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ПАРАЗИТАРНЫХ БОЛЕЗНЕЙ

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КРОСС-СЕКЦИОННОЕ ИССЛЕДОВАНИЕ ГЕЛЬМИНТОВ ЖЕЛУДОЧНО-КИШЕЧНОГО ТРАКТА ЖВАЧНЫХ ЖИВОТНЫХ КОПРОЛОГИЧЕСКИМИ МЕТОДАМИ

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Реферат

В данной работе представлены результаты исследований 442 проб фекалий крупного рогатого скота, буйвола и овцы на зараженность их гельминтами. Пробы фекалий были взяты на исследование у 171 гол. крупного рогатого скота, 128 буйволов и 143 овец. На основании результатов тестирования, проводимого в период с мая 2014 г. по апрель 2015 г., было установлено, что 81 из 171 гол. крупного рогатого скота (47.3%) показали положительный результат на наличие гельминтов, причем степень заражения коров (55%) была выше, чем у быков (40%). 41 из 128 обследованных буйволов показали положительный результат, а уровень заражения составил 32%.

Таким образом, уровень заражения коров (47%) был выше, чем быков (22%).

Самый высокий уровень инвазии был отмечен у овец.

Исходя из полученных результатов можно сделать вывод, что уровень заражения крупного рогатого скота составил 50.3%. Нематоды семейства *Trichostrongylidae* являются доминирующими как у крупного рогатого скота, так и у буйволов. Уровень заражения женских особей был намного выше, чем мужских.

В отношении сезонной динамики следует отметить, что самый высокий уровень заражения приходится на весенний период.

Ключевые слова: гельминты, распространение, жвачные животные, *Trichostrongylidae*.

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A CROSS-SECTIONAL OF GASTRO-INTESTINAL HELMINTHES OF RUMINANTS BY COPROLOGICAL EXAMINATION

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Abstract

In the present study 442 Fecal samples from cattle, buffaloes, and sheep for contamination with helminthes. Samples were examined from 171 cattle, 128 buffaloes, and 143 sheep. The testing, during the period from May 2014 to April 2015, showed that 81 out of 171 cattle were positive for helminthes infection (47.3%), with the rate of infection higher in females (55%) than in males (40%). In buffaloes, 41 of 128 tested were positive, a 32% rate of infection. Again, the infection rate was higher in females (47%) than in males (22%). In sheep, the rate of infection was highest of all three species. The results showed that, the infection rate among cattle were 50.3% and *Trichostrongyle* species were the predominant parasites among both cattle and buffaloes. The prevalence rate was much higher in females than males. Regarding seasonal dynamics the highest infection rates with helminthes reported was in spring season.

Keywords: Helminthes, prevalence, ruminants, *Trichostrongyle*.

Introduction

The aim of this work is to investigate the helminthes infesting ruminant animals in Sohag province, their incidence, prevalence, and the fluctuation of the infection rate during the different seasons. Parasites in livestock and other animals cause diseases that have a major impact on global socio-economic conditions. The current financial losses to agriculture due to parasites seriously reduce farm profitability. The annual cost associated with parasitic diseases in sheep and cattle in Australia has been estimated at \$1 billion Australian [13] and [15] among livestock, ruminants are one of the sources of Egypt's national income, with production of milk, meat, wool, hair, and hides. Moreover, their manure is a valuable soil fertilizer. Parasitic infections destroy our animal wealth and are the biggest hindrance to successful, profitable production. The percentage of field animals infected fluctuates with factors that include irrigation, season, frequency of exposure, immune condition, geographic location, and climate [7]. Professional livestock production is a business for profit. Parasitic infections adversely affect production, impairing the livelihood of the individual farmer and the entire industry [8], [9]. Thus, there are major economic gains to be made by taking measures to control important parasitic diseases. The current method to control Nematode parasites in livestock is use of chemotherapeutic agents (anthelmintics). Even with strategic treatment, this method is costly and not always effective. The excessive use of anthelmintics has resulted in substantial and widespread problems with genetic resistance in nematode populations. There is a need for developing improved means of controlling these parasitic nematodes. Gastro intestinal tract (GIT) parasites are known to be widespread [10], [11]. They lead to acute illness and death, premature slaughter, and rejection of meat parts at inspection stations. Indirect losses include decreased growth rate, weight loss in young growing calves, late maturity of slaughter stock, and decreasing cattle production in many regions and countries [15]. The infections are either clinical or sub clinical; the latter is the more common and is of great economic importance [12]. Although clinical parasitism has received considerable attention because of its obvious severity, the study of parasitism in herds without clinical signs of infection has been largely neglected. [3] Demonstrate that G.I. nematodes are still widespread among adult cows in temperate climate regions, with a prevalent infection rate of between 80 and 100%. The most prevalent species found was *Ostertagia ostertagi*. Moreover, two reviews suggest that sub clinical gastro-intestinal Nematode infections in adult cows can have an adverse effect on milk production.

