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ORIGINAL ARTICLE

Gastrointestinal parasitic infection of slaughtered sheep (Zel breed) in Fereidoonkenar city, Iran

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Abstract

The present study was carried out to determine parasitic infection of sheep with gastrointestinal helminthes in a slaughterhouse in Fereidoonkenar city, Iran. A total number of 50 sheep were examined from April to September 2008. Nematodes were removed from abomasums, small and large intestines, and kept in A.F.A. solution (alcohol, formaldeyde, acetic acid, distilled water, and glycerine) for further diagnosis. Cestodes were removed from small intestine, washed with water, and stained with carmine acid. The results of this study indicated that 70% of examined animals were infected as follows: *Ostertagia circumcincta* and *Marshallagia marshalli* (38%), *Trichostrongylus colubriformis* (16%), *Nematodirus spathiger* (14%), *Skrjabinema ovis* (12%), *Haemonchus contortus* (10%), *Camelostrongylus mentolatus* (4%), and *Gongylonema pulchrum*, *Cooperia punctata*, *Bunostomum trigonocephalum, Chabertia ovina* (2%). Among examined animals, 14% infected with *Moniezia expansa*, 10% with *Avitellina centripunctata* and 2% with *Helicometra giardi.* The infection rate in younger animals was higher than in adults. The maximum infection rate was with *O. circumcincta* and *M. marshali*. No infection was found in examined rumens.

Introduction

Gastrointestinal parasite infections are a worldwide problem for small and large animals. Domesticated small ruminants, especially sheep and goat are important sources of protein for many Iranians. In northern part of Iran, because of heavy rainy seasons, suitable conditions are available for development of many parasites. Since sheep breeding was performed at traditional condition in many parts of Iran, animals feeding on pastures lead to parasitic infection. According to the previous studies, parasites are major problems in small ruminants by causing disease, mortality and production losses.[1] Most of these losses caused by gastrointestinal nematodes, with the most important species like *Haemanchus contortus* which was presented in this study, too[1]. The importance of heamanchosis is due to severe anemia in young animals.[1] Also, infection with *Ostertagia* spp in long period leads to reduction of production and economic losses. Several investigations were carried out to determine the prevalence of these nematodes in sheep, goats and camels in different parts of Iran.[2-5] The results obtained from all investigations showed controlled program could decrease the prevalence of infection.[3,6] According to Odoi and Musisi.[10] (2007) the major risk factors of parasitic infection depends on parasite species, host (age, sex, genetic resistance and nutrition status) and environmental factors (climate conditions and management).[10] For better and appropriate control programs, detection of epidemiological aspects and the specific risk factors of parasitic infection is important. In the present study animals referred to the slaughterhouse from different parts of Mazandaran. As there was no information on parasitic helminthes of digestive tract of sheep in Fereidoonkenar city, this study was planned to carry out for the first time in this area.

Materials and Methods

Fecal samples were collected from rectum and examined by the floatation technique using zinc sulfate solution for confirming the diagnosis.[11]

A total number of 50 sheep were examined from April to September 2008. All examined sheep were Zel Mazandarani breed. All examined animals were female. On the basis of tooth formula, age of sheep ranged from less than one year to more than three years.

The rumen was opened longitudinally and observed macroscopically. To remove *Gongylonema* spp. from infected esophagus, pepsin-acid digestion solution was used. First, esophagus was placed on a glass plate, fixed in a flattened position, then put in pepsin-acid solution and incubated at 37 °C for 12-24 hours. After digestion, nematodes were removed and fixed in AFA solution (alcohol, formaldehyde, acetic acid, distilled water, and glycerine). Abomasums, small intestine and large intestines were placed in separate trays. The content of each section of gastrointestinal tract were opened and washed into a five-liter container using water. Then one liter of the contents was transferred into a glass jar. After clarification of the contents, nematodes were removed from abomasums, small and large intestines, and kept in AFA solution. Then the nematodes were put in lactophenol solution and identified using diagnostic keys.[11] Cestodes were collected from small intestine, washed with water, stained with carmine acid, and identified.[11]

