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Research Article

EVALUATION OF PREVALENCE OF LUNG NEMATODES IN SMALL RUMINANTS (SHEEP AND GOAT) IN INDUSTRIAL SLAUGHTERHOUSE IN YASUJ TOWN

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ABSTRACT
A slaughterhouse survey was performed for one year in order to determine the prevalence and intensity of lungworm infections in both sheep and goat. This study was carried out to determine lungworm species and their prevalence, lung worm's counts in sheep in Yasouj, Iran. A total of 1134 sheep and goat of different age and breed were examined for the lungworm infection. 620 lung samples from sheep and 514 samples from goats were collected. On necropsy and examination of the lungs studied of sheep 620 lung, number of 102 lung samples with rate of 16/45% to the lungworm, as well as from 514 goat lungworm 56 case with rate of 10/50% were found infected. There was no significant difference between the type of worms based on the Lungworm species (P >0.05). But significant difference between the prevalence of lungworm were found based on the season and as well as livestock species ($p<0.05$). So, that the worms were more common in cold seasons and the rate of prevalence was in the sheep more than goat.

Keywords: *Lung Nematodes, Ruminats, in Industrial Slaughterhouse, Yasuj Town*

INTRODUCTION
Lung nematodes are frequently found in sheep and it is an important problem for sheep breeders throughout the world. Protostrongylidae and Dictyocaulidae nematodes cause lungworm infections in sheep (Tarazona *et al.,* 1984). Protostrongylidae species occur in the alveoli, bronchioles and parenchyma of the lungs of various species of mammals. Dictyocaulidae species are located in respiratory passages of the lungs (Tavassoli *et al.,* 2001). Despite this, sheep production and productivity is constrained by many factors of which diseases and parasites are the major ones. Lungworms are among the end parasites frequently found in sheep and affect the production of these animals in Iran and worldwide. Lungworm infection in sheep is caused by the nematode parasites *Dictyocaulus filaria, Muellerius capillaris* and *Protostrongylus rufescens*. *D. filaria* infection is acquired by ingestion of infective larvae with herbages but M. capillaris and P. rufescens are transmitted when Molluscan intermediate hosts are accidentally ingested by grazing animals. D. filaria is the most important lungworm of sheep and goats and commonly associated with a chronic syndrome of coughing and unthriftiness, which usually affects lambs and kids (Fentahun *et al.,* 2012). M. capillaris and P. rufescens are more common but less pathogenic when compared to D. filaria. Dictyocaulus filaria, *Cystyocaulus ocreatus*, *Muellerius capillaris*, *Protostrongylus rufescens* and *Neostrongylus linearis* are known to exist in Turkey (Radfar *et al.,* 2006).
The objectives of the present study were to investigate the prevalence of lungworm infections in sheep and goat in Yasouj of Iran and the relationship between the types of worms based on the livestock species, prevalence of lungworm based on the season parasite burden of respiratory system nematodes in sheep and goat.

MATERIALS AND METHODS
Study Area
The study was conducted from October 2013 to May 2014 in and around Yasouj town, which is located at 30°41'N latitude and 33°51` E longitude, at about 980 km from Tehran, the capital of Iran. The study area is situated at an altitude ranging from 1600-2000 meter above sea level and the average annual rainfall of 827 mm and the mean annual temperature of 15°C.

Post-Mortem Examination

Sampling all sheep and goat were slaughtered and detailed necropsies were carried out. The respiratory tract was recovered from each animal and taken to the laboratory for examination of parasitic nodules. All suspected nodules were examined in detail by dissection. The trachea and main bronchi were opened with a pair of scissors, searched for the presence of adult worms and all visual parasites were collected. The lungs were cut to pieces 1-2 cm. diameter and placed in physiologic saline solution in an incubator at 37°C for two hours. The lung pieces were removed and remaining fluids were poured through a screen. Parasites were collected under the stereo microscope. Identification of adult parasites was done by direct microscopy (Radfar *et al.,* 2006).

Sample Collection and Laboratory Examination

For the postmortem examination, the lungs of 1134 sheep and goat were collected from sheep and goat slaughtered at different slaughterhouses in Yasouj town and transported to the laboratory in an icebox for extraction of adult lungworms following the procedures given by Urquhart *et al.,* 2006.

Statistical Analysis

The results from necropsy postmortem examinations were properly recorded and entered into Microsoft Excel spreadsheet and summarized by descriptive statistics. The association between the prevalence of lungworm infection and different risk factors: seasons, livestock species lungworms species was evaluated by using Chi-square (χ^2) test. A P value < 0.05 was considered for presence of significance. Spss software version 16.7 was used for all types of analyses.

