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Short Communication

An Epidemiological Survey of *Setaria* in the Abdominal Cavities of Iranian Sistani and Brahman Cattle in the Southeastern of Iran

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Abstract

Background: In this experiment, abdominal cavity of 518 Iranian Sistani cattle and 498 Brahman cattle were inspected for the presence of *Setaria* spp. from April 2012 - May 2013.

Methods: The species were determined by microscopic examination of the morphological characteristics of the anterior and posterior parts of the parasites and authentic guidelines.

Results: The overall prevalence of *Setaria* spp. was 28.6% and 36.5%, respectively and this difference was significant ($P<0.05$). Out of 148 Sistani cattle which were infected with *Setaria*, 51(34.4%) were infected with *S. digitata*, 31 (20.9%) were infected with *S. labiatopapillosa,* 65 (43.9%) showed mixed infection of S. *digitata* and *S. labiatopapillosa* and one case (0.6%) was infected with mixed infection of *S. labiatopapillosa, S. digitata* and *S. marshalli*. These values were 87 (47.8%), 27 (14.8%), 67 (36.8%) and 1 (0.5%) for 182 infected Brahaman cows, respectively. The proportion of infected cattle in spring and summer was greater than cooler season (autumn and winter) significantly ($P<0.001$). The prevalence of infection with *Setaria* in 2-3 years old Sistatni cattle (42.2 %) was greater than other age categories ($P<0.05$). Furthermore, the infection rate between males (25.5%) and females (37.3%) Iranian Sistani cattle showed significant difference ($P=0.009$).

Conclusion: It is important to point out the presence of cerebrospinal setariosis, namely in sheep, goats and horses in the investigated area.

Introduction

Nematodes of the genus *Setaria* are filarial parasites commonly found in the abdominal cavities of cattle and other ungulates in Iran. The adult parasites in their normal hosts are generally non-pathogenic. Transmission of infective larvae to abnormal hosts, such as goats, sheep and horses, through intermediate hosts however, can cause a serious and often fatal neuropathological disorder commonly identified as 'cerebrospinal setariosis' in these Hosts (1).

Iranian Sistani cattle are a heavy built and dual-purpose breed of cattle in Eastern Iran. This breed is a genetic resource that shows special features of adaptation to rural environments. One of the most distinctive features of Sistani cattle which make it a potential reservoir of germplasm useful for future crosses is its great capability to resist diseases

Although the major species of *Setaria* that causes cerebrospinal setariosis in sheep and goats have been considered to be *S. digitata* in Japan (2) and *S. labiatopapillosa* in the United States (3) , both species of *Setaria* worms have been reported from the cattle in Iran (4). Therefore, it seems to be important to ascertain which *Setaria* species caused cerebrospinal setariosis.

Considering aspects related to animal health, study of the prevalence of parasite infections in cattle should, therefore, be a continuous task, with the most relevant aim being the establishment of control measures. Few studies have been conducted on the prevalence of bovine *Setaria* from areas all over the world including Iran (4-7,). However, current information on regional prevalence is essential for development and modifications of control measures in animal health.

The objective of the present study was to determine the prevalence of *Setaria* in the abdominal cavities of Iranian Sistani and Brahman cattle in the mentioned area, based on their autopsy data.

Materials and Methods

This study was conducted in Zabol area in Sistan and Baluchestan Province, located in the southeastern part of Iran. This city lies on the border with both Afghanistan and Pakistan that is located near Lake Hamun and the region is irrigated by the Hirmand River.

From April 2012 to May 2013, abdominal cavities of 518 Iranian Sistani cattle and 498 Brahman cattle were inspected for the presence of *Setaria* spp. in Zabol abattoirs. Numbers of parasites were recorded for each cow. The species were determined by microscopic examination of the morphological characteristics of the anterior and posterior parts of the parasites and guidelines given by Yamaguti (8).

In order to evaluate the role of different risk factors for infection, sex, age and season of inspection of these was animals were recorded in a sheet.

Prevalence at 95% confidence interval for infection were calculated as the number of parasitologically positive animals divided by the total number of animals observed at that particular time. Association of independent variables (sexو age and season) and infection was evaluated using Chi-Square and Fischer exact test of SPSS software version 16 and P< 0.05 was considered as significant.

