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Caprine Fascioliasis in the Gezira State, Central Sudan

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Abstract: This work was carried out in northern part of the Gezira State, Hassahisa Province, in the Central of the Sudan to investigate the prevalence of caprine fasciolaisis and the epidemiological aspects, which might influence the prevalence of the disease. 287 goats were sampled faecaly and serologically for the evidence of *Fasciola gigantica* infection. 12.5% of examined goats were positive for *F gigantica* egg inspection. This infection was correlated positively with the progress of age from olds, youngs and kids 16.2, 12 and 1.9% respectively. The prevalence of the disease was significantly higher in inner irrigated areas (core village) 14.7% than peripheral (main road) areas 8.7%. Also the disease is more prevalent in winter 15% than in summer 9.9%. 79.5% of all examined goats were found positive for antifasciola antibodies (using crude antigen). This prevalence was 98.1, 81.5 and 21.2% for olds, youngs and kids respectively. It was 83.7% for inner irrigating and 71.8% for peripheral irrigating goats. The antifasciola antibodies were found positively higher in winter 85% in comparison with summer 73.8%.

Key words: *Fasciola gigantica,* epidemiology, Gezira-Sudan

Introduction

The disease of fascioliasis or liver fluke is world wide distributed (Boray, 1985 and 1986). In the Sudan the disease is highly endemic and reported in many areas of the country such as Darfur, Upper Nile, Khartoum, Bahr ElGaza;. Equatoriam Blue Nile, Kassal as well as Northern States (Eisa *et al.*, 1979). Although *Fasciola gigantica* which is responsiple for fascioliasis in the Sudan was reported in goats since 1945 (Eisa, *et al.*, 1979) unfortunately, little information was carried out on caprine fascioliasis especially in the epidemiological aspects. Most of the previous study about the prevalence of fascioliasis in the Sudan was obtained from the slaughter hoses (Karib, 1962), thus it is very difficult to asses the economic impact of the disease and its effect of animals production. The disease of fascioliasis in generally associated with considerable losses in live stock production at the chronic stage of disease and high mortalities during the out breaks from acute fascioliasis (Karib, 1962; Sinclair, 1962 and Rosbey, 1970).

Many epimdemiological factors affect the prevalence of the disease and development of immature stages throughout the live cycle such as habitat, pasture management, micro and macro-climate of the environment, immunological and nutritional status of the host, presence of intermediate hosts, the numbers of infected metacercariae and eggs in the environment present a meshwork of interacting variables which greatly confound even an understanding of epidemiological dynamics (Robert, 1950; Roweliffe, and Ollerenshaw, 1960; Dinnik, and Dinnik, 1663 and Kendall, 1965).

The goats were the predominant animals in the northern part of the Gezira and kept indoors for milk production only rare slaughtered but till now no information available for the situation of common parasitic infection in generally and caprine fascioliasis especially so the present work is intended to investigate the prevalence of the disease by using both faecal and serological techniques and epidemiological factors which affect the disease elevation. However, epidemiology of caprine fascioliasis had been investigated in many of tropical countries(Lohani, and Jaekle, 1981; Burrio, and Phulan, 1984; Dhar, ., 1988; Bhatia, *et al.*,1989 and Troare, 1989).

Materials and Methods

Study area: This study was carried out at the northern part of the Gezira State, Hassahisss Province 130 kilometer South from Khartoum (Capital of the Sudan). (Fig. 1)

A number of 287 goats were examined in study during the period Dec 2001, Jan and Feb 2002 (dry and cold season) and Jun, July and Aug 2002 (wet and hot season). The study was carried out in three villages lie on the western bank of the Blue Nile. Two of them (Eldibiaba and Takala) have a central location in the irrigated area (core location) which characterize by a large numbers of canals and stagnant water was found throughout the year, while Abushar has a peripheral location in the main road of Khartoum Wadmadani adjacent to the Blue Nile and characterize by less number of canals. The grazing system for all types of

villages is semi closed the goats go to the pasture early in the morning and come back in the evening to be kept indoors through the night for milk production. In the first location they graze near canals whereas in the peripheral location they graze only beside the main river Blue Nile.

General examination: Each goat was subjected for the following examination before sampling. Clinical abnormalities, physiological examination, health status, breed of the animal and sex. The determination of the age was done according to the dental information of King (1978) and divided into three group kids (1 > year), youngs (1-3 years) and olds (3 < years).

Sample collection and examination:

Faecal samples: Faecal samples were collected from the rectum of each individual goat in long plastic sacs and immediately placed in bottles of 10% formal saline 5:1 v/w, labeled and brought to laboratory using faecal sedimentation techniques according the method mentioned in Soulsbey (1982).

Serum samples: Blood was collected from the jugular veins of goats using sterile disposable syringes and transferred immediately into sterile tubes. Serum was separated by centrifugation and preserved in small epidorf tubes containing 1 ml. The tubes were then labeled and stored at −20°C until they were used further for serological analysis.

The enzyme-linked immunosorbent assay (ELISA) was applied to detect the presence of antibody against *Fasciola gigantica* adult worm in the serum of the examined goats. The crude antigen was obtained from *Fasciola gigantic* adult worms found with hyper manifestation in condemned bovine livers at Khartoum Abattoir and prepared according to the method of Burden, and Hammet, (1978). Several titrations were conducted for standardization the test before proceeding of ELISA. The antigen was freeze dried and diluted in 1: 40 in coating carbonate buffer pH 9.6, the serum also was diluted at 1: 40 in serum diluting solution. The conjugate (Rabbit anti-goat IGg (H) conjugated to horse reddish peroxidase) was diluted 1: 10^4 in washing buffer. The substrate was OPD (orthophenalinedyamine + equal amount of H_2O_2) and H_2SO_4 4M was used to stop the reaction. The absorbancy of the reaction was determined by using 450 n. m. wavelengths. The control negative for antifasciola antibodies serum was obtained from laboratory bread goats at the Animal House of the University of Khartoum, Sudan.

