Journal of Biodiversity and Environmental Sciences (JBES)
ISSN: 2220-6663 (Print) 2222-3045 (Online)
Vol. 4, No. 4, p. 106-111, 2014
http://www.innspub.net

RESEARCH PAPER OPEN ACCESS

Assessment of abomasal nematodes in adult sheeps in Abattoir of Baneh Iran

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Article published on April 05, 2014

Key words: Assessment , Abomasal nematodes , Sheeps , Baneh , Iran.

Abstract

Livestock production covers up to 40 percent of the gross value of agricultural production globally. Abomasal nematodes of small ruminants are one of the major causes of productivity loss. This study was carried out to determine the correlation between the prevalence, seasonal incidence and geographical distribution of abomasal worm infection of native sheep in Baneh Town of Iran, suitable for animal husbandry. From February 2011to February 2012 the contents of abomasums of 400 sheep were washed separately in a 100 mesh sieve. The worms present in each abomasum were collected separately, counted and preserved in 70% alcohol containing 5% glycerin for identification to the species. The overall percentage of infection was 25.36% and *Haemonchus contortus,Teladorsagia circumcincta, Marshallagia marshalli,Ostertagia occidentalis,Ostertagia trifurcata* and *Parabronema skrjabini* were 6 species identified in studied areas. The overall prevalence rate and intensity of worm's burden as representative of Baneh were low, although *Teladorsagia circumcincta* was the most prevalent and frequent worm species found. Using T-test and ANOVA, no significant relationship was found between prevalence, season, age and sex.

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Introduction

Abomasal nematode parasite infections are a major constraint to the sheep industry and cause production losses, increased costs of management and treatment, and even mortality in severe cases (Skerman and Eslami, 1967). Abomasum is one of the most important sites for living bursate nematodes belonging to Trichostrongylidae family in small ruminants, because it is the site location for 4 pathogen species of GI nematodes e.g., *Haemonchus spp., Teladorsagia spp., Ostertagia spp. and Trichostrongylus spp*., Meanwhile it was shown that gastrointestinal nematodes could be harmful to the health of infected animals and causes economic losses due to mortalities, reduce weight gain and other production losses (Uriarte, Liorente and Valderrabano, 2003). On the other hand the development of parasites including gastrointestinal nematodes of ruminants is entirely weather dependant (Vlassoff. and Mckenna, 2010). Although the effects of helminth infections on production of particular livestock species depend mostly upon the age of the animal, breed, parasite species involved and the time at which infections with infective larvae begin, the intensity of the worm population (Sissay,Uggla and Waller, 2007). Seasonal incidence of Abomasal nematodiasis is done to find rise to a peak and decline so that the treatment can be timed to prevent development of serious infection and to reduce contamination of pastures with eggs and larvae. If major differences occur in climatic condition of different zones, epidemiological studies must be carried out according to each zone.

In several studies big differences have been shown in the prevalence and intensity of small ruminant's Abomasal nematodes according to different climatic condition (Tariq, Chishti, Ahmad and Shawl, 2008). Fifty two millions sheep are scattered in different regions of Iran, (Al-Shaibani, Phulan, Arijo and Qureshi, 2008), where climatologically it is divided into 4 regions (Skerman and Eslami, 1967). The majorities of sheep population in Iran are grazing in the pasture and are in permanent contact with pasture harboring 3rd stage larvae of Abomasal nematode.

In a comprehensive study in 2 zones (Zone 1 and 2), which carried out by Skerman *et al* 1967, epidemiology, seasonal incidence and economic importance of gastrointestinal nematode of small ruminants of Iran was studied. Since then, in several studies, no attention has been paid to the effects of climatic conditions of different zones of Iran on the epidemiology of Abomasal nematodes. This study was carried out to have new understanding of abomasal helminthiasis in baneh Town (zone 2) of Iran.

