



RESEARCH PAPER

Studies on haematological changes in GI nematodes in cattle and buffalo in Udaipur, district (Rajasthan)

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Abstract : A study on prevalence of for gastrointestinal nematode in the infected and non-infected cattle and buffalo of Udaipur district (Rajasthan) from Sept. 2020 to January 2021 by haematological parameters such as haemoglobin (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR), total leucocyte Count (TLC) and differential leucocyte count (DLC). The highly significant decrease in haemoglobin concentration in nematode infected and non-infected buffalo (8.65 ± 0.2335 and 10.12 ± 0.1077) and (8.63 ± 0.2886 and 09.84 ± 0.1411) in infected and in non-infected cattle, respectively. The packed cell volume showed highly significant decrease in nematode infected and non-infected buffalo (28.98 ± 0.2101 and 32.94 ± 0.2477) and (27.64 ± 0.5337 and 30.65 ± 0.3956) in infected and non-infected cattle, respectively. The highly significant decrease in erythrocyte sedimentation rate in nematode infected and non-infected buffalo (0.80 ± 0.0245 and 1.00 ± 0.0167) and in cattle was found to be in infected (0.63 ± 0.0287) and in non-infected (0.97 ± 0.0240), respectively. Total leukocyte count (TLC) value significant increase for infected and non-infected buffalo and cattle buffalo (8.53 ± 0.2784 and 10.45 ± 0.2538) and (8.36 ± 0.2582 and 10.49 ± 0.1689), respectively. In the infected buffalo neutrophils (32.96 ± 0.3084), eosinophils (5.50 ± 0.2049), Basophils (0), lymphocytes (62.36 ± 0.2948) and monocytes (5.48 ± 0.1831). However, in non-infected buffalo neutrophils (37.21 ± 0.3701), eosinophils (4.60 ± 0.2196), basophils (0), lymphocytes (57.21 ± 0.2802) and monocytes (4.99 ± 0.2094). Whereas, in infected cattle neutrophils (28.02 ± 0.2914), eosinophils (5.74 ± 0.1942), basophils (0), lymphocytes (67.48 ± 0.2979) and monocytes (5.57 ± 0.1547). However, in non-infected cattle neutrophils (32.15 ± 0.3088), eosinophils (3.88 ± 0.1836), basophils (0), lymphocytes (61.59 ± 0.3475) and monocytes (5.23 ± 0.1832). There is reduction in haemoglobin, packed cell volume and ESR in the GI nematode infected cattle and buffalo. In total leukocyte count in buffalo and cattle lymphocytes, eosinophils and monocytes showed increased in infected group.

Key Words : Haematological changes, InGI nematodes, Cattle, Buffalo

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INTRODUCTION

India is predominantly an agricultural country where livestock and agriculture are closely associated with each other. The role of livestock sector is very crucial in the

economy of India (Rajakaruna and Warnakulasooriy, 2011). Parasitic infection are very common in tropical and sub-tropical regions of World and causes major economic losses to the livestock industry (Velusamy et

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al., 2014). In India there are 109.85 million buffalo and 192.49 million cattle which constitute approximately 57.80% and 15.06% of total world buffalo and cattle population, respectively (Livestock Census, 2019). The economic impact of GI parasites in livestock industry encompasses mortality and morbidity losses, enhanced susceptibility to diseases, losses resulting from condemnation of carcasses and viscera as well as cost of drugs and veterinary aids (Rajakaruna and Warnakulasooriya, 2011). The gastrointestinal tract (GIT) of animals harbor wide variety of parasites like helminthes, coccidia etc. which cause clinical and 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 (Larsson *et al.*, 2006; Larsson *et al.*, 2011; Thumbi *et al.*, 2013). GI parasites can affect their hosts by directly consuming host resources or indirectly by damaging intestinal function, altering host behaviour (Adelman and Martin, 2009) or disrupting the control of co-infecting parasites (Jolles *et al.*, 2008). Gastrointestinal (GI) nematodes rank highest on global index with *haemonchus contortus* on top for substantial loss of productivity in the livestock industry (Perry *et al.*, 2002). Internal parasites are a significant threat facing today's in 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 particular and nation in general. Various workers have also reported that subclinical infection due to gastrointestinal nematode may bring down various haematological parameters like haemoglobin (Hb), packed cell volume (PCV), total leucocytic count (TLC), differential leucocytic count (DLC). Which may ultimately lead to lowering of milk production and draught capacity. 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 (Maahrana *et al.*, 2016).

MATERIAL AND METHODS

The study was conducted from the month of Sept. 2020 to January 2021 in and around Udaipur district in Southern Rajasthan. Five ml of blood was collected from the jugular vein of both infected and non-infected animals, in clean sterile vials containing 5% EDTA solution as anticoagulant to study the following haematological parameters such as haemoglobin (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR), total leucocyte count (TLC) and differential leucocyte count (DLC) by Sahli's method.

Statistical analysis :

Differences between the haematological parameters of infected and non-infected animals were analyzed using two samples F- Test.

RESULTS AND DISCUSSION

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Haematological parameters of nematode infected and non-infected buffalo and cattle :

The haematological parameters of twenty infected and ten non- infected buffalo and cattle were analyzed by using two sample t-tests. A total number of 30 blood samples (10 healthy and 20 infected) were analyzed for different haematological parameters.