Data analysis: The software computer program Epi 6 Microsoft Copy-right was used for the analysis. Chi square test was applied for significant difference at $P < 0.05$. The correlation between prevalence and age, season and habitat of the animals was also determined.

Results

Out of 287 goats examined for the presence of *F. gigantica* by faecal sedimentation technique. 36 goats revealed *F. gigantica* eggs in their faeces with an overall prevalence of 12.5%. (Table 1) indicated that the infection was more prevalent in the center irrigated areas (14.7%) than peripheral located (Road) villages (8.7%).

Table 1: Distribution of *F. gigantica* eggs according to the location of the examined goats

Location	Animal examined	Positive for *F. gigantic* eggs	Prevalence
Core	184	27	14.7%
Road	103	9	8.7%
Total	287	36	12.5%

Table 2: The seasonal distribution of *F. gigantica* eggs for the examined goats in the Gezira

Season	Animal examined	Positive for *F. gigantic* eggs	Prevalence
Winter	146	22	15%
Summer	141	14	9.9%
Total	287	36	12.5%

Table 3: Distribution of *F. gigantica* eggs according to the age of the examined goats

Age	Animal examined	Positive for *F. gigantic* eggs	Prevalence
Olds	154	25	16.2%
Youngs	81	10	12.3%
Kids	52	1	1.9%
Total	287	36	12.5%

The seasonal variation in the prevalence was shown in (Table 2) The prevalence of the disease was higher in winter (15%) than in summer season (9.9%).

The infection pattern is significantly different between olds , youngs and kids ($P < 0.05$). The prevalence was correlated positively with age increasing of the animal. The infection was 16.2, 12.1 and 1.9% for olds, youngs and kids respectively (Table 3).

Table 4: The optical densities% for antifasiola antibodies of the examined goats

O. D.	Location		Season		Age			Total
	Core	Road	Winter	Summer	Kids	Youngs	Adults	
0.5>	16.3%	28.2%	15%	26.2%	78.8%	18.5%	1.9%	20.5%
0.5<	83.7%	71.8%	85%	73.8%	21.2%	81.5%	98.1%	79.5%
Total	184	103	146	141	52	81	154	287

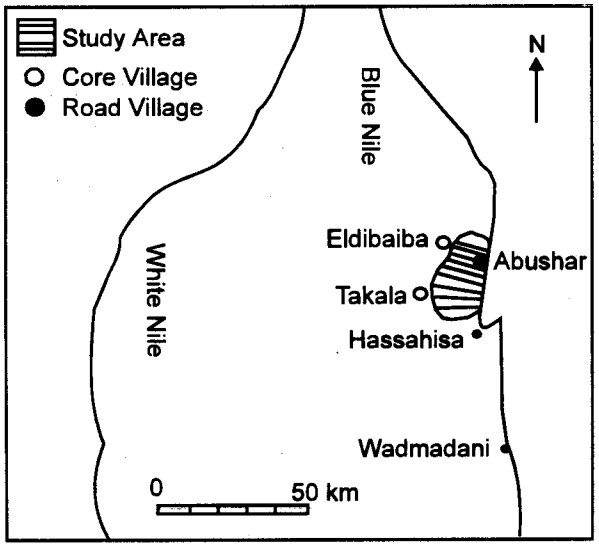

Fig. 1: Location Map of the Study Area

25 goats of these animals were found kept under close husbandry system (8.7% from total examined) showed no infection, so the infection was found only in goats of semi closed husbandry system and the real prevalence was 13.7%.

Table (4) shows the different optical densities, which were carried out by using ELISA test.

Disscusion

The disease of fascioliasis or liver fluke is still prevalent in the Sudanese goats, especially in the Gezira (12.5%) but this prevalence was associated singnifacntly with inner irrigation location of animals rather than animals grazing in the peripheral areas of the Gezira, because the disease strongly associated with the distribution of the intermediate host (Over, 1982; Boray, 1985 and Malone 1997). In the Sudan *Lymnae natalensis* (*F. gigantica* intermediate host) densities were found correlated positively with stagnation of water in canals (Haroun, *et al.*, 1991) which were numerous inside irrigated areas of the Gezira, hence the parasite is highly prevalent. The disease was found more prevalent in winter and this result agrees with many of previous research work carried out in the same topic (Pachauri, *et al.*, 1988; Bhatia, 1989; Troare, 1989 and AlBayati, 1991). That is may be due to the present of viable metacercariae to be ingested from pasture during rainy season (Dinnik, and Dinnik, 1963) so it will take a time (3 months Soulsby, 1982) to be mature and deposit the eggs in the faeces of infected animal which will be commonly higher and observed in the winter, that usually follow the rainy season in our country. Also the prevalence of the disease was found so higher in old goats in comparison to the kids that is may be due to the exposure for infection i.e. the kids were milk depender.

ELISA antibodies test was revealed that most of examined goats (79.5%) contain antifasciola antibodies, I think this result is insignificant for detection of *F. gigantica* infection, many of the animals were cured from the infection either naturally or treated. The crude antigen which was used it may contains multi number of anti bodies e.g. immature stages, metacercaria or other related trematode parasite. So the specific antigen for further research investigation is highly recommended.

This study is an additional information to the scanty information available on caprine fascioliasis in the Sudan. Further research should be carried out on the amount of intermediate host, their distribution, chemotherapy and pathophysiology of the disease.

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