

Seasonal prevalence of abomasal nematodes in small ruminants slaughtered at Tabriz town, Iran

Garedaghi Yagoob*, Bahavarnia Seyed Razi

Department of Pathobiology, Tabriz Branch, Islamic Azad University, Tabriz, Iran

*Corresponding Author: Y_garedaghi@yahoo.com, Y_garedaghi@iaut.ac.ir

Abstract: A study was carried out to determine the prevalence of abomasal nematodes of sheep and goats slaughtered in Tabriz town from January 2012 through June 2012 with special emphasis given to *Haemonchus* species. During the study period 200 abomasa of sheep and 200 abomasa of goats were examined according to standard procedures. Three genera of nematodes were identified in both sheep and goats abomasa with overall prevalence of 88 % (n = 200). And 79.5 % (n = 200), respectively. The specific prevalence rates observed were 77.2 % for *Haemonchus* spp., 44.1% for *Trichostrongylus axei*, and 16.3% for *Teladorsagia* spp. in sheep and 73.1 % for *Haemonchus* spp., 36.2 % for *T. axei* and 17.3% for *Teladorsagia* spp. in goats. Generally a high infection rate with abomasal nematodes was observed in both sheep and goats of the study area.

[Garedaghi Yagoob, Bahavarnia Seyed Razi. **Seasonal prevalence of abomasal nematodes in small ruminants slaughtered at Tabriz town, Iran.** *Life Sci J* 2013;10(5s):206-209] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 37

Key words: prevalence, abomasal nematodes, Tabriz, sheep, goat.

1: Introduction

Sheep and goats, requiring little inputs, play vital role in rural economy through provision of meat, milk, blood, cash income, accumulating capital, fulfilling cultural obligations, manure, and contribute to the national economy through the export of live animals, meat and skins (Amenu, 2005). Helminth infections in domestic ruminants are of major importance in many agro-ecological zones in Iran and had the highest index as an animal health constraint to the poor keepers of livestock worldwide through losses due to reduced weight gains and growth rate, reduced nutrient utilization, lower meat, wool and milk production, involuntary culling, cost of treatment and mortality (Central Statistics Authority, 2004). Gastrointestinal nematodes are recognized as a major constraint to both small and large-scale small ruminant production in developing countries, leading to significant economic losses (Fritsche, 1993). The abomasal nematode *Haemonchus contortus* is particularly important and causes severe anaemia and death in severely infected animals (Hansen, 1994). Review of the available literature in Iran strongly suggests that helminthosis has nationwide distribution and is also considered as one of the major setbacks to livestock productivity incurring huge indirect and direct losses in the country. In Tabriz region livestock represent the pillar of the economy and plays a vital role in livelihood of the farming communities (Jacquet, 1995). Of the endoparasites, the abomasal nematode *H. contortus* is incriminated as the dominant cause of parasitic gastroenteritis and exerts a severe economic toll in sheep and goats of Iran (Krecek, 2006). On the contrary most studies on small ruminants for Tabriz region are scanty and

unpublished and have basic limitations both in scope and coverage. Therefore comprehensive information on regional or national basis on this widely distributed, most pathogenic and economically very important abomasal nematodes such as *H. contortus* can be used as a baseline data to design sound helminth control strategy (Mulugeta, 1989). The present study was therefore aimed at determining the prevalence, species composition, and worm burden of abomasal nematodes of small ruminants of Tabriz region in Iran.

2: Materials and Methods**2.1. Study animals and design**

The study was conducted on sheep and goats slaughtered in industrial slaughterhouse in Tabriz town from January 2012 through June 2012. Most of the study animals were originated from Tabriz and different areas of Tabriz town. Regular visits to slaughterhouse in Tabriz town allowed collections of abomasa of sheep and goats weight 30-45 kg and 1-5 year old for the study. As soon as possible, after removal of the alimentary tract from the body cavity, the abomasa ligated at both ends were cut and transported to the parasitology laboratory of Veterinary Medicine College in Tabriz branch, Islamic Azad University for microscopic examination.

