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Research Article

PREVALENCE OF SOMEGASTROINTESTINAL PARASITES IN NOMADIC FLOCK OF DESERT SHEEP, NORTH KORDOFAN STATE, SUDAN

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ABSTRACT

This study was conducted to assess the prevalence of some gastrointestinal parasites in nomadic flock of Desert sheep in North Kordofan state during the period from November to December 2018. Random selected nomadic herd of 200 heads of sheep was used in this study to investigate the prevalence of some gastrointestinal parasites in the study area during the period of November to December 2018. By the use of disposable gloves, 15 grams of the feces were collected from the rectum and placed in a fecal container and labeled. McMaster technique was used which is composed of McMaster chamber, saturated salt solution, and round –bottomed rimed plastic tube, tea sieve and water. The data were analyzed using analysis of variance. The results revealed that 90% of samples were positive for coccidiosis, 75% for Trichostrongyles, 28% for strongyliodes, 8%mixed infection of Trichurisspp andcoccidiosis, 7%a mix of Trichurisspp, strongyliodes and coccidiosis, 5% for mixed both Trichurisandstrongyliodes, finally 3% for trematoda infection. It was concluded that parasites of different species were prevalent in the stock there is a realealth problem of gastrointestinal parasites& it should to be managed.

Keywords: Desert Sheep, nomadic flock, Gastrointestinal Parasites, prevalence.

INTRODUCTION

The estimated Sudanese national sheep flock is 23.04 million head (MFEP, 1994). Ithas been classified on the basis of morphology and distribution into four main groups:Sudan Desert, Sudan Nilotic, Sudan Arid Upland and Sudan Equatorial Upland(Bennett *et al.,* 1948; McLeory, 1961; Wilson and Clarke, 1975). Fused ecotypes fromnon-systematic crossbreeding at the boundaries of the ecozoneshave also been recognized.More than 65% of the sheep in Sudan are of the Sudan Desert type (Ovisaries) (Suliman*et al.,* 1990), which is believed to be a descendant of a sheep of Egyptian origin (Ovislongipes). They are distributed north of latitude 108N, extending eastwardinto Eritrea and westward into Chad (Wilson, 1991) and are raised under rangeland conditions in the eastern and western regions of the country. Sudan Desert sheep are further classified into tribal subtypes, e.g. Hamari, Kabashi, Shenbali in North andWest Kordofan States (Mukhtar, 1985), Shugor, Dubasi and Watish in the CentralStates (Suliman*et al.,* 1990) and Bourug in the Butana area of eastern Sudan..In recent years, the use of Sudan Desert sheep as an export commodity has increased. In 1991/92, it contributed about $60 million to the national foreign exchange earnings at an annual off take rate of 600 000 head (LMC, 1992). Kordofanregion is the major source of sheep for export, mostly of the Hamari and Kabashisubtypes. It holds about 4.63 million head (20%) of the national sheep flock,concentrated mostly in the northern and western states. None the less, the productioncharacteristics of Sudan Desert sheep under the rangeland conditions of NorthKordofan have not been studied in detail.

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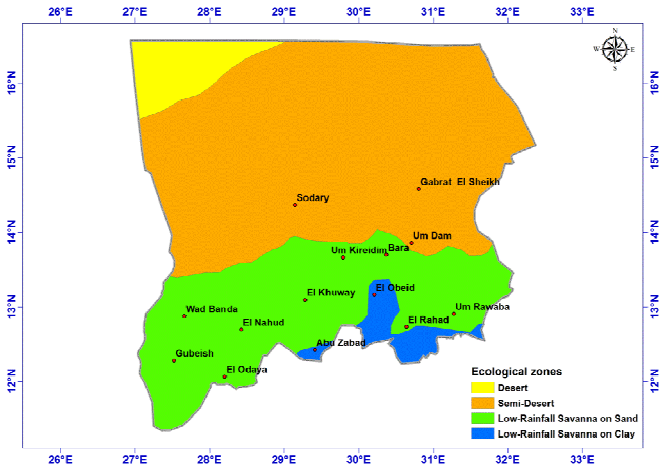
The Sudan sheep industry is also jeopardized by diseases and most losses can be attributed to Hel. Although the damage inflicted by various parasites variess, nematodes are more serious in the main sheep-raising areas. Nematode infestation flares up at the very end of the dry season and the early onset of rains. Heavy casualties occur among ewes when stomachworm infestation is complicated by anaemia. This study is carried to assess the prevalence of some gastrointestinal parasitic worms in a nomadic flock of desert sheep - North Kordofan state

MATERIALS & METHODS

-The study area:North Kordofan State lies between Latitudes 11o15´ to 16O30´ N and Longitudes 27-32oE), Sudan (Figure 1). The study area lies within three ecological zones as described by Harrison (1958). These are (Figure 1) semi- desert, low rainfall savannah on sand and low rainfall savannah on clay, following variations in rainfall distribution from north to south.

