

## Prevalence of gastro-intestinal nematode infection in the dromedary camel (*Camelus dromedarius*) in the Butana plains, Sudan

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FADL (M.), MAGZOUB (M.), BÜRGER (H.-J.). Prévalence des nématodes gastro-intestinaux chez le dromadaire (*Camelus dromedarius*) dans les plaines du Butana au Soudan. *Revue Élev. Méd. vét. Pays trop.*, 1992, 45 (3-4) : 291-293

La prévalence et l'intensité des nématodes gastro-intestinaux ont été étudiées en relation avec les variations saisonnières et les pluies chez 429 dromadaires femelles présentées sur le marché de Tambul dans les plaines du Butana (Soudan), au cours des années 1985-1986. Cette étude a révélé que la prévalence de l'infection et l'intensité de la ponte des oeufs de nématodes présentent des profils saisonniers comparables. Ce caractère saisonnier est principalement dû à *Haemonchus* spp. et *Impatiaria* spp., alors que *Trichostrongylus* spp. semble présent toute l'année (sous forme adulte). Il existe une bonne corrélation entre l'élévation du nombre d'oeufs et les pluies, qui assurent un développement optimal des stades pré parasitaires. **Mots clés :** *Camelus dromedarius* - Nématodose gastro-intestinale - Prévalence - *Haemonchus* - *Impatiaria* - *Trichostrongylus* - Variation saisonnière - Soudan.

### Introduction

Sudan has the second largest population of camels in the world. Approximately three million head were recorded according to the last official census of the Ministry of Animal Resources (1984-1985). Eastern Sudan is second to Western Sudan (North Kordofan and North Darfur) in the density of dromedary camels. The Butana plains (map 1) contain the majority of camels in Eastern Sudan.

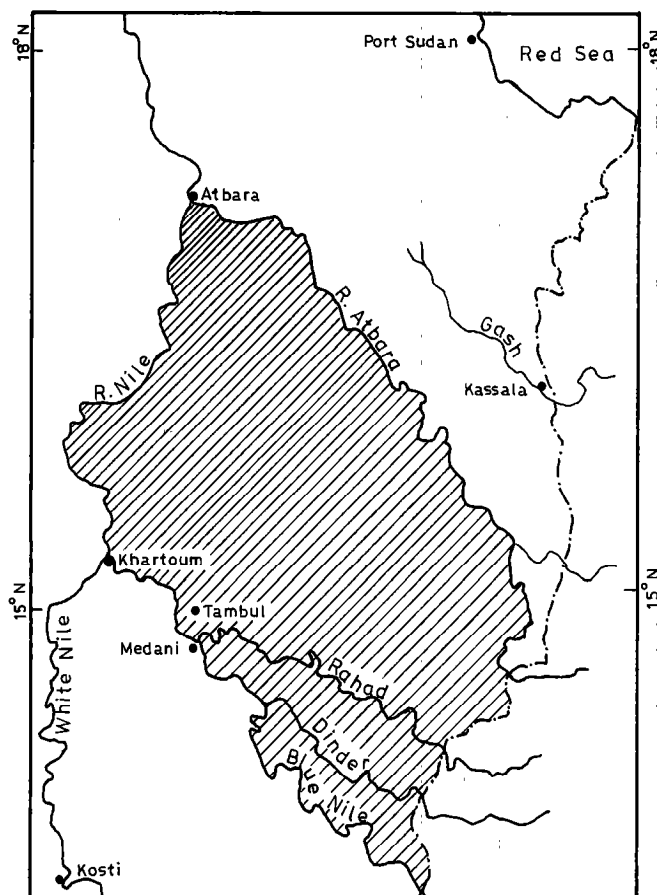
Camels contribute largely to the welfare of nomadic pastoralists as food supplier (in form of milk, meat and fat) as a carrier and as a wealth reserve beside its significant contribution to the national income (11).