Materials and Methods

Ruminants of different ages and sexes were investigated during a period from May, 2015 to April, 2016 for the presence of helminthes. We examined 442 faecal samples from Cattle, Buffaloes and Sheep. The number of samples comprised 171 from cattle, 128 from buffaloes, and 143 from sheep. The samples examined were collected from farms in several places, as well as from those brought to the clinics from Sohag, Egypt (26° 10'12, N 32° 43'37 E).

Collection of Faecal Sample

Faecal samples were collected in a plastic sack directly from the rectum or immediately after defecation. Each was labeled with the data as to age, sex, date of collection and the locality, and any apparent lesions. These samples were collected throughout the year.



Preparation and Examination of the Faecal Sample

The preparation and examination of the sample took place on the day of collection. The samples are first examined with the naked eye. The floatation technique with saturated salt solution issued to detect the nematode and cestode eggs [4]. The sedimentation technique with water is used for detection of trematodes eggs [5].

Gross Examination of Faeces

Several characteristics of faeces should be recorded, such as consistency, color, blood and mucus, age of feces and the presence of gross parasites (some parasites, larvae, gravid segments of Cestodes) [5].

Floatation Technique

The floatation technique with saturated salt solution is used to detect the nematode and cestode eggs. [4]

E. Sedimentation Technique

This technique is used for detection of trematodes eggs. This method concentrates both feces and eggs at the bottom of a liquid medium, usually water. Sedimentation detects most parasite eggs [5].

Data Management and Analysis

All the data collected (age, species, and parasitic infestation) is entered to an MS excel sheet and analyzed using SPSS version 16. Descriptive statistics were used to determine the prevalence of the disease and the χ^2 -test was used to look at the significant difference between age and species of the host with parasites.

Results

The present study revealed that of 442 faecal samples from cattle, buffaloes and sheep, 81 of 171 examined cattle (47.3%) were positive, and the rate of infection was higher in females (55%) than in males (40%). In buffaloes examined, 41 of 128 tested positive for the infection (32%), and the infection rate was higher in females (47%) than in males (22%). The prevalence in sheep was much higher than in cattle and buffaloes. Among sheep examined, 72 of 143 were positive (50.3%), and again the rate of infection was higher in females (56%) than in males (45.4%).

Concerning the seasonal dynamics of infection in cattle, the highest infection rate was in spring season (60.4%), followed by summer season (50%), autumn season (42%), and winter season (33.3%). In buffaloes, the highest infection rate was in spring season (50%), then summer season (36%), followed by autumn season (25%), and winter season (19.5%). In sheep the seasonal infection rate was highest in spring season (55.5%), followed by autumn season (50%), winter season (48.5%); the lowest rate of infection was in summer season (46.8%).

