

**INCIDENCE AND MONTHLY PREVALENCE OF
GASTROINTESTINAL NEMATODES IN DONKEYS
(EQUUS ASINUS) IN KHARTOUM STATE, SUDAN.**

(With 5 Tables)

BY

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معدل الانتشار و الحدوث الشهري للديدان الاسطوانية المعدية المعوية في
الحمير في ولاية الخرطوم، السودان

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في تقصي حقلي، تم أخذ ١٢٠٠ عينة من البراز من الحمير في ولاية الخرطوم لفحصها لوجود الديدان الطفيلية و ذلك من خلال تقدير البيوض، و ذلك للفترة من يناير إلى ديسمبر ٢٠٠٣. تم التعرف علي ستة أجناس من الديدان الاسطوانية، تترتب علي حسب الأغلبية علي النحو التالي: الأعلى الديدان الرئوية من جنس *Dictyocaulus arnfieldi* بنسبة تواجد ٧٠,٥%، تليها جنس *Cyathostomes* بنسبة ٣٦,٧% ثم مجموعة *Strongylus spp* بنسبة بلغت ٣٥,٨%، و ديدان *Trichostrongylus axei* بنسبة ١٢%، ثم جنس *Parascaris equorum* بنسبة بلغت ١٠,٧%، و أخيراً ديدان *Strongyloides westeri* بنسبة ٣,٤%. معدل حدوث الإصابة بنوع واحد من الديدان (٥٣,٢%) كان أعلى من الإصابة المختلطة بعدد من الديدان (٤٦,٧%). معدل الإصابة الكلية وجد بمعدل يساوي ٧٠,١%. تبعا لمستوي الإصابة، ٥٨,٦% من الحيوانات كانت الإصابة فيها ضعيفة، بينما ٢١,٩% و ١٩,٥% من الحيوانات كانت الإصابة فيهم متوسطة و شديدة علي التوالي. النتائج الأخرى التي تم التحصل عليها أظهرت أن شهر مارس سجل أعلى متوسط لعدد البيوض (٢٧٨٦,٢ ± ١٩٨١,٣) و تراوح عدد البيوض فيه بين ١٠٠-١٦٣٠٠.

SUMMARY

In total 1200 rectal faecal samples were collected from donkeys in Khartoum State, for the period from January 2003 to December 2003. were examined parasitically for the presence of helminth parasites by assessment of faecal eggs. Six nematode genera were encountered in

donkeys. The genera found were, in order of abundance: *Dictyocaulus arnfieldi* (70.5%), *Cyathostomes* (36.7%), *Strongylus spp.* (35.8%), *Trichostrongylus axei* (12%), *Parascaris equorum* (10.7%), and *Strongyloides westeri* (3.4%). The incidence of infection with one species (53.2%) was found higher than that of mixed infection (46.7%). The overall incidence of infection with nematode parasites was found to be 70.1%. According to level of infection, 58.6% of the infected animals showed mild infection, while 21.9% and 19.5% of them showed moderate and severe infection respectively. Other results obtained, showed that March recorded higher mean EPG count (1981.3 ± 2786.2) with range from 100 to 16300.

Key words: Donkeys, gastrointestinal nematodes, epidemiology, Sudan.

INTRODUCTION

Donkeys are becoming increasingly important animals in the Sudan given the new socio-economic situation with an increased use of donkeys instead of horses in labour. This new situation can be noticed in many urban and suburban areas (Hamid *et al.*, 2001).

Horses, ponies and donkeys are hosts to a large variety of parasites, and it is hardly possible to find any grazing animal of these equines not harbouring a number of species at any particular time (Duncan, 1983). The number of donkeys referred to veterinary clinics has shown an obvious increase during the last decade (Mohamed *et al.*, 1998), which reflects increased importance of the animal. The aim of this study was to investigate the monthly incidence of gastrointestinal nematodes in donkeys in Khartoum State.

MATERIALS AND METHODS

Study area

This study was conducted in Khartoum state, which is located in central of the Sudan.