Materials and methods

Experimental Sites and Climates

Iran, although is a semi dry country but climatologically can be divided into 4 different zones among which zone 4 (Central and Salt Deserts) is neither suitable for animal husbandry nor fit for human to live in. Three other zones include: the Caspian zone (Zone I) The mountain plateau zone (Zone II) the Persian Gulf Lowland (Zone III), (Fig. 1), where their rainfall per year, relative humidity and mean monthly temperature are 40-150 cm, relatively high and (+8)-(+26) °C and 20-50 cm, low and(-5)-(+29) °C and 20-30 cm, relatively high and (+13)-(+36) °C respectively. The sampling was carried out in the main abattoir of zone II including: Baneh town where local and native sheep were slaughtered.

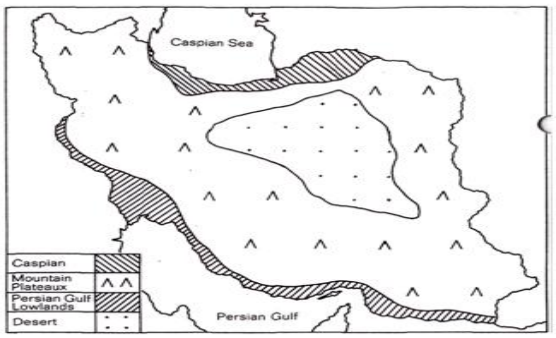

Fig. 1. The major climatic zones of Iran, Zone I (Caspian), Zone II (Mountain plateaux), Zone III (Persian Gulf lowland) and Zone IV (Desert), (Skerman *et al* 1967).

Experimental Animals and Parasitological Techniques

From February 2011 to February 2012, the age (1-4 year old) and sex (Male and female) of 400 native sheep from baneh town were determined and their abomasums were collected from sheep's that necropsies in Baneh slaughterhouse. The contents of each abomasums were washed under running water using a 100 mesh sieve and the present nematodes were counted and preserved in 70% alcohol containing 5% glycerin. Because the intensities of nematode infections were low, All of nematodes were subjected to microscopical examination and they were identified according to morphological characteristics described by Skerjabin (1954), (Skrjabin, 1954).

Data Analysis

Prevalence of parasite species was calculated as number of individuals of a host species infected with a particular parasite species/number of host examined. T- test (t-student) was employed to examine the effect of region, season, age and sex of the host on the level of parasitism. ANOVA test was used to show the correlation between mean worm burden, season, age and sex of the host. In all the analyses, $P = 0.05$ was for significance. Descriptive statistics were used to summarize the data. In addition, Microsoft Excel software was used to store the data of abomasal nematodes. The software program, Stata, (intercooled Stata 7.5) and SPSS 11.5 were employed for data analysis.

Results

The prevalence and intensity of nematode infections are summarized in Table 1. Six species of nematodes with low prevalence and intensity were found in examined abomasums. The overall prevalence and intensity was 25.36% and 98.5 respectively. Among the species found *Teladorsagia circumcincta* was the most prevalent and frequent species. No significant correlation was observed between the prevalence of infection with seasons, ages, sexes .

Table 1. The total prevalence and intensity of abomasal nematode infection in baneh town, Iran.

Parasite	% Prevalence	Mean number of worm per infected abomasum	Maximum burden
Haemonchus contortus	2.1	11.5	32
Parabronema skrjabini	4.3	9.8	18
Marshallagia marshalli	10.11	81.3	410
Teladorsagia circumcincta	17.31	102.1	523
Ostertagia trifurcata	0.06	6.8	22
Ostertagia occidentalis	2.71	7.1	17

Data are presented as mean±SE. *Significant different at P<0.05 level.