The study of the types of parasites found in cattle showed that the most prevalent helminthes were Trichostrongyles, *Toxocara vitulorum*, *Moniezia* spp. (64.1%, 39.5%, and 24.8% respectively), followed by *Strongyloides papillosus*, *Fasciola*, *Trichuris* spp., and *Dictyocallus viviparus* (14.8%, 13.5%, 8.6%, and 3.7% respectively.) In buffaloes the most prevalent helminthes were Trichostrongyles (70.7%), *Toxocara vitulorum* (56%), *Moniezia* (19.5%), *Strongyloides papillosus* (14%), *Fasciola* (12%), and finally lung worm (2.4%).

In sheep the most prevalent parasites were Trichostrongyles, *Moniezia* spp., *Strongyloides papillosus*, (62.5%, 40%, and 16.6%), followed by *Fasciola* sp. (13.8%), *Dictyocallus filaria* (8.3%), and the lowest rate of infection was *Trichuris* sp. (2.7%).

We also looked at the effect of age on parasitic infection. Cattle over 5 years showed the highest prevalence of infection (39.5%), followed by cattle below 2 years of age (32%), with cattle aged between 2 and 5 years having the lowest rate of infection (28%). In buffaloes, the animals aged less than 2 years showed the highest prevalence of infection (39%), followed by those over 5 years (32%), with buffaloes aged between 2 and 5 years having the lowest rate (26.8%). In sheep, animals older than 1.5 years showed the highest prevalence of infection (33.3%), followed by sheep aged between 9 months and 1.5 years, and finally those aged below 9 months (29.1%).



Table 1

The Rate of Infection among Cattle, Buffaloes and Sheep with Helminthes Parasites through Faecal Examination in Sohag Province

Animal species	Sex	Examined (No)	Positive	
			(No)	(%)
Cattle	Female	78	43	55
	Male	93	38	40
	Total	171	81	47.3
Buffaloes	Female	51	24	47
	Male	77	17	22
	Total	128	41	32
Sheep	Female	66	37	56
	Male	77	35	45.4
	Total	143	72	50.3

Table 2

Seasonal Infection Rates among Cattle, Buffaloes and Sheep with Helminth Parasites through Faecal Examination in Sohag Province

Season	Cattle		Buffaloes			Sheep		
	examined	Positive (%)	examined	Positive (no)	Positive (%)	examined	Positive (no)	Positive (%)
Winter	39	33.3	41	8	19.5	35	17	48.5
Spring	48	60.4	34	17	50	36	20	55.5
Summer	34	50	25	9	36	32	15	46.8
Autumn	50	42	28	7	25	40	20	50
Total	171	46.8	128	41	32	143	72	50.3

Discussion

The present study reveals that the infection rate of Helminthes was higher in sheep than in cattle, and the level of infection in cattle was higher than that in buffaloes. Buffaloes showed the lowest level of infection, perhaps due to the fact that buffaloes are more resistant to parasitic infestation than other ruminants, as mentioned by [2]. The infestation in sheep was the highest among the examined animals, attributable to its feeding habits (it is a sweeper animal) and also to out-doors grazing, this agrees with [6].

Table 3

Infection Rate of Cattle and Buffaloes, Sheep with Different Helminthes after Faecal Examination

Animal spp.	Cattle (P=81)		Buffaloes(P=41)		Sheep (P=72)	
	P (No)	P (%)	P (No)	P (%)	P (No)	P (%)
<i>The parasite</i>						
<i>Trichostrongyles</i>	52	64.1	29	70.7	45	62.5
<i>Moniezia spp.</i>	20	24.6	8	19.5	29	40.2
<i>Toxocara vitulorum</i>	32	39.5	23	56	0	0
<i>Fasciola spp.</i>	11	13.5	5	12	10	13.8
<i>Strongyloides papillosus</i>	12	14.8	6	14	12	16.6
<i>Lung worm</i>	3	3.7	1	2.4	6	8.3
<i>Trichuris spp.</i>	7	8.6	0	0	2	2.7

P = number of infected animals



Table 4

The Relation between Age of Infected Cattle and Buffaloes and Infection with Helminthes

