



A Survey on Prevalence of *Toxocara vitulorum* in Calves in Siirt

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Abstract

Toxocara genus has important risk for public health and is a concern for both human and veterinary medicine. *Toxocara vitulorum* is the largest nematode for cattle and infests the small intestines of water buffalo, bison, and cattle living in tropical and subtropical regions with humid climates. The objective of the present study is to investigate the prevalence of *T. vitulorum* in calves in Siirt province of Turkey. This study was carried out in the Siirt province, located in the Southeast Anatolian region. The animal material of the study consisted of a total of 100 calves of ages up to 6 months. Fecal samples were collected directly from the rectum using disposable latex gloves, after which they were placed in individual fecal containers. Samples brought to the laboratory were stored at +4°C until analysis. Fülleborne saturated saline flotation technique was applied to fecal samples. The samples were then evaluated under a light microscope. As a result of the study, a positivity rate of 7% (7/100) was detected in the samples examined for *T. vitulorum* by microscopic method. In conclusion, the prevalence of the *T. vitulorum* in Siirt province was revealed, and considering the losses caused by the infection, it was concluded that the disease should not be neglected. Farmers should be informed about the disease and appropriate treatment options for it.

Key Words: Calf, Siirt, *Toxocara vitulorum*, prevalence.

Siirt İli Buzağlarında *Toxocara vitulorum* Prevalansı Üzerine Bir Çalışma

Öz

Toxocara cinsi, beşerî ve veteriner halk sağlığı açısından önemli olan türleri içermektedir. Bunlardan *Toxocara vitulorum* sığırların en büyük nematodu olup, nemli iklime sahip, tropik ve subtropik bölgelerde, siğir, manda ve bizonların ince bağırsaklarında yaşamaktadır. Bu çalışmada, Siirt ilindeki buzağlarda *T. vitulorum* prevalansının araştırılması amaçlanmıştır. Bu çalışma Güneydoğu Anadolu bölgesinde yer alan Siirt ilinde gerçekleştirildi. Araştırmanın hayvan materyalini 6 aylık yaşa kadar olan toplam 100 buzağı oluşturdu. Dışkı numuneleri tek kullanımlık lateks eldiven kullanılarak doğrudan rektumdan alınıp bireysel dışkı kaplarına konuldu. Laboratuvara getirilen dışkı örnekleri +4 °C'de saklandı. Dışkı örneklerine Fülleborne'un tuzlu su yüzdürme tekniği uygulandı. Daha sonra örnekler ışık mikroskobu altında incelendi ve örneklerin 7'sinde (%7) *T. vitulorum* yumurtası tespit edilmiştir. Bu çalışma ile *T. vitulorum*'un Siirt ilindeki prevalansı ortaya konulmuş olup, enfeksiyonun meydana getirdiği kayıplar göz önüne alındığında, hastalığın ihmal edilmemesi gerektiği, çiftçilerin hastalık ve uygun tedavi seçenekleri hakkında bilgilendirilmesi gerektiği sonucuna varılmıştır.

Anahtar Kelimeler: Buzağı, Siirt, *Toxocara vitulorum*, prevalans.

INTRODUCTION

Toxocara genus contains species like *Toxocara canis*, *Toxocara cati*, *Toxocara malaysiensis* and *Toxocara vitulorum*, all of which pose important risks for public health, and are a concern for both human and veterinary medicine (1, 2). Amongst these, *T. vitulorum* (Syn: *Neoscaris vitulorum*, Goeze, 1782, Travassos, 1927), is the largest nematode for cattle and infests the small intestines of water buffalo, bison, and cattle living in tropical and subtropical regions with humid climates (2-8).

Toxocara vitulorum is among the most destructive parasites of young ruminants like calves and buffalo calves,

which are the definitive hosts for this parasite (9). The disease is mostly seen in 1 to 3-month-old calves, and it is rarely seen in animals older than 6 months (3, 7, 8, 10). Transmission of the parasite to calves occurs in the prenatal period through the intrauterine path, and through milk in the postpartum period (3, 6, 8, 10, 11). The eggs can be observed in the feces of newborn infected animals as early as the 16th - 23rd days postpartum (7-10). Under suitable temperature, humidity, and oxygen conditions for the eggs, infective larvae can develop in less than three weeks (7). Eggs shed with feces include L₁ stage larvae that develop into L₃ larvae within 2-4 weeks. Eggs containing L₃ do not crack in the environmental until ingested. Larvae ingested by calves become

adults within 3-4 weeks, after which they also shed eggs through feces (9). Adult female *T. vitulorum* can produce thousands of eggs every day (7, 9).

