

Original Research Article

Effect of Some Gastro-Intestinal Nematodes Infection on Hematocrit Values in Goat, Sheep, Horse, Donkey and Cattle at Nyala City, South Darfur State, Sudan

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Abstract: The aim of this study was to evaluate the effect of nematodes infection on pcv value in Goats, Sheep, Horse, Donkey and Cattle's. A total of 469 samples of faecal and blood were collected and transported to laboratory for detection of nematodes eggs and determine pcv value. The results obtained revealed that the higher prevalence rate of nematodes in study animals was on donkey when compared with others. The prevalence rate was higher in summer season than other autumn and winter. The effect of nematodes infection on PCV was found significantly lower ($P < 0.05$) in *Haemonchus* spp, *Trichostrongylus* spp and *Strongyloides* spp when compared with *Ascaris* spp, *Strongylus* spp and *Oxyuris* spp.

Keywords: Goats, Sheep, Horse, Donkey, Cattle, nematodes and Hematocrit.

INTRODUCTION

The gastrointestinal (GI) nematodes are the important parasites of all regions across the tropics and sub-tropic countries like Sudan. They cause low productivity due to stop growth, poor weight gain, feed utilization, feeding and water intake, lower meat, wool and milk production, cost of treatment and mortality in young animals [1]. The epidemiology of gastrointestinal tract parasites in livestock varied depending on the local climatic conditions, such as humidity, temperature and rainfall, in addition to other factor such as vegetation and management practices. These factors largely determine the incidence and severity of various parasitic diseases in a region [2]. Diagnosis of gastrointestinal nematode infections plays a major role in investigating parasite epidemiology. The anti-mortem diagnosis of nematode infections in livestock has been based on the detection of nematode eggs or larvae in the feces by microscopic examination using flotation methods [3].

Determining blood parameters is helpful in assessing the health status of animals. There is many diseases lead to anemia, for examples of which include: helminthosis, trypanosomosis, and tick-burden and tick-borne infections such as babesiosis and anaplasmosis [4]. Hematocrit (PCV) is one of laboratory diagnosis of anemia and can be performed in most rural settings where methods of Hb concentration determination are unavailable and rough estimates are made using observed PCV values, which is a much simpler and cheaper approach. In rural African human medicine clinical practices, haematocrit (PCV) values are commonly used because they are easy and cheaper to perform using manual techniques [5]. The aim of this article to determining the effect of gastro-intestinal nematodes infection on Hematocrit values in Goats, Sheep, Horse, Donkey and Cattle.

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MATERIALS AND METHODS

Study Area

The present study was conducted in year 2014 – 2016 at Nyala Veterinary Research Laboratory, Nyala, Sudan. It is located between latitudes 8° 30 and 13° 30 North and longitudes 22° and 28° east.

Study Design

All data were collected from Nyala Veterinary Research Laboratory result registration records during period from January, 2014 to December, 2016. Fresh faecal samples were collected directly from the rectum of 469 animals using gloved hand and placed into universal bottles. In the laboratory, faecal samples were examined for the detection of nematode eggs employing standard procedures of flotation by using sodium chloride (NaCl) as flotation fluid [6]. A total of 469 blood samples were taken. 5 ml of blood were withdrawn from the jugular vein using sterile syringes. The blood was immediately transferred to heparinized containers. The samples were then transferred to the Laboratory. Blood were taken from the heparinized containers in a heparinized capillary tube to determine packed cell volume (PCV). The capillary tube was centrifuged at 1500 rpm for 5 minutes then the value of PCV was determined using a micro haematocrit reader [7]. All PCV and faecal results were registried in registration records. All data were divided according to season into: Summer (February – June), autumn (July – November) and winter (December January).

Statistical Analysis

Data were tabulated and analyzed using descriptive statistics such as percentage by software Microsoft Excel, 2007 and SPSS (Statistical Package for Social Sciences) Version 16. P value less than 0.05 was considered as statistically significant.

