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Prevalence of *Strongylus vulgaris* in the Mesenteric Artery of Donkey from Nyala, South Darfur State, Sudan

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ABSTRACT

In this study, the epidemiological status of *Strongylus vulgaris* infections in the mesenteric arteries of donkeys was investigated. The study was undertaken in South Darfur from May, 2005 to April, 2006. Ninety two cranial mesenteric arteries of donkeys and its branches were examined for *Strongylus vulgaris* larvae. The results revealed that the overall prevalence rate was (64.1%) and the overall larval mean count was 46 ± 7.3 . The maximum number of larvae in the infected arteries started to rise from the beginning of the rainy season and reached the peak level in early cool season and then declined sharply towards the hot season. The prevalence of *Strongylus vulgaris* larvae have association with monthly temperature there was no correlation between the prevalence of the parasite and rainfall or relative humidity.

Key words: Prevalence, donkeys, *Strongylus vulgaris*, Nyala, Sudan

INTRODUCTION

The earliest recognized parasitic disease of donkeys in the Sudan was strongyle infections which have been shown to cause serious losses in the Sudan (Kheir and Kheir, 1981; El Dirdiri *et al.*, 1986). The Darfur region is one of the most heavily populated regions with animals especially equines. Ministry of Animal Resources of South Darfur (SBAR, 2000) estimated the numbers of horses and donkeys as 1,300,000 and 450,000, respectively. However, there were no systemic surveys or records of parasitic diseases occurrences and prevalences. Many studies were undertaken in Darfur region. Previous studies on the evidence of the occurrence of equine gastrointestinal parasites have been provided by Kheir and Kheir (1981), Eisa *et al.* (1979) and Hamid *et al.* (1998). Currently, Seri *et al.* (2004) reported that the prevalence of *Strongylus vulgaris* reordored from donkeys in Khartoum State was estimated to be 35.8%. The therapeutic evaluation of albendazole and ivermectin and dramectin against *Strongylus vulgaris* in Sudanese donkeys was provided by Imam *et al.* (2010) and Fangama *et al.* (2013), respectively. The objectives of the current study were directed to investigate the epidemiological status of *Strongylus vulgaris* infections in the mesenteric of donkeys in South Darfur.

MATERIALS AND METHODS

Study area: The present study was conducted at Nyala town, South Darfur State, Sudan. The State is located in the South west of Sudan. It covers 139800 km² between Latitude 13-9.30° North and Longitude 27-24.30° East. The climate in South Darfur is savannah type with clay sandy soil in the south, while the north is semi desert with sandy soil. The climate is characterized by a dry cold season (November-February), dry hot season (March-June) and Wet hot season (July-October). The mean minimum and maximum temperature is 20.98 and 35.14°C, the mean annual relative humidity is 35.58% and the mean total rainfall is 402 mm.

Study animals: This study involved Ninety two donkeys. Animals used in this study were purchased from Nyala livestock market and were admitted from different areas in the south Darfur State. All the animals examined were of common local type and of varying ages (1-13 years) and of both sexes.

Parasitological techniques: From May, 2005 to April, 2006, Ninety two donkeys were killed and necropsied at the Faculty of Veterinary Science University of Nyala. 5-13 donkeys were examined every month. Every week 1-2 donkeys were sacrificed for postmortem examination for a whole year. The animals were fastened for two days prior to necropsy. The necropsy procedures were done as described by Reinecke and Le Roux (1972). For the *Strongylus vulgaris* larvae, the cranial mesenteric and its branches were separated from the other attached organs, they were opened and all the visible larvae were collected, the cranial mesenteric arterioles were then dissected and scraped and larvae searched under the microscope.

Presentation of data: Data were summarized in terms of prevalence, abundance and intensity of infection. Difference among prevalence in relation to season were tested by Duncan test and the differences were considered significant when $p < 0.05$. Software used was SPSS for windows, version 14.0 and the differences were considered to be significant at $p < 0.05$.

RESULTS

Fifty nine of the examined animals (64.1%) were *Strongylus vulgaris* larvae positive. The monthly mean burden of the recovered parasites from the cranial mesenteric artery is depicted in Table 1. The overall monthly worm burdens per donkey infected with *Strongylus vulgaris* were 46 ± 7.3 . The highest mean worm burden (126.7 ± 30.1) for *Strongylus vulgaris* larvae was recorded in November, whereas the least mean burden (2.0) was recorded in April.

The relationship between mean worm burdens of parasites recovered from the mesenteric artery of examined donkeys and the season is shown in Table 2. There was a strong relationship between the hot wet season ($p < 0.05$) and mean worm burden of larvae of *Strongylus vulgaris*. The highest mean worm burden (62.1 ± 12.8) for *Strongylus larvae* was recorded during hot wet season. On the other hand, the least mean parasitic burden (8.3 ± 1.9) was recorded during the hot dry season.