Result

The overall prevalence of *Setaria* spp. in Iranian Sistani and Brahman cattle were 28.6% (95% CI: 24.7-32.5%) and 36.5% (95% CI: 32.3-40.7%), respectively and this difference was found to be significant ($P<0.05$).

Out of 148 Sistani cattle which were found to be infected with *Setaria*, 51(34.4%) were infected with *S. digitata*, 31 (20.9%) infected with *S. labiatopapillosa,* 65 (43.9%) showed mixed infection of S. *digitata* and *S. labiatopapil-*

losa and one case (0.6%) was infected with mixed infection of *S. labiatopapillosa, S.digitata* and *S.marshalli*. These values were 87 (47.8%), 27 (14.8%), 67 (36.8%) and 1 (0.5%) for 182 infected Brahaman cows, respectively. Intensity rate was 4 (range: 1-17) in Iranian Sistani cattle and 8 (rang: 1-29) in Brahman cattle .Prevalence of infection with *Setaria* spp. in Sistani and Brahman cattle with respect to sex, season and age presented in table 1 . Investigation of seasonal dynamic of infection with *Setaria* spp. in Sistani and Brahman cattle showed that, the proportion of infected cattle in spring and summer was greater than colder season (autumn and winter) significantly (P<0.05). The prevalence of infection with *Setaria* in 2-3 years old Sistatni cattle (42.2%) was greater than other age categories (P< 0.05; Table 1). Also, the infection rate between male (25.5%) and female (37.3%) Iranian Sistani cattle showed significant difference (P=0.009; Table 1). In Brahman cattle, there were no significant differences in prevalence of infection with *Setaria* spp. either between female (40%) and male (34.3%) or between different age categories (Table 1).

Table 1: Prevalence of infection with *Setaria* spp. in Iranian Sistani and Brahman cattle with respect to sex, season and age

		Sistani cattle			Brahman cattle		
Variables	**Parameters**	**No. of tested animal**	**No. of positive (%)**	**P-value**	**No. of tested animal**	**No. of positive (%)**	***P*-value**
Sex							
	Male	384	98 (25.5)[a]	0.009	303	104 (34.3)[a]	0.199
	Female	134	50 (37.3)[b]		195	78 (40)[a]	
Season							
	Spring	137	59 (43.1)[a]	<0.001	146	70 (47.9)[a]	<0.001
	Summer	152	53 (34.9)[a]		155	70 (45.2)[a]	
	Autumn	133	18 (13.5)[b]		125	26 (20.8)[b]	
	Winter	96	18 (13.8)[b]		72	16 (22.2)[b]	
Age (yr)							
	<2	171	44 (25.7)[a]	0.002	103	41 (39.8)[a]	0.459
	2-3	116	49 (42.2)[b]		141	50 (35.5)[a]	
	3-4	141	36 (25.5)[a]		170	66 (38.8)[a]	
	>4	90	19 (21.1)[a]		84	25 (29.8)[a]	
	Total	518	148 (28.6)		498	182 (36.5)	

[ab] For each variable, values within a column followed by different letters are significantly different (P < 0.05).

Discussion

Our examination shows that*Setaria* spp were exist and prevalence of them was relatively high in both breeds of cattle in this area especially for *S. digitata* and *S. labiatopapilosa*.. To the best of our knowledge, this is for the first time that *S. marshalli* is identified in Iranian cattle, in the present study. When the results for Iranian Sistani cattle were compared with those of Brahman cattle, the frequencies of *Setaria* in Brahman cattle were higher than Sistani breed. The differences in the prevalence of *Setaria* between the two Iranian breeds might be associated with the level of immunity and resistance to parasitic diseases in Iranian Sistani cattle. The proportion of infection with *S. digitata* and *S. labiatopapilosa* were 67.12% and 17.46% in examined cattle in Qazvin while in examined cattle in Mazandaran, the infection was reported with *S. digitata* (99.45%) only (4). Moreover, *S. digitata* and *S.*

labiatopapilosa were also reported from Gilan (5), East Azerbaijan (6) and Urmia (7). Epidemiological survey of bovine *Setaria* in Japan showed that the incidence of *S. digitata*, *S. marshalli* and *S. labiatopapilosa* were 94.5%, 5% and 0.1%, respectively (2). On the other hands, the prevalence of the bovine *setaria* in Taiwan was 12.5% with *S. digitata* only (9). In other regions of the world such as Korea an infection rate of 5% and 57% with *S. digitata* were reported in two studies (10, 11). In Korea (12), infection rate of 25.1% and 2.9% with *S. digitata* and *S. marshalli* were reported, respectively.