RESULTS AND DISCUSSION

Results

In this study, we showed that in the city of Yasouj of the high prevalence of lung nematode and cold season is rate analog than warm seasons more. The overall 620 lung samples from sheep and 514 samples from goats were collected. On necropsy and examination of the lungs studied of sheep 620 lung, number of 102 lung samples with rate of 16/45% to the lungworm, as well as from 514 goat lungworm 56 case with rate of 10/50% were infected. Prevalence of single and multiple infections with lung nematodes in sheep is showed (Table 1). Overall, *D. filarial* was the most prevalent species observed in rate of 30.39% of the positive animals. *P. rufescens* was the second most prevalent recorded in 22 (21.56%) animals whereas *C. ocreatus* was the least dominant recovered from 18 (17.64%) also of the mixed infections 71 (69.66%) and Single infection 31 (30.39%) of the infected sheep and for the goats can be seen in Table 2. As shown in Tables (1, 2) statistical analysis indicated that there was a significant difference in the overall prevalence of infection between prevalence of single and multiple infections with lung nematodes in sheep and goat s ($p < 0.05$). The results of the correlation analysis between lungworm species identified in the 56 infected in the goat and 102 infected in the sheep on based of seasons total nematode counts are presented in the Tables (3, 4).

Table 1: Prevalence of Single and Multiple Infections with Lung Nematodes in Sheep (n=620)

Lungworm Species	Observation	Proportion (%)	P Value
D. Filaria	31	30.39	
C. Ocreatus	18	17.64	
P. Rufescens	22	21.56	
D. Filaria and *P. Rufescens*	9	8.82	
D. Filaria and *C. Ocreatus*	12	11.76	
D. Filaria and *C. Ocreatus and P. Rufescens*	10	9.80	
Single Infection	71	69.61	
Mixed Infection	31	30.39	
Overall	**102**	**100**	**0.145**

Significant correlation (P<0.05) was determined between Lungworm species on based of seasons in the sheep and goat. Species overall of livestock (goat, sheep) infected on based of lungworm species as shown in table 5. As shown is D. filaria number and percentage of highest in the sheep and goat respectively. Table 6 is shown overall of lungs observed and infected with lungs warm in the goat and sheep.

Table 2: Prevalence of Single and Multiple Infections with Lung Nematodes in Goat (n=514)

Lungworm Species	Observation	Proportion (%)	P Value
D. Filaria	15	26.78	
C. Ocreatus	11	19.62	
P. Rufescens	13	23.21	
D. Filaria and P. Rufescens	7	12.50	
D. Filaria and C. Ocreatus	6	10.71	
D. Filaria and C. Ocreatus and P. Rufescens	4	7.10	
Single Infection	39	69.65	
Mixed Infection	17	30.35	
Overall	**56**	**100**	**0.164**

Table 3: Lungworm Species Identified in the 56 Infected in the Goat on Based of Seasons

D. filaria	9	14	6	5	0.002	15.77
C. ocreatus	4	13	5	2	0.003	20.15
P. ufescens	7	11	4	5	0.000	19.12

Table 4: Lungworm Species Identified in the 102 Infected in the Sheep on Based of Seasons

D. filaria	17	22	11	13	0.004	26.54
C. ocreatus	13	14	7	8	0.003	29.56
P. ufescens	14	20	8	10	0.000	24.12

Table 5: Species Overall of Livestock (Goat, Sheep) Infected on Based of Lungworm Species (No, %)

Species of Livestock	D. Filaria (No)	D. Filarial (%)	C. Ocreatus (No)	C. Ocreatus (%)	P. Rufescens (No)	P. Rufescens (%)	P Value
Goat	34	60.71%	24	42.85%	27	48.21%	0.001
Sheep	63	61.76%	42	41.17%	52	50.98%	0.000

Table 6: Overall of Lungs Observed and Infected with Lungs Warm in the Goat and Sheep

Species of Livestock	Observed Lungs	Infected Lungs	Percent of Infected Lungs
Sheep	620	102	16.45
Goat	514	56	10.50
Overall	1134	158	26.95

Discussion

These results agree with those of other researchers, who also reported the prevalence of infection lungworm infection was observed as 16%.13.57% in Brojerd, 12.9%,11.02% in Elazığ provinces and 26%,18.25% in Trakya Region with necropsy in the (sheep and goat) respectively (Alemu, 2006). In a study conducted in South Marmara Region reported that the prevalence of lungworm infection was 33.8% and 38% based on faecal examination and necropsy findings, respectively. The overall prevalence of lungworm infections reported in our study was higher than the prevalence rate reported in South Marmara Region which had similar climatic conditions as those in our study area. These differences were probably linked to feeding habitat of sheep in different localities (Bogale, 2012).

Dictyocaulusfilaria was the most prevalent lungworm species identified (60%, 61.1%) during the period. This finding in agreement with various reports from different parts of Ethiopia and Turkey (Bagci, 2006). The highest prevalence of *D. filarial* over the other species is most likely associated with its direct lifecycle.

In contrast, *C. ocreatus* and *P. rufescens* have indirect lifecycles, with land snails and slugs acting as the intermediate hosts. Transmission occurs when infected slugs or snails are accidentally ingested during grazing.

Therefore, their geographical distribution and prevalence is mainly determined by the distribution of the intermediate hosts which in turn is affected by the availability of suitable environmental conditions. *P. rufescens* was the least prevalent in the present study and this is probably due to its intermediate host range being restricted to certain species of snails unlike *C. ocreatus*, which has a wide range of intermediate hosts (Yildiz, 2006).

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