium coli* and *Eimeria* spp. Also, a relatively higher percentage of animals showed mixed infection by more than one type of the revealed parasites. Recently, similar results with higher prevalence rates have been reported from Lazio region (Italy) showing that gastrointestinal strongyles were the most frequent helminths found on buffalo farms followed by liver flukes, rumen flukes, *Strongyloides* spp. and *Moniezia* spp. [13, 14].

It has been found that the numbers and intensity of helminth species in buffaloes reported in the present study is less than that reported in Mathura, India [15], and Gorakhpur region of Uttar Pradesh, India [16], possibly due to improved animal husbandry practice, animal welfare and rational use of anthelmintics in this part of the country. It is of interest to mention that there was no detection of cestodes in the examined buffaloes during the current investigation. This might be referred to raising animals in animal houses giving no chance for buffaloes to be accessible to the intermediate hosts of cestodes.

The prevalence of all gastrointestinal parasites were almost comparable in both sexes with the exception of coccidiosis which was significantly higher ( $p<0.05$ ) in males (Table 1). This finding can be supported by the fact that this region of Punjab usually shows common managerial practices that are adopted for animals of both sexes followed by deworming programme which is the same for each that give the reason of being no significant difference in the prevalence of parasitic infections among the two sexes could be detected. This goes parallel with the fact that the better milch breed buffaloes, being maintained in Punjab as

compared to other places of India. The breeding of males is of a great value in terms of economy [17].

Among two age groups of buffaloes, trematodal infection was encountered only from animal above 6 months of age and strongylosis was recorded as the predominant GI parasitic infection in buffaloes of Punjab state (Table 1). Coccidiosis was significantly higher in calves ( $p<0.01$ ) than adult animals as the later exhibited cellular immunity against coccidiosis as a result of the previous exposure to the oocysts [12].

Blood examination of 388 samples revealed that the overall prevalence of haemoprotozoal infections was 4.9% (Table 2). *Theileria annulata* was found to be the most prevalent blood protozoa followed by *Typanosoma evansi*, *Anaplasma marginale* and *Babesia bigemina* in the examined buffaloes. Higher prevalence of theileriosis in buffaloes is referred to the abundance of the vector, *Hyalomma anatolicum anatolicum* ticks, from buffaloes reared at this part of the country [18].

Previous investigations recorded a higher occurrence of clinical trypanosomosis in Indian buffaloes examined in Guntur district, Andhra Pradesh [19], Durg, Chhattisgarh [10] and Bihar [20]. Clinical examination of animals pointed out that bacteria and viruses are incriminated in the induction of fever. The prevalence of trypanosomosis was significantly higher in elder animals ( $p<0.05$ ) which coincide with previous reports [20, 21].

The current investigation revealed a lower prevalence of babesiosis, 0.26%. Previous reports in Punjab state recorded the prevalence of bubaline

**Table 2: Prevalence of Haemoprotozoal Infections in Buffaloes from Ludhiana District, Punjab, India**

Parameter	Category	Number examined	Positive (%)	<i>Theileria annulata</i> (%)	<i>Trypanosoma evansi</i> (%)	<i>Babesia bigemina</i> (%)	<i>Anaplasma marginale</i> (%)	Mixed infection (%)
Age	<1 yr	13	-	-	-	-	-	-
	1-5 yr	165	3 (1.82)	1 (0.61)	-	1 (0.61)	1 (0.61)	-
	>5 yr	210	16 (7.62)	8 (3.81)	7 (3.33)	-	2 (0.95)	1 (0.48)
	$\chi^2$ value		7.37**	4.50	6.04**	1.36	0.25	0.85
Sex	Male	16	-	-	-	-	-	-
	Female	372	19 (5.11)	9 (2.42)	7 (1.88)	1 (0.27)	3 (0.81)	1 (0.27)
	$\chi^2$ value		0.86	0.39	0.31	0.04	0.13	0.04
	Total	388	19 (4.90)	9 (2.32)	7 (1.80)	1 (0.26)	3 (0.77)	1 (0.26)

\*\*p&lt;0.05.

babesiosis using blood smear examination [22]. Kulshreshtha *et al.* [23] recorded a lower prevalence (0.08%) rate of *Babesia bigemina* isolated from Uttar Pradesh by direct smear. On the other hand, Miranpuri [24] detected higher prevalence rates of both *Anaplasma marginale* (6.2%) and *Babesia bigemina* (2.6%) in the north-eastern states using examination of blood films and lymph smears. The same author revealed more higher infection rates (14.9% and 4.7%) for those parasites in the north-western parts. In relation to host sex, it was interesting to observe that the haemoprotozoal infections could not be detected in male buffaloes. This might be attributed to the lesser number of the examined male buffaloes in the present investigation compared with that of females [20].

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