The semi-desert zone is located between latitudes 13º40' and 14°30' N. The total area of this zone amounts to 1,245,100 ha and annual rainfall varies between 75–300mm. The bulk of the rain, which is very variable and unpredictable, is confined to the two months of July and August. Low rainfall savannah on Sand zone is located between latitudes 12º40' and 13°40'N; the total area amounts to 2,460,200 ha, with annual rainfall between 300-400mm. The rainy season commences in July and lasts to mid October with its peak during August. The low rainfall savannah on clay zone is located between latitudes 12º13' and 12°40'N, with a total area amounts to 417,500 ha, and annual rainfall between 400 and 500mm, the rainy season is longer than that of the low rainfall savannah on sand zone.

Figure 1: North Kordofan, ecological zone and map of the study area.



-Soils and vegetation cover:

Soils in the semi desert zone are mainly sand dunes "Qoz". They are stabilized by vegetation except in the vicinity of villages where overgrazing and extensive cultivation has destroyed the vegetation cover. In some areas, longitudinal dunes extend from north to south. The coarse and fine sand fraction of these soils is 90% while the pH varies between 5 and 9. Mineral nutrients and organic matter contents are naturally low, but they have high water permeability and relatively high availability of water during the dry season. Thus the vegetation, especially the perennial vegetation, is usually of better types than that found in soils with higher clay content.Dominant grasses and herbs (understory vegetation) include: Cenchrusbiflorus, Eragrostistremula, Aristidamutablis, Cyprus cong., Convolvulus deserti, and Stylothansushamatus. The dominant trees and bushes (over storey vegetation) include Acaicatortilisand Leptadeniapyrotechnica, Dactyloctiniumaegyptium, Acanthus spp, Zorniaglochidiata, and Euphorbia aegyptiaca. The dominant trees and bushes (over storey cover) are Leptadeniapyrotechnica, Acacia Senegal, A. tortilis, Maeruacrassifolia, Calotropisprocera, Leptadeniabucifolia, and Bosciasenegalensis. In the low rainfall savannah on clay zone, soils are dark cracking clays (clay content ≥ 60%), alkaline, usually with a pH of about 9. Gypsum and Calcium Carbonate crystals and calcrete are found. The soils around Jebels are transitional between clay soils and soils with rocky fragments on the surface and in the subsurface soil. Dominant grasses and herbs (understory cover) include Cenchrusbiflorus, Zaleapentandra, Fimbristylistdich., Aristidamutablis, Zorniaglochidiata, and Ipomeacordofana. The dominant trees and shrubs (over storey cover) are Bosciasenegalensis, Guireasenegalensis, Combretum spp., Bauhineaspp, A. mellefera, A. nilotica, and Capparissepiaria. Soils in the low rainfall savannah on sand zone are similar to somewhat that in the semi desert zone (stabilized sand dunes), with the exception of the presence of some clay patches in depressions between the longitudinal dunes (locally known as “Gurdud” soils). The dominant grasses and herbs (understory cover) include Cenchrusbiflorus, Eragrostistremula, and Fimbristylistdich., Aristidamutablis.

-Faecal samples collection:

Random selected nomadic herd of 200 heads of sheep was used in this study to investigate the prevalence of some gastrointestinal parasites in the study area during the period of November to December 2018. By the use of disposable gloves, 15 grams of the faeces were collected from the rectum and placed in a faecal container and labeled.

Preparation and examination of the faecal samples:

McMaster technique was used which is composed of McMaster chamber, saturated salt solution, and round –bottomed rimed plastic tube, tea sieve and water.