Clinical signs appear 10-15 days after birth and can be observed for six months (7). Adult parasites can cause digestive system problems such as loss of appetite, weakness, diarrhoea, dehydration, constipation, greasy and foul-smelling stools, and death, especially in young animals. The air exhaled by clinically infected animals smells like garlic (butyric acid) (3, 8). Approximately 70-500 adult parasites are believed to be needed for clinical findings to occur (4).

The larval form of the *T. vitulorum* can cause focal lesions of the liver and lungs, inflammation of local lymph nodes, and eosinophilia throughout the parasite's life cycle (10). Human ingestion of infected eggs has been reported to cause visceral larva migrans in humans (7, 8, 10).

The objective of the present study is to investigate the prevalence of *T. vitulorum* in calves in Siirt province of Turkey.

MATERIAL AND METHODS

The Study Area

This study was carried out in the Siirt province (Merkez, Kurtalan, and Şirvan), located in the Southeast Anatolian region (Figure 1). Siirt province is in a semi-arid climate region. The average highest and lowest temperatures are between 37.1 °C and 19 °C in summer, and 8.8 °C and -0.5 °C in winter. Water shortages are common during the summer.

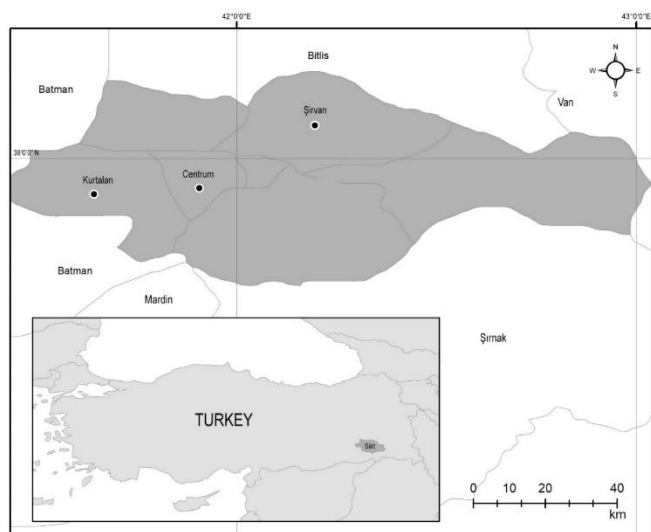


Figure 1. The Siirt province map. Black circles indicate the study areas.

Animal Material and Sample Collection

This study was carried out between March - September 2021. The animal material of this study consisted of a total of 100 calves (38 males and 62 females) of ages up to 6 months. Fecal samples were collected directly from the rectum using disposable latex gloves, after which they were placed in individual stool containers. Location, age, gender, diarrhoea status and anthelmintic usage status for the samples were recorded. Fecal samples brought to the Department of Parasitology, Faculty of Veterinary Medicine, Siirt

University and were stored at +4°C until analysis. Fülleborn's saturated saline flotation technique was applied to fecal samples. The samples were then evaluated under a light microscope.

Statistical Analysis

The data obtained in the study were analyzed using the SPSS V16.0 program. The relationship between grouped variables was calculated using the Chi-square test.

Ethical Approval

This study was approved by Siirt University Animal Experiments Local Ethics Committee (Decision number: 2021.04.26).

RESULTS

The anamnesis gathered from the animal owners included the information that the calves were not given any anthelmintic drugs. As a result of this study, *T. vitulorum* egg was detected in seven (7%) of the examined feces samples of 100 animals by microscopic method (Table 1). Among the sexes, the highest positivity rate was encountered in males ($p>0.05$), and among age groups, in the 1-3 month group ($p>0.05$). For locations, the highest positivity rate was in the Merkez district ($p>0.05$), and in terms of stool form, diarrhoea had higher positivity ($p>0.05$). No statistically significant difference was detected between the groups in any criteria.