Results

The results of this study indicated that 70% of examined animals were infected as follows: *Ostertagia circumcincta* and *M. marshalli* (38%), *Trichostrongylus colubriformis* (16%), *Nematodirus spathiger* (14%), *Skrjabinema ovis* (12%), *H.contortus* (10%), *Camelostrongylus mentolatus* (4%), and *Gongylonema pulchrum*, *Cooperia punctata*, *Bunostomum trigonocephalum, Chabertia ovina* (2%). Among examined animals, (14%) infected with *Moniezia expansa*, (10%) with *Avitellina centripunctata* and (2%) with *Helicometra giardi.*

Due to the age of animals, the most infected sheep were in lower age group. Maximum and minimum infection rates were found in age group of 1-1.5 years and age group of > 3 years, respectively.

The infection with *H. contortus* was also observed (10%) during the examination period. No infection was found in examined rumens.

Among examined organs, abomasum showed the most infection rate (Fig.1). Sexual index, maximum, minimum and average of infection are given in Table 1. Ratio of male to female nematodes was different in isolated nematodes.

Among gastrointestinal nematodes of ruminants, *Camelostrongylus mentulatus* and *Cooperia punctata* are rarely reported from Iran, as they were the case in the present study, too.

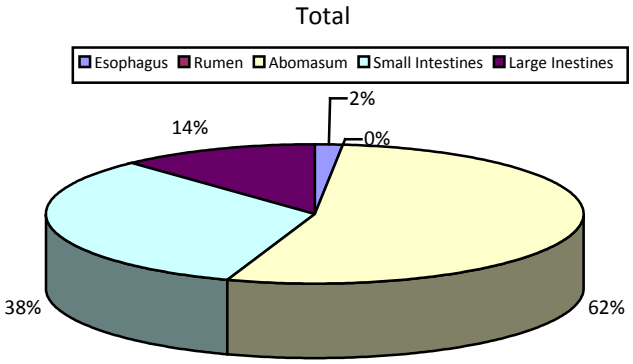

Fig 1. Percentage of infected organs of collected samples in a slaughterhouse in Fereidoonkenar.

Discussion

The results of this study indicated that 70% of examined animals were infected. The maximum of infection rate was with *Ostertagia circumcincta* and *M. marshalli*. The reason could be associated with several factors including the presence of sufficient moisture and optimum temperature conditions during rainy seasons, favored for survival of infective larvae in the pasture in northern parts of Iran.[12,13] Also, hypobiosis phenomenon should be considered in case of high infection rate in mentioned periods. Another study indicated that infection rate of *Ostertagia* spp and *M. marshalli* in goats were 78% and 61%, respectively.[6] Moosakhani (2004) reported that infection rates in examined ruminants with above nematodes in region two on the basis of Skerman *et al*. (1967) classification[12] were 5.8% and 47% in Khoy; 44.4% and 33.3% in Urmia; 28.5 and 28.5% in Bukan; 42.8% and 28.5% of sheep in Naghadeh, respectively.[2] Also, infection rates of examined sheep in Tabriz with *O. circumcincta* (32.05%), *O. trifurcate* (4.75%) and *M. marshalli* (28.53%) were reported by Hashemzdeh and Shahbazi (2009).[4] In another investigation by Bahadori *et al*.(2007) in region one, 4.44% and 2.22% of sheep and 2.22% and 2.22% of goats were infected with *Ostertagia circumcincta* and *M. marshalli*, respectively.[3] The results of these surveys demonstrated that prevalence of infection was moderate in region one whereas in region two was approximately high. In this study, 10% of examined abomasums were infected with *H.contortus.* The importance of heamanchosis is due to severe anemia in young animals.[1]

Table 1. Number of removed helminthes, percent and average of infection.