The habitat in the Butana plains represents gradation between medium rich savannah in Southern extremities to a typical desert condition in the North (5). Thus the area receives annual rains ranging from 100 to 400 mm (2). Camels and camel-owners are nomadic, they tend to migrate in a North-South direction in their search for good pasture and water (2). During the rainy season (July-October) camels congregate in several hundred/km<sup>2</sup> in the middle and Northern extremity of the Butana plains (5). They adopt during this period the habit of being grazers more than browsers.

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Map 1 : Butana plains area (hatched lines) from BABIKER (1984).

Although gastro-intestinal nematodosis is a common feature among Sudanese camels, yet only a few reports on the occurrence of this infection are given by STEWARD (15), MALEK (1), ELGEZULI *et al* (7). The pathogenicity of natural and experimental haemonchosis in Sudanese camels was studied by ARZOUN (3). Due to the lack of information on their prevalence, this study was carried out to determine the prevalence and intensity of gastro-intestinal nematode infections and their relation to the seasons in Sudanese camels.

### Materials and Methods

A total of 429 faecal samples were collected individually from the recta of female camels at Tambul market (110 km Southeast of Khartoum in the Butana plains) over a twelve month period (1985-1986). The camels were 3-12 years old, apparently and were presented for either slaughter or sale at the market.

Egg counts were quantified using the McMaster technique by dilution of 3 g of faeces in 45 ml of zinc chloride/sodium chloride (1.04 : 1, D=1.3) mixture as flotation solution. The number of eggs per gram of faeces was

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obtained by multiplying the average number of eggs counted in the two McMaster chambers by 100 (6). Generic determination was performed on the third stage larvae from faecal cultures following the keys of GOERGI (9) and SOULSBY (14).

The monthly arithmetic mean of egg counts was determined by the standard method (10) and the point prevalence rate (PPR) was calculated according to the classical formula given by SCHWABE *et al* (12).

Rainfall data were obtained from the Meteorological Department in Khartoum.

## Results

Results on the prevalence rate of gastro-intestinal nematode infection and on the intensity of egg output are summarized in figure 1. Ninety six percent of the camels examined were found to be infected in July (peak prevalence rate). Lower rates of prevalence were demonstrable from February to April and from November to January. A similar seasonal pattern was observed for the intensity of egg counts. The rainfall data indicate the highest rainfall to occur in July. The amount of eggs excreted as well as the prevalence of strongylid/trichostrongylid infections began to increase before the rains started.

Data on larval differentiation (table I) showed clearly that the abomasal worm *Haemonchus spp.*, as well as *Impalaia spp.* from the small intestine and *Oesophagostomum spp.* from the large intestine were more prevalent during the rainy season. *Trichostrongylus spp.* showed high prevalence throughout the dry and rainy seasons.

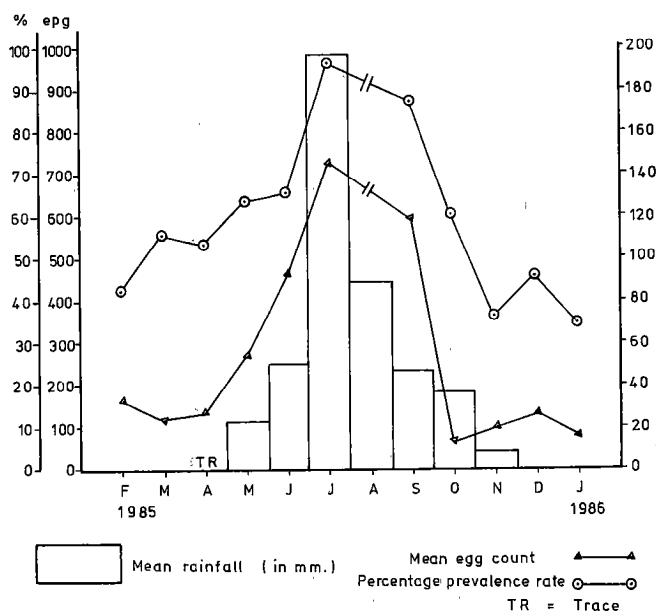


Fig. 1 : Monthly percentage prevalence rate, monthly mean of egg counts of strongyle/trichostrongyle infection and monthly mean of rainfall.