Table 1. *T. vitulorum* analysis for sex, age, location and presence of diarrhoea in calves

Variable	Number of calves (n)	Positive (n)	Positive (%)	P
Sex				
Female	62	4	6.45	0.784
Male	38	3	7.89	
Age (month)				
<1	27	2	7.41	0.759
1-3	44	4	9.09	
4-6	29	1	3.45	
Diarrhea				
Yes	41	5	12.20	0.119
No	59	2	3.39	
Location				
Centrum	25	2	8.00	0.946
Kurtalan	41	3	7.32	
Şirvan	34	2	5.88	
Total	100	7	7.00	

DISCUSSION AND CONCLUSION

Toxocara vitulorum infections are seen in many tropical and subtropical regions that have humid climates, but it is reported that it spreads at a high rate in Africa, Philippines, Sri Lanka, India, Europe, and Australia (3, 4, 12). In addition to the direct transmission of the parasite, its transmission through placenta and milk makes the disease control difficult, and the prevalence can reach 100% if the disease is not properly controlled. Most importantly, it can cause death in calves (4, 13).

Different prevalence ratios have been reported by studies conducted in different parts of the world. A prevalence of 2.94% was reported in Syria (14). The prevalence rate was 2.7% in 0-1 months, 7.6% in 2-3 months, and 0.9% in 5-6 months in a study performed in Mali (15). This number changes to 22.6% in Lao (13), to 37.50% in Pakistan (9), to 12.4% in Cambodia (6), to 26.16% in India (Guwahati) (16), to a distinctively high 63% in Ethiopia (17), to 9% in the USA (18). Another study has reported and 40% (19) positivity for the USA as well.

The first detailed study on the prevalence of the disease in Turkey was conducted by Güralp et al. (1985) in which 0.8% positivity was reported. The prevalences reported in other studies are as follows: 16% (12) and 17.7% (21) in Van, 2.2% in Bursa (22), 0.63% in Samsun (23), 7.5% in Kars (8), 1.76% in the Thrace region (11), 28.96% in Hakkari (10), 1.1% (3) and 22.2% (5) in Erzurum, 0.28% among young and 0.41% among adults in Konya (24), and 0.83% in Afyon (7).

As a result of the present study, *T. vitulorum* egg was detected in 7 (7%) of the 100 samples examined, and the result obtained was similar to the findings reached by various researchers (8, 15, 18). Geographical conditions, climate (humidity and temperature), shelter structure, age of the animal, anthelmintic treatment, and care and feeding conditions can be counted among the reasons for the differences between studies.

It has been reported that the incidence of the disease is higher in regions with heavy rainfall and that there must be sufficient temperature and humidity in the barn for the eggs to develop (3). The data obtained in the present study reveal a lower prevalence rate than the results of studies carried out in many regions of the world (6, 9, 10, 13, 16, 17, 19, 21). The fact that Siirt province is quite hot, especially in summer, along with the low humidity rates of the region, might be the cause for this situation.

Many researchers (3, 7, 8, 10, 11, 16) reported that males are more sensitive than females to the infestation. Researchers (5, 7, 24) reported that there was no statistically significant difference between gender groups. As a result of the present study, positivity was determined to be higher in males (7.89%) compared to females (6.45%), but no statistically significant difference was detected ($p>0.05$). These results are similar to the findings of the researchers.

In many studies carried out, it is reported that *T. vitulorum* infections are mostly seen in the 1–3-month age group (3, 4, 6, 8, 10, 12, 16-18, 22), and that the infection rate decreases until 1 year of age and is rarely seen after the first year (4, 5). The fact that the highest positivity was detected in the 1-3 age group as a result of this study also supports these researchers. The reason for the uncommon infestation of old cattle is due to the short prepatent period of the parasite and the expulsion of the parasites in a short time due to age-related resistance (8).

Diarrhoea is also seen among the clinical symptoms of this infection (3). In a study carried out by Arslan et al. (2008), it is reported that the two samples detected positive were diarrheal. As a result of this study, it was determined that the prevalence of diarrheal calves was higher than those

with normal stools, but it was not statistically significant ($p>0.05$).

Among the locations surveyed in the study, the highest positivity was found in the Merkez district and the lowest positivity was found in the Şirvan district. No statistically significant difference was determined between the locations ($p>0.05$).

It is stated that unsuitable animal husbandry, care and feeding conditions, along with climate and vegetation properties, play an important role in the spread of the parasite (10, 20, 22, 24). When the disease is not controlled, morbidity rates can reach 100% and mortality rates can reach 80% in calves. This situation is very important for both animal and human health (visceral larva migrans). As a result of this study, the prevalence of the disease in Siirt province was revealed, and considering the losses caused by the infection, it was concluded that the disease should not be neglected. Farmers should be informed about the disease and appropriate treatment options for it.

CONFLICTS OF INTEREST

The authors state no conflict of interest.

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