2.2. Worm recovery, identification and count

Worm recovery, species identification and determination of worm burden were carried out according to standard procedures described by Hansen and Perry (1994) and MAFF (Ministry of Agriculture, Fisheries and Food) (1977). The abomasa were ligated at both ends and removed from omasum and duodenum. Then they were opened along the greater

curvature and their contents were thoroughly washed in to a graduated bucket under a slow jet of water (the approximate volume of the abomasal content was 0.75 l). The mucus membrane was carefully rubbed with fingers to remove any worms adhering to it. The contents and washings were made to a total volume of two liters. Then it was vigorously stirred until all the abomasal contents, mucous and water were thoroughly mixed. A total of 200 ml of the contents was then transferred to measuring cylinder in five steps of 40 ml per step while stirring the mixture. A sub-sample of 20 ml was transferred to a small graduated beaker to which 2 – 3 ml iodine was added to stain the worm and 2 – 3 ml sodium thiosulfate solution was also added to decolorize debris. Finally about 3 – 4 ml of the sample was placed in a Petri dish having parallel lines marked at 5 mm apart, diluted with water and examined under a stereomicroscope. Samples were examined for the presence of nematodes, which were identified and counted as male or female. The total number of worms counted in the 20 ml sub-sample was then multiplied by 100 to get the total number of worms present in the abomasums.

2.3. Statistical analysis

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.

3. Results

Examination of 200 abomasa of sheep revealed the presence of three different genera of nematodes with overall prevalence rates of 88 % (n = 176). The different genera identified were: *Haemonchus* 77.2 %, *T. axei* 44.1 % and *Teladorsagia* 16.3 % (Table 1). Likewise, of the total 200 abomasa of goats examined three genera of nematodes with overall prevalence rate of 79.5 % (n = 159) were recorded. The three genera

of nematodes identified were: *Haemonchus* 73.1 %, *T. axei* 36.2 % and *Teladorsagia* 17.3 % (Table 2).

The overall monthly average worm burden ranged from 1740.1 in January to 2394.1 in March for sheep whereas it varied from 1650.2 in May to 2215.1 in January for goats. In sheep the highest *Haemonchus* count was recorded in April (777.1) and the lowest in February (628.2) and falls between these values for other months as shown in Table 1. The highest *T. axei* burden was recorded in March (992.2) and the lowest in January (550), while for *Teladorsagia* the highest worm burden was found in March (792.7) while the lowest was observed in February (450). In goats the average worm count for *Haemonchus* spp. Was highest in January (720) and lowest in April (564.3), for *T. axei* the highest count was recorded in January (971) and lowest in May (503.8), where as the highest count for *Teladorsagia* was observed in April (625) and the lowest in June (550) as shown in Table 2. Generally sheep with 1953.2 overall mean worm count were found to be more heavily infested than goats with 1882.3 overall mean worm count during the study period. However, there was no statistically significant ($P < 0.05$) difference between months and host species in prevalence and worm burden of abomasal nematodes. Worm burden for *haemonchus* spp.(783±2), *T.axwi*(524±1), *Teladorsagia* spp.(431±3) in sheep and *haemonchus* spp.(559±6), *T.axwi*(488±1), *Teladorsagia* spp.(393±4) in goats was calculated in this study. Also ODDS RATIO was in sheep (Young 2.7; Adult, Female 3.4 and Male 3.1) and in goats (Young 1.99; Adult, Female 2.87; Male 2.2).

Prevalence rate of abomasal nematods in old animals (sheep and goat with 3-5 year aged) was 10-12 % further than young animals (1-2 year aged) .also prevalence rate of abomesal nematodes in female sheep's and goats was 6-7% further than male animals.

Also we don't find any Association of prevalence with nutritional status and breed category of sheep and goats in this study.

Table 1. Monthly prevalence and mean count of abomasal nematodes in sheep

Month	No. examined	<i>Haemonchus</i> spp. (%)	<i>T. axei</i> (%)	<i>Teladorsagia</i> spp. (%)	Total
January	30	82(673.5)	52(550)	12(616.5)	1740.1
February	40	73.6(628.2)	43.6(842.7)	13.5(450)	1821.2
March	35	74.5(709.4)	44.4(992.2)	14.4(792.7)	2394.1
April	50	78.1(777.1)	31.4(868.2)	9.5(675)	2220
May	20	80.3(682)	43.4(784.3)	23.4(637.4)	2002.1
June	25	82.5(667.4)	50.4(870)	25.4(612.3)	2050
Total	200	77.2(689.2)	44.1(817.2)	16.3(545.2)	1953.2

$P < 0.05$ for monthly prevalence and total worm burden; Values in bracket are the mean worm burden