Samples collection and examination

One hundred donkey fresh faecal samples were collected monthly for a whole year (January 2003 to December 2003), and submitted to the diagnostic laboratory of the department of Medicine Pharmacology & Toxicology, Faculty of Veterinary Medicine, University of Khartoum. Sudan. Egg counts were carried using modified McMaster technique

(MAFF, 1986) and the eggs were identified according to Thienpont *et al.* (1979). The percentage of infestation and differential egg counts for nematodes were determined.

Intensity of infection

The severity of infection as obtained from the number of eggs per gram of faeces was determined according to Soulsby (1982) as following:

500 eggs /gram of faeces = mild infection

800 – 1000 eggs /gram of faeces = Moderate infection

1500 – 2000 eggs / gram of faeces = Severe infection.

Results and discussion

The monthly prevalence of gastrointestinal nematodes encountered during this study, intensity of infection, type of infection mean egg counts, and differential egg counts and percentage of infection are presented in Tables (1-5).

All examined donkeys were male pack donkeys belonging to Nubian ass (*Equus africanus africanus*). From Table (1) the overall prevalence was 70.1%. The highest prevalence was recorded in December (76%). The lowest incidence (64%) was reported in three months. Generally the cold months (November, December, January and February) reported higher incidence ranging from 72-76%. This parasitical infection as general was higher than that recorded by (Kheir and Kheir, 1981) who reported 56.2% at Nyala town and 24% in Bahr El Arab. This may be attributed to the large number of animals examined in this study compared to the small number of animals examined in Nyala town (215) and Bahr El Arab (120). The relationship between high nematode infestation and winter months may be related to suitable temperature of winter season (22-26°C) and humidity (85-100%) favors surviving and hatching of nematode eggs.

From table (2) in all months animals examined showed mild infection. While in November, December, and March the percentage of moderate and severe infections increased. This lowered egg production was also reported by Kheir and Kheir, (1981) in cases of multiple infection with three nematode species in donkeys, where the egg counts fell to 100, 200, and 300 eggs per gram of faeces as compared with the corresponding counts in case of single infection. Although most of egg counts recorded in this study were more than 300 eggs per gram of

animals. Kheir and Kheir, (1981), attributed this to the age of animals under investigation (4-10 years), that they might have acquired old age resistance against helminth parasites.

From Table (3) it was interesting to note that the incidence of infection with single nematode species was higher than with multiple infections during the whole year. Months of March, July and December showed increased percentage of mixed infection.

From Table (4) the mean egg count was (1981.3±2786.2) in March. November also showed increased shedding of eggs. These findings are in agreement with that of Kheir and Kheir, (1981). February and June showed the lowest egg count.

From table (5) the presence of *Dictyocaulus arnfieldi* showed higher incidence during the whole year, high values were recorded during the months of June, July and August (81.9-89.1%), in Ethiopia Feseha *et al.*, (1991) reported 83% incidence of *Dictyocaulus arnfieldi*. The incidence of large *Strongylus sp.* and small *Strongylus sp.* (Cyathostomes) study showed also high values during the cold and rainy months. This is in agreement with the findings of Kheir and Kheir (1981), in Kenya Mukhwana (1994) reported 57.6% incidence of large *Strongylus sp.*, and 15.4%, for the the small strongyles. In this study *Parascaris equorum* recorded incidence ranging between (8.3-13.9%) during the whole year except in February the percentage was only 4.3%. Kheir and Kheir (1981) reported (6.6%) in Nyala and (6.8%) at Bahr El Arab. In Kenya 20.7% of the animals examined harboured infection with the same parasite (Mukhwana, 1994). Infestation with *Trichostrongylus axei* showed fluctuation in incidence and the lowest percentage (1.5%) was recorded in August. The incidence of *Strongyloides westeri* in this study was only (3.4%), while Kheir and Kheir (1981), reported (4.1%) at Nyala and (6.8%) at Bahr El Arab. In Morocco Abdelkarim (1991), reported 1% and in Chad Graber (1970) reported (6%).