Infected part of GI tract	Species	Number of removed helminthes	Infection (%)	Average of infection	Sex of removed helminthes		Range of infection	
					M	F	Min	Max
Esophagus	*Gongylonema pulchrum*	1	2	10	9	11	9	11
Abomasum	*Ostertagia circumcincta*	19	38	71.5	171	19	3	140
	Haemonchcus contortusus	5	10	5	1	18	1	9
	Marshallagia marshalli	19	38	33	139	207	1	65
	Camelostrongylus mentulatus	2	4	1.5	3	-	1	2
Small intestines	*Nematodirus spathiger*	7	14	15	17	28	33	1
	Cooperia punctata	1	2	18	5	13	18	18
	Bunostomum trigonocephalum	1	2	1	-	1	1	1
	Trichostrongylus colubriformis	8	16	28.5	30	60	1	56
	Avitellina centripunctata	10	20	-	-	-	-	-
	Moneizia benedeni	7	14	-	-	-	-	-
	Helictometra giardi	1	2	-	-	-	-	-
Large intestines	*Skrjabinema ovis*	6	12	16	6	62	5	27
	Chabertia ovina	1	2	6	3	3	6	6

Based on the results of other investigations, 4.44% of sheep in region one[3] indicated that infection with *H.contortus*. This means the infection rate is low in northern part of Iran. But some reports from region two with infection rate of 4% of goats in Urmia, [6] 27.3% of sheep and 4% of goats in Khoy, [2] and 29.26% of sheep in Tabriz [4] indicated infection with *Haemanchus* is important in region two. Infection rate of other ruminant such as camels with *H.contortus* was 18% and 6.67% in region two and three, respectively.[5,14] In a study which was carried out by Tariq *et al*.(2008) the infection rate of *H.contortus* was high.[15].Meanwhile, influence of age on the prevalence of parasitic infection revealed that lower age groups of sheep were involved with higher infection. The low level of parasitism reported in adult animals was due to the immunity of the host. Previous infection and age of the host provide effective protection against re-infection.[11] The same results were gained from other investigation in Kashmir valley.[15] The infection with *Cooperia punctata* in this study was 2%. In recent years no infection with this nematode has been reported from sheep in Iran, but some reports were recorded from camels.[5,16] The most prevalent nematode species of small intestine is *Nematodirus pathiger* with an infection rate of 50% in examined goats in region two.[17] Among small intestine nematodes *Bunostomum* spp is an important nematode because the adult worms attach to the intestinal mucosa and suck blood. The parasite is more important in warmer climates than cold ones. There was some report on this hookworm from Shiraz[9], and several studies indicated that climate conditions were effective on the appearance and development of many parasites with direct life cycle and incidence of parasitic infection was correlated with rainfall pattern.[17,18] In the present study, no infection was found in examined rumens. However, some studies have been done on *Cotylophoron cotylophorum* (1.85%) in Golestan[3] and *Paramphistomum* (7.36%) in Shiraz.[9] The low abundance of paramphistomosis may be due to anthelmintic treatment against liver fluks (*Fasciola* and *Dicrocelium*) in northern part of Iran[19]. Prevalence of *Amphistomes* in other regions in the world depends on low snail population and climate conditions in the area,[20] Also, infection rate of examined sheep with cestodes were low in this study that was in agreement with other reports.[9,17]

In the present study, the nematodes found in large intestine were *Skrjabinema ovis* (4%) and *Chabertia ovina* (2%). Heavy infection with *C.ovina* is important, and according to other studies which were carried out in Iran, 20% and 52% of goats,[8] 1.11% and 2.22% of sheep were infected with *C.ovina* and *S. ovis* in region one, respectively.[3] Another survey to know the presence of gastro-intestinal nematode parasites infecting sheep was done in Galicia (NW Spain) by Pedreira *et al*. (2006).[21] The sheep-level prevalence was 100%, and the genera identified were *Chabertia, Cooperia, Haemonchus, Nematodirus, Oesophagostomum, Teladorsagia, Trichostrongylus and Trichuris* spp. In the mentioned study, the results indicated that chemotherapy was the only parasite-control practice, and flocks were treated according to the farmers' experiences.[21] Also, the results suggested lack of knowledge about worm-control strategies and anthelmintic use or unwillingness to apply such knowledge. Recent studies in Iran documented there were drug resistance in some flocks.[22]

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