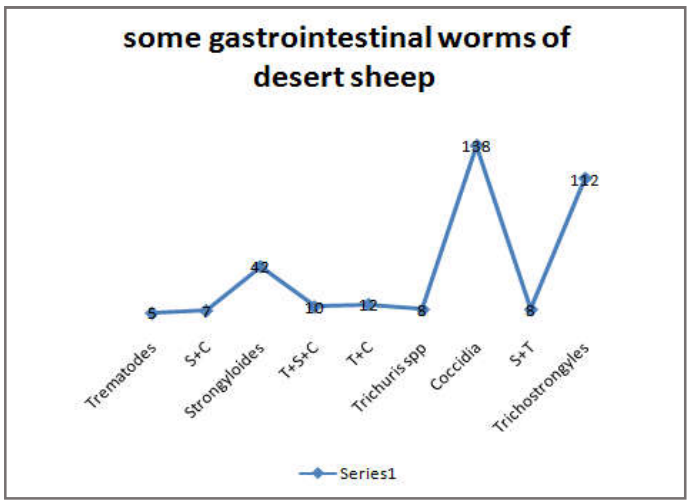
1. 3 grams of faeces were dissolved in 45 ml of water in a universal bottle.
2. The content was sieved and the supernatant discarded
3. The plastic tube was filled with 15 ml of the solution, centrifuged and the supernatant. discarded
4. The tube was refilled with 15 salt solutions and the sediment suspended by inverting the tube for five to six times.
5. One chamber of the McMaster was filled by Pasteur pipette with the sediment solution, the inversion was repeated and the second chamber filled.
6. The slide was allowed to stand for 3 minutes and the eggs were counted under the ruled square, in both chambers under the microscope using low power resolution for detection of helminthes and coccidia eggs.

RESULTS

The table and the chart under show the laboratory faecal samples analysis results that reveal 90%0f samples positive cases for coccidiosis, 75% for Trichostrongyles, 28% for strongyliodes, 8% mixed infection of Trichurisspp+coccidiosis, 7% mixed of Trichurisspp+ strongyliodes+ coccidiosis, 5% for mixed both of Trichurisandstrongyliodes+ coccidiosis, finally 3% for trematoda infection.

Table (1) Faecal samples analysis results for some sheep gastrointestinal parasitic worms:

	Trichostrongyles	S+T	Coccidia	Trichurisspp	T+C	T+S+C	Strongyloides	S+C	Trematodes
No.total samples	150	150	150	150	150	150	150	150	150
Prev. of +vecases	112.0	8.0	138.0	8.0	12.0	10.0	42.0	7.0	5.0
% of+vecases	75%	5%	90%	5%	8%	7%	28%	5 %	3%



Photograph (1) Identification of gastrointestinal parasites (Eimeriaspp)

DISCUSSION

The first reports of tape worms in Sudan were in 1908; Oesophogostomumcolmubianum in 1915 and Ecchinococcusgranulosus in 1944. Majid*et al.,* (2000) reported an overall infestation rate of internal parasites of (80%) in Kordofan,Furthermore, Ahmed *et al.,* (1997) found that sheep brought to Khartoum State for marketing and local consumption harboured four genera of nematodes; namely. Haemonchusspp (56.3%) followed by Strongyloidespapillosus (36.6%), Oesophogosyomumspp (3.7%) and lowest was Trichostrongylusspp (3.4%); moreover, nematode infestation was highest in watish breed (58.6%) and lowest in baladi breed (21.1%), while in the kabashi and hamari breeds it was (58%) and (47.7%) respectively. Also that infestation was highest during the rainy season reaching up to (100%), but, declined during the cold months of winter down to (31%) and (5.88%) in November and December respectively.

The prevalence of parasitic diseases varies greatly between areas depending on the relative importance of many factors but mainly the level of agriculture in the area; nutritional deficiency which achieve major importance where extensive grazing on native pastures is widely practiced. On the other hand, where agriculture is more intensive and land more productive; pasture management tends to dominate other factors. Although a great deal of work has been done on the bionomics of helminth larvae, it is not yet possible to reliably predict the potential transmissibility of a particular parasite at a particular place and time for more than a few regions. Moreover, the microcliamte and macroclimate of the environment, the shade characters and volume and height of pasture; the grazing habits, immunological and nutritional status of the host; the presence of intermediate hosts, vectors and the numbers of infective larvae and eggs in the environment present a mesh work of interacting variables which greatly confound the understanding of epidemiological dynamics of helmnith parasites (Blood *et al.,* 1989; MVM, 1986 and Williamson *et al.,* 1982)

Trichostrongylusspp

include T.colubriformis, T vitrinus and T rugatus in sheep and goats; they are major causes of death and poor growth of ruminants run at pasture the year round and the disease they cause is characterized by persistent diarrhoea and wasting (Blood *et al.,* 1989; and MVM, 1986) In the present study, Trichostrongylusspp were the most prevalent gastrointestinal parasites identified to infest sheep in North Kordofan State; around (75%) Trichostrongyles cause in sheep and goats anorexia, persistent diarrhoea and loss of weight; moreover, villous atrophy occurs and results in impaired digestion and malabsorption leading to loss of protein across the damaged mucosa (Blood *et al.,* 1989; and MVM, 1986)