RESULTS

Out of 548 faecal samples 469 were found to be positive with various GI nematodes infection contributing a prevalence rate of 85.57%. The results showed that the higher prevalence rate in study animals was on donkey when compared with goat, horse, cattle and sheep (34.3 %), (33.7%), (16%), (15.1%) and (0.9%) respectively. On the other hand, the *Ascaris* spp registered higher number of infection when compared with *Strongylus* spp, *Haemonchus* spp, *Oxyuris* spp, *Trichostrongylus* spp and *Strongyloides* spp (153), (95), (94), (63), (37) and (27) respectively. Otherwise, the higher prevalence rate was showed in summer season when compared with autumn and winter (43.5 %), (32.2) and (24.3) respectively. The effect of nematodes infection on PCV was found significantly lower ($P < 0.05$) in *Haemonchus* spp, *Trichostrongylus* spp and *Strongyloides* spp when compared with *Ascaris* spp, *Strongylus* spp and *Oxyuris* spp (27.16 ± 0.79), (27.46 ± 0.96), (27.89 ± 1.46), (29.33 ± 0.57), (29.73 ± 0.62) and (29.76 ± 0.74) respectively.

Table-1: Prevalence of Nematodes infection on ruminant and equine animals

Helminthes	Cattles No. +ve (%)	Goats No. +ve (%)	Sheep No. +ve (%)	Donkey No. +ve (%)	Horse No. +ve (%)	Camel No. +ve (%)	Total
<i>Ascaris</i> spp	43 (60.6)	40 (25.3)	-	45 (28)	25 (33.3)	-	153
<i>Strongyloides</i> spp	3 (4.2)	20 (12.7)	-	3 (1.9)	1 (1.3)	-	27
<i>Haemonchus</i> spp	4 (5.6)	86 (54.4)	4 (100)	-	-	-	94
<i>Strongylus</i> spp	-	-	-	75 (46.6)	20 (26.7)	-	95
<i>Oxyuris</i> spp	-	-	-	36 (22.4)	27 (36)	-	63
<i>Trichostrongylus</i> spp	21 (29.6)	12 (7.6)	-	2 (1.2)	2 (2.7)	-	37
Total	71 (15.1)	158 (33.7)	4 (0.9)	161 (34.3)	75 (16)	-	469

No = Number, spp = species, %= percent, +ve = positive

Table-2: Prevalence of Nematodes infection according to season

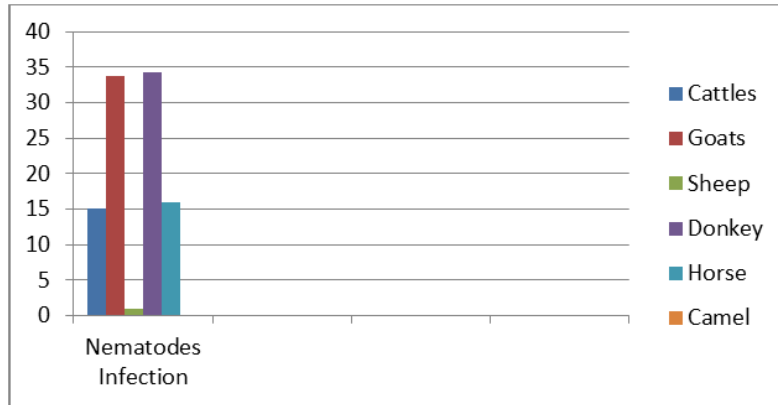
Helminthes	Summer No. +ve (%)	Autumn No. +ve (%)	Winter No. +ve (%)	Total
<i>Ascaris</i> spp	72 (35.3)	53 (35)	28 (24.6)	153
<i>Strongyloides</i> spp	17 (8.3)	7 (4.6)	3 (2.6)	27
<i>Haemonchus</i> spp	22 (10.8)	33 (21.9)	39 (34.2)	94
<i>Strongylus</i> spp	41 (20.1)	33 (21.9)	21 (18.4)	95
<i>Oxyuris</i> spp	42 (20.6)	10 (6.6)	11 (9.6)	63
<i>Trichostrongylus</i> spp	10 (4.9)	15 (9.9)	12 (10.5)	37
Total	204 (43.5)	151 (32.2)	114 (24.3)	469