As shown in Fig. 1 that temperature ranges between 20 and 25°C favour build up of *Strongylus* larvae, the effect of climatic factors on prevalence of *Strongylus vulgaris* larvae revealed a significant negative correlation with monthly temperature only ($r = -0.804$).

Table 1: Monthly mean worm burden \pm SEM of parasites recovered from cranial mesenteric artery (CMA) of necropsied donkeys during May 2005-April 2006

Month	CMA (L ₄ of <i>Strongylus vulgaris</i>)
Jan.	21.3 \pm 7.2
Feb.	8.6 \pm 2.1
March	12.3 \pm 4.8
April	2.0
May	10 \pm 3.7
June	5.0 \pm 1.5
July	36.3 \pm 10.6
Aug.	52.8 \pm 7.5
Sep.	20 \pm 1
Oct.	85.5 \pm 24.6
Nov.	126.7 \pm 30.1
Dec.	63.7 \pm 11.8
Overall means	46 \pm 7.3

Table 2: Seasonal mean worm burden \pm S.E.M of parasites recovered from cranial mesenteric artery (CMA) of examined donkeys during May 2005-April 2006

Season	CMA (L ₄ of <i>Strongylus vulgaris</i>)
Cool dry	60.5 \pm 13.6
Hot dry	8.3 \pm 1.90
Hot wet	62.1 \pm 12.8

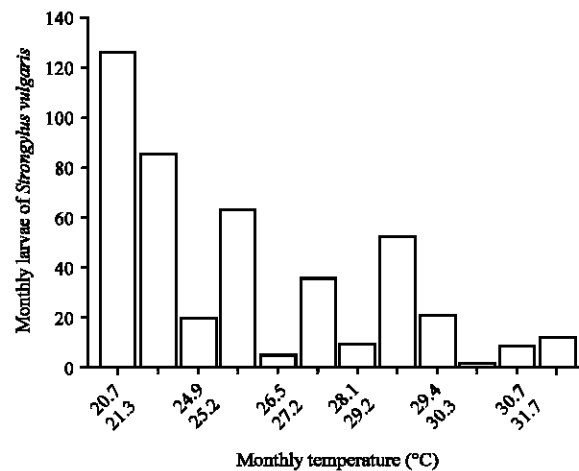


Fig. 1: Monthly means larvae counts in donkeys in relationship with monthly temperature

DISCUSSION

Donkeys are becoming increasingly important animal in the Sudan providing support and transport at a low cost for urban and rural areas. Equines have a potential of making valuable contribution to a new development strategies such as reconstruction and development programs in many parts of Sudan specialty Darfur region as they diversificate source of income in the rural areas.

The present study reported (64.1%) prevalence for *Strongylus vulgaris* larvae infection in the cranial mesenteric artery. The incidence of *Strongylus vulgaris* larvae arterial infection reported here is rather similar to the work of Pandey (1980) who gave (90%) prevalence from the donkeys in Morocco.

The intensity of infection with *Strongylus vulgaris* larvae is moderate. Other works revealed that maximum number of larvae recovered from a single donkey was 274 (Poynter, 1970). Ogbourne (1976) found the maximum number of larvae recovered from any single horse to be 136. The difference between the two host species may be due to the higher susceptibility of donkeys to *Strongylus vulgaris* or to the husbandry system adopted for their management.

In the current study, analysis of the dynamics of *Strongylus vulgaris* infection shows that the maximum number of larvae in the arteries begin to rise from the beginning of the rainy season and reach the peak level at early cool season and then declined sharply towards the hot season. These high figures for both intensity and prevalence of infection during the rainy season may be attributed to favourable conditions for infection and survival of infective larvae of *Strongylus vulgaris*. This finding was in accordance with the work of English (1979) who reported that highest number of worms in arteries was observed during winter and the minimum in early summer.

High levels of arterial infection occur in late rainy season (October) and early cool season (November) this may indicate that highest pasture burden occurs in September and October. Duncan and Pirie (1972) stated that the ingested infective larvae reach the cranial mesenteric arteries in 3 weeks. As the prepatent period of *Strongylus vulgaris* is 6-7 months, the infective larvae ingested during the late rainy and early cool season would be in the caecum and colon in large number during the hot season (March and April), these adult worms contribute to the pasture contamination during the coming rainy season Therefore, it is evident that *Strongylus vulgaris* in Nyala area is an annual species.

The present study confirmed that strongyle infestation was significantly higher in the rainy season of the year. This result was in accordance with the work of Yosif *et al.* (2001), Mulate (2005) and Fikru *et al.* (2005) who indicated that faecal egg counts begin to rise to severe levels during the wet period of the year. From this seasonal variation of strongyle infestation treatment schedule can be proposed. A treatment can be given at the end of the rainy season. At this time the animals are well nourished and may harbour large number of parasites without being seriously affected. Eliminating of these parasites will improve the adaptation of the animals to the harsh dry season conditions. Another treatment can be given at the end of the dry season. This treatment reduces infestation of pasture at the first rainfall by residual parasite.

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