Strongyloides

papillosus is the thread worm of sheep and goats and has an unusual life cycle by the fact that only female worms occur in the parasitic cycle; furthermore, the parasites embed in the mucosa of the upper portion of the small intestines. The host is infested by ingestion or transmission of the infective larvae in colostrums or by penetration of the skin resembling the early stages of foot rot and may aid penetration of the causal agents of foot rot. In addition to the general signs and affections of gastrointestinal parasitism; presence of large numbers of the worm in the intestine produce catarrhal enteritis with petechiae and ecchymosis especially in the duodenum and jejunum and the presence of blood and mucus in the faeces (Blood *et al.,* 1989; and MVM, 1986) In the present studystrongyliodes represent 28% of the investigated animals.

Trichuris

species may parasitize very young lambs or sheep feeding on the ground causing congestion and oedema of the caecal mucosa accompanied by diarrhoea and unthriftiness (Blood *et al.,* 1989; and MVM, 1986) However, in the present study, Trichurisspp (5%) were also recovered in mixed infestations with other gastrointestinal parasites.

Fasciola

is one of the most important trematodes (flukes) of domestic ruminants, ranges in severity from adevastating disease in sheep to an asymptomatic infestation in cattle; however, the disease in sheep is manifest by a distended, painful abdomen, anaemia and sudden death; nonetheless, it should be differentiated from infectious necrotic hepatitis. Furthermore, sheep do not appear to develop resistance to infection, but, chronic liver damage is cumulative over several years. In the present study it represent 3% positive samples.

Cocidios

iswas first reported in the country in 1915 as quoted by Ibrahim *et al.,* (1968). The reported Coccidiaspp in Sudan include Eimeriagilruthi (Sarwar, 1951) in sheep and goats at (32%) and (40%) prevalence respectively; E intircata, E ovina, E crandalis, E faurei and E ovidanalis in sheep (Osman, 1990, personal communication); prevalence of coccidiosis in Gadarif, Kordofan, Darfur and Kassala ranged between (6.1%) and (13.2%) as reported by Majid*et al.,*(2000). the source of infection is the faeces of clinically affected or carrier animals and infection is acquired by ingestion of contaminated feed and water or by licking the hair coat contaminated with infected faeces. However, multiple infections comprising more than a single

species of Coccidia are the rule in natural infections; but, a single species of Coccidia may be the major pathogen and others probably contribute to the disease. This can be explained by the findings of some surveys in cattle where clinical coccidiosis occurred only when E bovis and E zuernii occurred together; and that in faecal surveys in sheep and goats, the prevalence of multiple species can be as high as (95%) and (85%) respectively (Blood *et al.,* 1989; and MVM, 1986). In this studycoccidiosis represent 90% positive samples.Moreover, field observations have shown that early weaned lambs are more susceptible to coccidiosis than those weaned at a later date which may be the reflection of lack of immunity in younger lambs, but, dietary stress in early weaned lambs may contribute to the disease (Blood *et al.,* 1989; and MVM, 1986). Generally, in light infections, the most characteristic sign of coccidiosis is watery diarrhoea with little or no blood; moreover, in severe infections, the diarrhoea contains blood, shreds of epithelium and mucus and the hindquarters and the tail become soiled with faeces; the animal becomes depressed, dehydrated and lose weight. Signs also include fever, inappetance, anaemia; emaciation and death; however, goats may actually be constipated and die acutely without diarrhoea (Blood *et al.,* 1989; and MVM, 1986)

RECOMMENDATIONS

Because of the severe economic impact of gastrointestinal parasites, it is high time to think seriously of a control intervention strategy based on:

- The study of worms' life cycle to interfere timely and cost effectively.
- Carry out periodic faecal examination (FECs) to monitor worm infestation levels
- Test for drench resistance (examine FECs before and after treatment) to avoid unnecessary costs of ineffective dewormers and exposure of animals to unneeded drugs.
- Intensify extension to raise the perception of herders on the severity of internal parasites and their high economic costs.

Astound parasite control strategy will benefit producers in the following ways:

- Livestock will be healthier and more immune to other infections.
- Calves, lambs and kids will grow more efficiently.
- The adoption of the required management procedure will reduce the amount of drugs needed.
- A low parasite pressure will results in less carcass condemnation at slaughter.

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