Based on our data, the age of the cattle was found to be an important risk factor associated with *Setaria* spp. Infection. The result of current study revealed that infection rate in 2-3 years old cattle is greater than younger animals ($P < 0.05$). This might be associated with the higher possibility of the biting of host by intermediate host so that adult animals have larger infection rates and the highest prevalence .

The present study indicated that female Iranian Sistani cattle are more susceptible to *Setaria* infection than males ($P < 0.05$). Nutrition and immunity of males and females may also attribute to such differences. It should be noted that this difference could be confounded by age so that most of adult female animals which are presented at abattoirs for meat are at age 3 or more years old but male animal presented at abattoirs are younger. Therefore, the differences in the prevalence maybe attributed to the age, rather than the patterns of transmission. Comparison *Setaria* infection rate between male and female in Brahman cattle showed that female animals are more infected, although the difference was not significant (P=0.199).

The seasonal dynamics of bovine *Setaria* showed that prevalence was highest in spring with a remarkable decline during the colder seasons and the difference was significant ($P < 0.05$). Due to the necessity of the intermediate host in setariosis, influencing epidemiology of the intermediate host, determine epidemiology of the parasite indirectly. Moisture and moderate temperature is considered to be an important factor in determining the survival and availability of mosquitoes. Thus, the relatively higher record of bovine *Setaria* during spring could also be due to the fact that the survival and development of intermediate host is favored by moderate temperature and high humidity.

Conclusion

Setaria spp. are common parasites of Sistani and Brahman cattle in studied regions. The occurrence of *Setaria* spp. in these regions leads us to search for the occurrence of cerebrospinal setariosis in sheep, goats and horses in this area of Iran.

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Reference

1. Taylor MA, Coop RL, Wall RL. Veterinary parasitology, Blackwell, Oxford; 2007.
2. Nakano H, Tozuka M, Ikadai H, Ishida H, Goto R, Kudo N, Katayama Y, Muranaka M, Anzai T, Oyamada T. Morphological survey of bovine *Setaria* in the abdominal cavities of cattle in Aomori and Kumamoto Prefectures, Japan. J Vet Med Sci.2007; 69(4):413-5.
3. Soulsby EJL . Helminths, Arthropods and Protozoa of Domesticated Animals. 7th ed. Setariidae. 1989;pp. 316–323.
4. Bazargani T, Eslami A, Gholami GR, Molai A, Ghafari–Charati J, Dawoodi J, Ashrafi J. Cerebrospinal Nematodiasis of Cattle, Sheep and Goats in Iran. Iranian J Parasitol.2008; 3(1): 16-20.
5. Baharsefat M, Amjadi AR, Yamini B, Ahourai P. The first report of lumbar Paralysis in sheep

due to nematode larvae infestation in Iran. Cornell Vet.1973; 63:81-87.

6. Dawoodi J.Setariasis of cattle in Mianeh, East Azarbayejan Iran (DVM dissertation). University of Tehran;1991.
7. Eslami A, Zamani Herglani Y. Abattoir investigation on the helminth infections of buffalo in Iran. J Vet Fac Univ Tehran.1989; 44:25-34.
8. Yamaguti S. Systema Helminthum, The Nematodes of Vertebrates, vol. 3. Interscience, New York; 1961.
9. Mohanty MC, Sahoo PK, Satapathy AK, Ravindran B. *Setaria digitata* infections in cattle: parasite load, microfilaraemia status and relationship to immune response. J Helminthol.2000; 74(4):343-7.
10. Kim SH, Kim CS, Lee BJ . Survey of the internal parasites of Cheju cattle. Korean J Vet Res.1968; 8: 92–97.
11. Paick YK, Rhee JK, Back BK, Lee SB. Studies on epizootic cerebrospinal setariasis. I. Infection rate of *Setaria digitata*. Korean J Vet Med.1976; 12: 81–87.
12. Rhee JK, Choi EY, Park BK, Jang BG. Application of scanning microscopy in assessing the prevalence of some *Setaria* species in Korean cattle. Korean J Parasitol.1994; 32:1-6.