Discussion

The interpretation of our results, enlighten a new concept on the epidemiology of abomasal helminths of sheep from Baneh towm of Iran and indicate a reduction in the number of species recorded, prevalence rate and intensity of infection and the absence of seasonality. As far as the prevalence and intensity of abomasal worm infections are concerned, our findings are in consonant with studies carried out in this field in recent years (Oliaee, Eslami, Bokaie and Hoghooghi- Rad, 2008) but not with old reports. In the survey, carried out two decades ago, (Eslami, and Nabavi, 1976) dramatic differences and decrease occurs with our results in the prevalence and mean intensity of 3 common nematode species; e.g. *H.contortus,T.circumcincta and M. marshalli* .Although as it is notices by Santin-Duran *et al.* (Suntin-Duran, Alunda, Hoberg and la Fuente, 2008), worm burden may have been underestimated in our study, as we did not also search or recover fourth

stage larvae that may have been presented as the arrested population in sheep, a phenomenon recorded for *M.marshalli, H.contortus, N.filicollis* and *T.colubriformis* in sheep from Fars province, southern part of Iran (Michel, and Hooshmand-Rad, 1978). A striking founding is the absence of 3 species of *Trichostrongylus* spp in the present research, which were recorded from sheep with high prevalence and mean intensity range (17-58% and 8-740 respectively), (Eslami, and Nabavi, 1976). This shows the more responsiveness of these species to strategic anthelmintic treatment starting two decades ago. On the other hand, our findings uniformity of seasonality and prevalence in baneh town , are in contrast with Skerman *et al.* (Skerman and Eslami, 1967). These remarkable changes are firstly related to the governmental strategic treatment of Iranian sheep and goats' population since 1968 twice a year for a period of 10 years, with albendazole and its continuation later on by sheep owner themselves. Secondly to periodical draught encountered in Iran in last two decades. Meanwhile the economic benefits of strategic treatment and raise the price of meat bring the sheep owner to the assumption that more treatment will lead to more meat, the result of which, among other things, was production of resistance of some trichostrongylids to albendazole and tetramisole. Moreover limitation in grazing pastures due to rise in price of land decreased the available pastures and its compensation by hand feeding and hence less worm infections.

According to several studies carried out in Iran, (Skerman and Eslami, 1967, Nabavi, Eslami, Shokrani, , Bokaie, Shayan and D. Saadat, 2011) and other parts of the world, (Taylor, Coop and Wall, 2007) gastrointestinal nematodes could be harmful to the health of infected animals and causes economic losses due to mortalities, reduce weight gain and other production losses. As far as the site location of GI nematodes are concern, abomasums has a strategic situation, because 3 important pathogenic nematodes of GI e.g. *H. contortus,* Ostertagia spp. And Trichostrongylus spp., live in this organ. It seems likely even to take into consideration the mean number of multispecies nematodes infections reported in this study (98.5) no pathogenecity can be attributed to them. As far as abomasal helminths fauna of sheep is concern, it seems likely that the similar species are prevalent in countries neighboring Iran such as Turkey (Sinasi, and Bayram, 2005) , Iraq (Altaif, and Issa, 1983), to a lesser extent in Pakistan (Al-Shaibani, Phulan, and Qureshi, 2008), where *H. contortus* was the most prevalent species and Ethiopia a country with completely different climatic conditions, where *T. circumcinct, H. contortus and Trichostrongylus axei* were the prevalent species (Abunna, Kumsa, Megersa, Regassa and Debela, 2009).

The results of this paper show a harmony between fauna, prevalence and even intensity of abomasal helminths of sheep. For actual abomasal worm infections and its extent to GI nematodiasis, no chemotherapy is recommended, but it is necessary to prevent emerging sever and new resistance of GI helmiths to anthelmintic compounds and reemerging a new population of helminths harmful to the health and economy of sheep breeding by monitor the trend of infection in the future. The differences in prevalence reported by these studies could be accounted on the basis of differential management practices (Garedaghi, Rezaii Saber and Attaremadraki, 2011). More studies are needed in order to draw widespread conclusions.

Acknowledgments

The authors wish to thanks the Islamic Azad university, Tabriz Branch, Tabriz, Iran for the financial supports, and all laboratory technicians for technical aids in this project.

Competing interests

Authors have declared that no competing interests exist.

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