Table 2. Monthly prevalence and mean count of abomasal nematodes in goats

Month	No. examined	Haemonchus spp. (%)	T. axei (%)	Teladorsagia spp. (%)	Total
January	43	68.3(720)	40(971)	20.5(561.4)	2215.1
February	28	73.2(690)	41.3(757)	13.4(450)	1895
March	31	63.1(583)	39.4(657)	15.6(423)	1623.2
April	39	67(564.2)	37(661.4)	17.2(625)	1750
May	30	74.4(630.4)	29.8(503.8)	12(613.6)	1650.2
June	29	82(708.7)	42.2(740.4)	16.9(550)	1897
Total	200	73.1(662.1)	36.2(722.1)	17.3(593.2)	1882.3

P < 0.05 for monthly prevalence and total worm burden; Values in bracket are mean worm burden

4. Discussion

The high overall prevalence and worm load of abomasal nematodes encountered in the current study is in agreement with the results of previous studies (El-Azazy, 1995) carried out his study in Saudi Arabia, which is a desert where hot dry climatic conditions prevail, whereas the present study was conducted in relatively wet and humid climate with variable amount of rain occurring during all months of the study period in Tabriz and its surrounding in Northwest of Iran. The results of worm counts presented herein showed slightly different patterns in sheep and goats. In sheep both the overall worm count and the specific counts for the three genera of nematodes showed similar trends. Even though the variation was insignificant, higher worm loads were recorded during March and April than January and February months of the study period. These higher worm counts during March and April coincide with the short rainy season in March to May in the area. This suggests that humidity and temperature during wet months favourably supports larval development and survival of nematodes in the pasture of the study area. In goats, the burden decreased from January onwards and then gradually started to rise in June. This difference between sheep and goats is most probably attributed to the difference in grazing habits and physiology of the two hosts (Thomas, 2007). In both sheep and goats *Haemonchus* spp. with respective prevalence of 77.2 % and 73.1 % was identified as the most predominant abomasal nematode of the area. This suggests the widespread occurrence of *Haemonchus* spp. In the area and, owing to its known high pathogenic significance, it can undoubtedly contribute to subtle production losses, unthriftiness, morbidity and mortality of small ruminants of the study area (Tesfalem, 1989). In support of our results earlier investigators reported that *Haemonchus* constitutes the largest proportion of abomasal nematodes. Similar high prevalence rates of *Haemonchus* was observed by Bersissa (2004, 2006) in Ogaden (90.1 %), Dereje (1992) in Wollayita Sodo (80 %), Gennene (1994) in Kombolcha (83.9 %), Getachew (1998) in Mekele (95.4 %), Githigia et al.

(2001), Wang et al. (2006) and El-Azazy (1995). The result of this study revealed that there was no significant ($P < 0.05$) difference in monthly infection rates of small ruminants by abomasal nematodes. This suggests the presence of infection during all months of the study period, which is in line with the observations of Bersissa (2006) and Tekelye (1987) who reported the occurrence of infection by abomasal nematodes throughout all seasons of the year. In this study Prevalence rate of abomasal nematodes in old animals (sheep and goat with 3-5 year aged) was 10-12 % further than young animals (1-2 year aged) also prevalence rate of abomasal nematodes in female sheep's and goats was 6-7% further than male animals. Also we don't find any Association of prevalence with nutritional status and breed category of sheep and goats in this study. In this study, moderate prevalence rates of *T. axei* (44.1 % and 36.2 %) and *Teladorsagia* spp., (16.3% and 17.3%) in sheep and goats, respectively were recorded. The result of this study is in support of the reports made by the previous workers. Even though its prevalence was lower than that of *Haemonchus* and *T. axei*, the importance of these parasites on the health and productivity of small ruminants should not be overlooked as the immature stages of these parasites are highly pathogenic to their host (Dunn, 1978). Moreover, this nematode has developed resistance to the most commonly used anthelmintics (Scott et al., 2007) and it has become a challenge to small ruminant production.

5. Conclusion

This study showed that small ruminants of the study area were found to suffer from high overall and monthly prevalence of abomasal nematodes infection. In both host species abomasal nematodes (especially *Haemonchus* spp.) are important impediments to small ruminant production of the area. The result of the present study revealed that sheep and goats in the study area are affected by similar prevalence and pattern of abomasal nematodes. Further investigation on biology of *Haemonchus* spp. and epidemiological studies to determine the associated losses in domestic

ruminants in all seasons in different agroecology and managements need to be pursued.

Acknowledgement:

The authors would like to thank Tabriz Branch, Islamic Azad University for the financial support of this research, which is based on a research project contract.

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3/8/2013