The age	Below 2 years (≤ 2 years)		From (2-5years)		Over 5 years (> 5 years)	
	P (No)	P (%)	P (No)	P (%)	P (No)	P (%)
Animal spp.						
Cattle (P=81)	26	32	23	28.3	32	39.5
Buffaloes (P=41)	16	39	11	26.8	14	34.1

Table 5

The Relation between Age of Infected Sheep and Infection with Helminthes

Age	Below 9 months		(9m -1.5years)		Over 1.5 years	
	P (No)	P (%)	P (No)	P (%)	P (No)	P (%)
Sheep (P=72)	21	29.1	27	37.5	24	33.3

List of Figures:

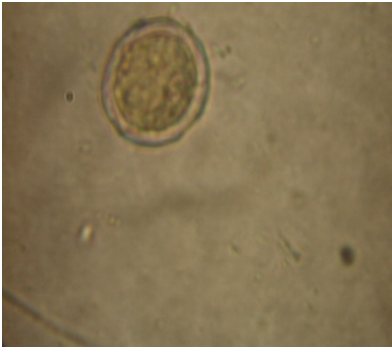


Figure (A) *Toxocara vitulorum* Egg (x40)

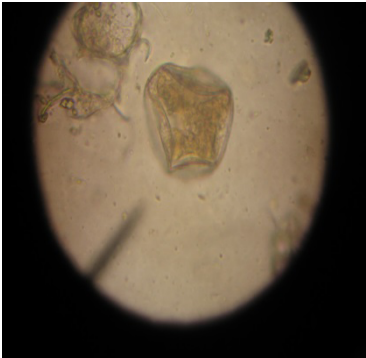


Figure (B) *Moniezia* spp. Egg (x40)

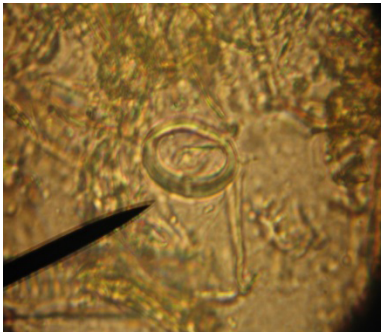


Figure (C) *Strongyloides papillosus* Egg(x40)

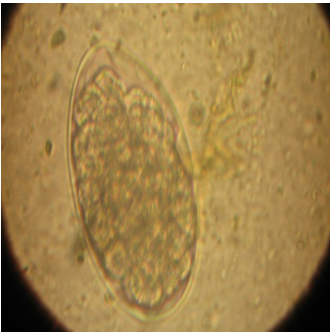


Figure (D) *Trichostrongylidae* Egg (x40)

Turning to the infection rate of the three groups of examined animals by sex, females were more highly infected than males in all three animal groups examined. This may be due to the fact that females are exposed to more stress, in the form of hormonal changes, pregnancy, lactation, and calving. Another consideration here is that most of the males were bred for fattening, and under good hygienic conditions, with periodic anthelmintic dosing. These results agree with those of [1], [16].



The seasonal dynamics study of parasitic helminthes infection among the examined animals reveals that in cattle, buffaloes, and sheep the spring and summer were the seasons when infection rates were highest, with peaks in March and May, followed by autumn, with a peak in September, and finally winter, with a peak in December. This can be attributed to a reduction in the overall resistance of the host during the dry seasons. Because of heat, summer has favorable conditions for the development of the infective stages. This agrees with [14]. The study of the relationship between age and the infection rate with helminthes, reveals that younger cattle (below 2 years) and buffaloes older than 5 years show the highest level of infection, with animals aged between 2 to 5 years doing better. This may be due to lower resistance and less developed immunity against infection in younger animals. It may also be due to blood sucking helminthes, that cause anaemia, as well as lowering immunity in animals both young and old. This agrees with [16], and [17]. In sheep, animals aged between 9 months and 2 years showed higher prevalence of infection with helminthes than the other examined sheep.

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