## Discussion

Results of this study show that there is a definite seasonal pattern for the intensity of egg counts and the prevalence rate. The intensity of egg counts can be considered as a pretty reliable measure for pasture contamination caused by "pastoral" camels but only a tentative parameter for the worm burden. Combining the data on both, the intensity of the egg counts and the prevalence, can be interpreted as reflecting the same seasonal pattern (Fig. 1).

Comparing rainfall data with the prevalence as well as the egg counts also reveals an apparent correlation of rainfall and worm parasitism *i.e.* peaks were obtained in July.

It is possible to speculate from the decline in the rate of prevalence as well as the egg count after the peak in July that the decrease was due to a selfcure phenomenon. This occurs in other animal species particularly with *Haemonchus spp.* infections : when infective larvae are ingested, they elicit an immune response in the mucosa resulting in elimination of the already established burden of adult worms (13).

It is well established that rainfall is a crucial factor for the development of infective larvae from eggs in the faeces. It could be speculated that strongyles/trichostrongyles survive the dry season (November-March) as inhibited stages in the mucosa of the abomasum or intestine may have resumed their development early (April-May) to assure high egg production at the time when (due to rains) conditions became favourable for the development

TABLE I Percent recovery of 3rd stage larvae from individual faecal cultures of camels during the period February 1985 - January 1986.

Months	Number of faecal cultures	Tr.	Ha.	Im.	Oe.
Feb.*	16	90	44	44	00
Mar.*	37	96	25	33	04
Apr.*	52	100	38	59	08
May.**	31	98	66	55	19
Jun.**	19	81	89	72	04
Jul.**	25	100	84	79	25
Aug.**	ND	ND	ND	ND	ND
Sep.**	15	100	90	82	11
Oct.**	06	90	90	40	10
Nov.*	10	92	63	67	00
Dec.*	12	100	45	27	00
Jan.*	09	100	33	35	00

Tr. : Trichostrongylus spp. Ha. : Haemonchus spp. Im. : Impalaia spp. Oe. : Oesophogostomum spp.

ND : No data.

\* : Dry season ; \*\* : Rainy season.

of preparasitic stages. This hypothesis is endorsed by the increased percentage of faecal samples containing *Haemonchus* spp. larvae (from May to October).

It may be could inferred from the results of larval differentiation that *Impalaia* spp. and *Oesophagostomum* spp. have a similar means of surviving unfavourable conditions as *Haemonchus* spp. (3, 4, 8). The high prevalence of *Trichostrongylus* spp. in all seasons does not exclude this possibility.

### Conclusion

Gastro-intestinal nematodes of camel show a certain pattern of prevalence (and abundance) which could be a valuable prerequisite for planning anthelmintic control programme as the prevalence rate is largely governed by the season. It is evident that more information is needed to determine the way(s) by which worms survive the dry season viz as inhibited stages in the tissue of the gut or as third stage larvae in the external environment or as adult worms.

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**FADL (M.), MAGZOUB (M.), BÜRGER (H.-J.).** Prevalence of gastro-intestinal nematode infection in the dromedary camel (*Camelus dromedarius*) in the Butana plains, Sudan. *Revue Elev. Méd. vét. Pays trop.*, 1992, **45** (3-4) : 291-293

The prevalence and intensity of gastro-intestinal nematode infection in their relation to season and rainfall were investigated from 429 female dromedary camels at Tambul market in the Butana plains (Sudan), during 1985-1986. The investigation revealed a similar seasonal pattern in the prevalence as well as the intensity of egg output. The seasonality is mainly brought about by *Haemonchus* spp. and *Impalaia* spp. while *Trichostrongylus* spp. seem to be present as adults throughout the year. There is a good correlation between high egg counts and rainfall ensuring optimal development of preparasitic stages. **Key words** : *Camelus dromedarius* - Gastro-intestinal nematode infection - Prevalence - *Haemonchus* - *Impalaia* - *Trichostrongylus* - Seasonal variation - Sudan.

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