In general, very little attention has been paid to the parasites of donkeys, however, in view of the presence of the large numbers of several species of helminthes in the same animals, it is highly likely that these parasites exert pathological effects in the donkeys. The animals are also subjected to the stress of poor nutrition, and hard work, especially during the peaks of agricultural operations (Pandey *et al.*, 1992). It is therefore, advisable to follow prophylactic regimen using different anthelmintics. At least two treatments the first at March and second in October would be required to keep the worm burden at a low level. An additional treatment in July might be useful.

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Table (1). Prevalence of gastrointestinal nematodes in donkeys per month (No. = 100/month).

Month	Prevalence%
January	72
February	70
March	75
April	64
May	74
June	64
July	72
August	66
September	64
October	72
November	72
December	76
Total	70.1

Table (2). Severity of infestation with gastrointestinal nematodes in donkeys per month (No. = 100 animal / month)

Severity	Mild		Moderate		Severe	
	No. +ve	%	No. +ve	%	No. +ve	%
January	47	65.3	14	19.4	11	15.3
February	52	74.3	10	14.3	8	11.4
March	31	41.3	19	25.3	25	33.3
April	39	60.9	14	21.9	11	17.2
May	47	63.5	15	20.3	12	16.2
June	44	68.8	10	15.6	10	15.6
July	36	50	21	29.2	15	20.8
August	35	53	16	24.2	15	22.7
September	38	59.4	14	21.8	12	18.8
October	47	65.3	15	20.8	10	13.9
November	40	55.6	16	22.2	16	22.2
December	37	48.7	20	26.3	19	25
Total	493	58.6	184	21.9	164	19.5

Table (3). Type of gastrointestinal nematode infestation in donkeys per month (No. = 100 animal / month).

Type	Mixed		Single	
	No. +ve	%	No. +ve	%
January	28	38.9	44	61.1
February	24	34.3	46	65.7
March	40	53.4	35	46.6
April	26	40.6	38	59.4
May	33	44.6	41	55.4
June	25	39.1	39	60.9
July	41	56.9	31	43.1
August	29	43.9	37	56.1
September	30	46.9	34	53.1
October	37	51.4	35	48.6
November	30	41.7	42	58.3
December	50	65.8	26	34.2
Total	393	46.7	448	53.2

Table (4). Range and Mean \pm SD of egg per gram of faeces (EPG) count in donkeys infested with gastrointestinal nematodes per month (No. = 100 animal / month)

Month	Mean \pm SD	Range
January	759.7 \pm 1238.1	100-8100
February	535.7 \pm 653.2	100-3100
March	1981.3 \pm 2786.2	100-16300
April	1029.7 \pm 1570	100-9400
May	1122 \pm 2387	100-17700
June	662 \pm 856	100-5800
July	1044 \pm 1807	100-13500
August	1070.5 \pm 1688.9	100-9900
September	920.3 \pm 1287.1	100-6800
October	809.7 \pm 1297	100-8300
November	1194 \pm 2120	100-13300
December	1065 \pm 1233	100-5900
Total	1016.6 \pm 363.6	100-17700

Table (5). Incidence percent of helminthes of donkeys per month (No. = 100 animal / month).

Month	+ve %	Dictyo.	Syus.	Cyatho.	Pscar.	Trich.	Sdes.
1	72	55.6	36.1	52.8	8.3	16.7	2.8
2	70	64.3	31.4	51.4	4.3	14.3	0
3	75	80	22.7	34.6	13.3	4	9.1
4	64	70.3	26.6	25	10.9	20.3	9.4
5	74	79.7	23	27	12.2	18.9	8.1
6	64	89.1	23.4	14.1	9.4	15.6	1.6
7	72	81.9	44.4	29.2	12.5	6.9	5.6
8	66	84.8	39.4	30.3	10.6	1.5	1.5
9	64	76.6	48.4	29.7	12.5	4.7	0
10	72	63.9	54.2	34.7	13.9	5.6	0
11	72	55.6	22.2	58.3	11.1	12.5	0
12	76	48.7	56.6	48.7	9.2	22.4	1.3

Dictyo. = *Dictyocaulus arnfieldi*
 Syus = *Strongylus spp.*
 Cyatho = *Cyathostomes*
 Pscar. = *Parascaris equorum*
 Tricho = *Trichostrongylus axei*
 Sdes = *Strongyloides westeri*