No = Number, spp = species, %= percent, +ve = positive

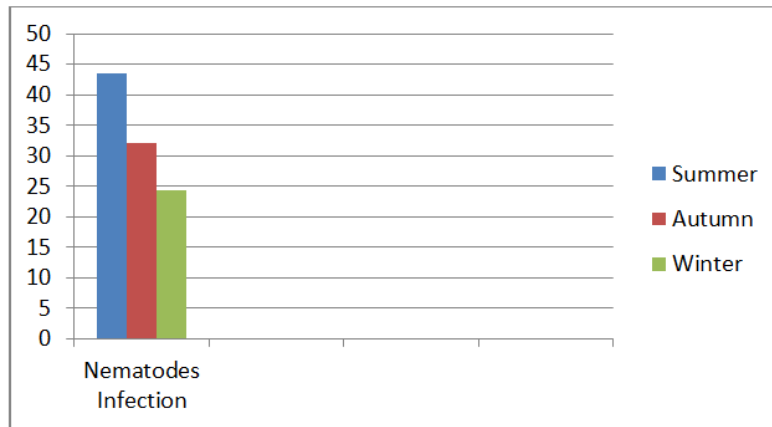
Table-3: Effect of Nematodes infection (Means ± SE) on PCV value

Helminthes	PCV %
Ascaris spp	29.33±0.57
Strongyloides spp	27.89±1.46
Haemonchus spp	27.16±0.79
Strongylus spp	29.73±0.62
Oxyuris spp	29.76±0.74
Trichostrongylus spp	27.46±0.96
P ≤ 0.5	0.045

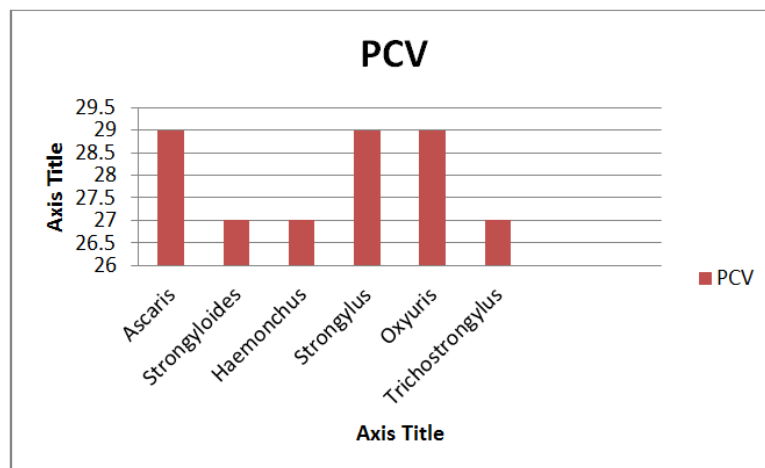
spp = species, p = significant, % = percent, SE = Standard Error



Prevalence of Nematodes infection on ruminant and equine animals



Prevalence of Nematodes infection according to season:



Effect of Nematodes infection on PCV values

DISCUSSION

This study showed that prevalence rate of nematodes were higher on donkey than other animals because, Darfur region is one of the most heavily populated regions with animals especially equines. However, Donkeys are more susceptible to infection due to represent an important aspect of small holder farming system especially in rural communities and hamlets, they are used for conveying people, goods, and farm inputs and outputs to and from farms [8-10]. In addition to engaged in work for long hours with maltreatment, poor management conditions, overlaid and feed on less nutritive garbage [11, 12]. This study showed a higher level of prevalence rate in summer when compared with autumn and winter. These high results related to high infection of *Ascaris* spp. It might be due to hot humid climate in summer season provides favorable environment for the survival and development of parasitic larvae and may reach the infective stage within 1 to 3 months (or more) depending on temperature [13].

The PCV values were observed higher decrease in *Haemonchus* spp, *Trichostrongylus* spp and *Strongyloides* spp when compared with other nematodes in this study. The parasitic stage of *Haemonchus* and *Trichostrongylus* spp suck blood and caused hemorrhage in GI so, that anemia is distinct symptom [14]. When blood loss continuous iron deficiency and lead to decrease of PCV and indicated by low plasma iron concentration [15]. Furthermore, *Strongyloides* spp lead to decrease PCV value may be due to blood loss owing to migration from side of penetration until its arrival at site of infection in host [16].

CONCLUSION

From the present study, it is concluded that the higher prevalence rate of nematodes in study animals was on donkey when compared with others. The prevalence rate was higher in summer season than other autumn and winter. The effect of nematodes infection on PCV was found significantly lower ($P < 0.05$) in *Haemonchus* spp, *Trichostrongylus* spp and *Strongyloides* spp when compared with *Ascaris* spp, *Strongylus* spp and *Oxyuris* spp. So, iron should be considered when treating bloodworm in domestic animals because there is relationship between hemoglobin concentration and fertility.

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