Haemoglobin(g/dl) :

The highly significant decrease in haemoglobin concentration in nematode infected and non-infected buffalo $p=(-5.700)$ and for cattle $p=(-4.102)$. The mean hemoglobin value was found to be 8.65 ± 0.2335 in infected buffalo and 10.12 ± 0.1077 in non-infected buffalo, In cattle mean hemoglobin value was found to be 8.63 ± 0.2886 in infected and in non-infected 9.84 ± 0.1411 , respectively (Table 1). Similar findings are reported in nematode infected buffalo and cattle by Gadre *et al.*, (2008) recorded (Hb- 7.17 ± 0.27 , PCV- 22.89 ± 0.64 , TEC-

3.59±0.10, TLC-4.64±0.11, Lymphocyte-73.11±0.72, Neutrophils-16.60±0.44, Eosinophils-7.55±0.24, Monocytes-2.45±0.11) in bovines and Ganguly *et al.* (2017) recorded (Hb-5.11±0.18, PCV-15.17±0.58, TEC-3.55±0.13) in cattle.

Packed cell volume (PCV) (%) :

The mean packed cell volume value was found to be in infected buffalo 28.98±0.2101 and non-infected buffalo 32.94±0.2477, In cattle mean packed cell volume value was found to be in infected 27.64±0.5337 and in non-infected 30.65±0.3956, respectively. The results showed highly significant decrease in packed cell volume in nematode infected and non- infected buffalo p=(-12.189) and for cattle p=(-4.530). It was found to be highly significant.

Erythrocyte sedimentation rate (ESR mm/hr) :

The mean erythrocyte sedimentation rate value was found to be in infected buffalo 0.80±0.0245 and non-infected buffalo 1.00±0.0167, in cattle mean erythrocyte sedimentation rate value was found to be in infected 0.63±0.0287 and in non-infected 0.97±0.0240, respectively table. The results showed highly significant decrease in erythrocyte sedimentation rate in nematode infected and non- infected buffalo p=(-6.739) and for cattle p=(-8.991). It was found to be highly significant.

Total leukocyte count (TLC)(X10³/cumm) :

The mean total leukocyte count value was found to

be in infected buffalo 8.53±0.2784 and non-infected buffalo 10.45±0.2538, in cattle mean total leukocyte count value was found to be in infected 8.36±0.2582 and in non- infected 10.49±0.1689, respectively. The results showed total leukocyte count was significant for infected and non-infected buffalo and cattle.

Differential leukocyte count (DLC)(%) :

The values for difference lls of different DL cisrepresented in Table. The mean percentage value for neutrophils in the infected buffalo 32.96±0.3084 followed by eosinophils 5.50±0.2049 and basophils mean was (0). However, lymphocytes 62.36±0.2948 and monocytes 5.48±0.1831 in infected buffalo. In non-infected buffalo neutrophils 37.21±0.3701 followed by Eosinophils 4.60±0.2196 and Basophils mean was (0). However, lymphocytes 57.21±0.2802 and monocytes 4.99±0.2094.

In infected cattle mean percentage value for neutrophils 28.02±0.2914 followed by eosinophils 5.74±0.1942 and basophils mean was (0). However, lymphocytes 67.48±0.2979 followed by monocytes 5.57±0.1547, in non-infected cattle neutrophils 32.15±0.3088 followed by eosinophils 3.88±0.1836 and basophils mean was (0). However, lymphocytes 61.59±0.3475, followed by monocytes 5.23±0.1832. The results showed neutrophils was highly significant for infected and non-infected buffalo and cattle. The results showed lymphocytes was highly significant for infected and non-infected buffalo P=(12.660) and for cattle P=(12.875). The results showed eosinophils was highly significant

Table 1 : Haemoglobin (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR) and total leucocyte count (TLC) of helminth infected and non-infected cattle and buffalo

Parameter	Cattle		Buffalo	
	Infected (n=20)	Non - infected (n=10)	Infected (n=20)	Non- infected (n=10)
Hb (g/dl)	8.63±0.2886	09.84±0.1411	8.65±0.2335	10.12±0.1077
PCV (%)	27.64±0.5337	30.65±0.3956	28.98±0.2101	32.94±0.2477
ESR (mm/hr)	0.63±0.0287	0.97±0.0240	0.80±0.0245	1.00±0.0167
TLC (X10 ³ /cumm)	8.36±0.2582	10.49±0.1689	8.53±0.2784	10.45±0.2538

Table 2 : Differential Leukocyte count of helminth infected and non- infected buffalo and cattle

Parameter	Buffalo		Cattle	
	Infected (n=20)	Non-infected (n=10)	Infected (n=20)	Non-infected (n=10)
Neutrophils	32.96±0.3084	37.21±0.3701	28.02±0.2914	32.15±0.3088
Lymphocytes	62.36±0.2948	57.21±0.2802	67.48±0.2979	61.59±0.3475
Eosinophils	5.50±0.2049	4.60±0.2196	5.74±0.1942	3.88±0.1836
Monocytes	5.48±0.1831	4.99±0.2094	5.57±0.1547	5.23±0.1832
Basophils	0±0	0±0	0±0	0±0

for infected and non-infected buffalo $P=(2.996)$ and cattle $P=(6.972)$. The results showed monocytes was not significant for infected and non-infected buffalo and cattle (Table 2).

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