



Investigation of *Toxocara vitulorum* Prevalence in Buffalo Calves in Iğdır Province

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Received : 18/10/2022

Revised : 03/11/2022

Accepted : 01/12/2022

ABSTRACT: Buffalo: It is an animal in the *Bubalus* class in the Bovidae family, in the Artiodactyla order, which is widely grown in the world as a meat, dairy and draft animal, especially in certain countries. There are approximately 74 breeds of buffalo originating from domestic and wild forms. These breeds are roughly divided into two classes as swamp and river buffaloes. While swamp buffaloes are considered as draft animals, river buffaloes are raised for meat and milk. Anatolian buffaloes in Türkiye are mostly raised for milk production, but they are also used in meat production after the yield period. Ascariidiosis is a widely detected parasitic zoonotic disease that affects millions of people and animals around the world. *Toxocara (Neoascaris) vitulorum*, which is found in the small intestines of cattle buffalo and bison in tropical and subtropical countries with humid climates, has also been detected in cattle and Buffalo calves in Türkiye. The aim of this study is to investigate the prevalence of *T. vitulorum* in buffalo calves of Iğdır province of Türkiye microscopically. Accordingly, between 2021-2022, the necessary approval was obtained from private enterprises in Iğdır region and 116 stool samples were collected from Buffalo calves up to 6 months and brought to the laboratory. As a result of microscopic examination, it was found that 2 (1.7%) of 116 samples were positive for *T. vitulorum*.

Keywords: Buffalo calves, Iğdır, *Toxocara vitulorum*.

INTRODUCTION

Buffalo is an animal in the *Bubalus* class in the family Bovidae, in the Artiodactyla order, which is widespread in the world as a meat, dairy and draft animal, especially widely cultivated in certain countries. It is grouped as African buffalo (*Syncerus caffer*) and Asian buffalo (*Bubalus bubalis*). There are approximately 74 breeds of buffalo originating from domestic and wild forms (Nuhay and Gülhan, 2017). These breeds are roughly divided into two classes as swamp and river buffaloes. While swamp buffaloes are considered as draft animals, river buffaloes are raised for meat and milk (Kelgökmen and Ünal, 2015; Nuhay and Gülhan, 2017). Buffaloes are heavy in structure and behavior, have a low rump, their hair is colored black or gray. Hairs on the skin are sparse. The cross section of the horns resembles a triangle. Their development is late and continues until the age of 5-6 (Kelgökmen and Ünal, 2015).

Buffaloes in Turkey originate from Mediterranean buffaloes, which are a subgroup of river buffaloes, and are called Anatolian buffaloes (Nuhay and Gülhan, 2017). Anatolian buffaloes formed the animal material of this study. It is grown mostly in Samsun, Tokat, Sinop, Amasya, Afyon and Çorum provinces of Turkey (Şahin and Yıldırım, 2012; Nuhay and Gülhan 2017; Aksoy et al., 2021). In the works of Kelgökmen and Ünal in 2015, they stated that according to the latest data, there are about 177 million buffalo worldwide (Kelgökmen and Ünal, 2015). According to 2021 Turkvet data, an average of 186,320 buffalo are bred in Türkiye and there are approximately 1222 buffalo in Iğdır province (Anonymous, 2021).

Anatolian buffaloes are suitable for intensive and widespread production and can convert cheap and low-quality roughage sources into milk and meat (Akdağ, 2004; Şahin and Yıldırım, 2012; Kelgökmen and Ünal, 2015; Aksoy et al., 2021). In Türkiye, Anatolian buffaloes are mostly bred for milk production, but after the yielding age, they are also used for meat production. (Aksoy et al., 2021).

Ascariidiosis is a widely detected parasitic zoonotic disease that affects millions of people and animals around the world (Chen et al., 2018; Nijse et al., 2016). in cattle, buffalo and other ruminants *T. vitulorum*, in dogs *T. canis*, in cats *T. cati*, the types of ascarids seen in animals have been reported in studies (Hanedan and Bilgili, 2021; Çelik et al., 2022).

Toxocara (Neoascaris) vitulorum, which is found in the small intestines of buffalo and bison in tropical and subtropical countries with humid climates, has also been detected in cattle and Buffalo calves in Turkey (Umur and Gicik, 1995; Hanedan and Bilgili 2021; Çelik et al., 2022).

Clinical manifestations appear 10-15 days after birth and can be observed for six months (Kozan et al., 2021; Çelik et al., 2022). Adult parasites can cause digestive system problems such as loss of appetite, weakness, diarrhea, dehydration, constipation, oily and foul-smelling defecation and death, especially in young animals (Umur and Gicik, 1995; Hanedan and

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Bilgili, 2021; Çelik et al., 2022). In cases of mild infection, clinical manifestations may not be clear. The presence of adult parasites in the intestine can cause mechanical damage, enlargement of the abdomen, regression of growth, vomiting and diarrhea. In intensive infections, pulmonary damage and edema, cough, nasal discharge, mucoid enteritis, vomiting and diarrhea, intestinal obstruction/rupture and death may develop (Raza et al., 2018; Hanedan and Bilgili, 2021). The air exhaled by clinically infected animals smells like garlic (butyric acid) (Arslan et al., 2008; Umur and Gıcık, 1995; Çelik et al., 2022). It is believed that about 70-500 adult parasites are required for the appearance of clinical manifestations. The larval form of *T. vitulorum* can cause focal lesions of the liver and lungs, inflammation of the local lymph nodes and eosinophilia throughout the life cycle of the parasite (Aydin et al., 2006).

One of the most important pathogenic nematodes of large ruminants. while *T. vitulorum* does not cause disease in adult animals, it can cause significant pathological damage in calves and Buffalo calves. In general, it was found that buffaloes are more resistant to diseases than cattle, on the contrary, they are more prone to ascaridiosis. Both the prevalence and pathogenicity of this disease are greater in buffaloes. Pathogenicity increases in direct proportion to the number of larvae taken. In addition, it has been shown that a large amount of parasites can cause death in Buffalo calves (Dorny et al., 2015; Raut et al., 2016; Gürler and Gürler, 2018).

The biological cycle of ascarids differs depending on the age of the host and the reception of the infective form. If the host is less than 6 months old, most of the infective forms taken become mature in the intestines. This condition continues inversely proportional to the development of the host's immune system. During pregnancy, these larvae are activated again with the suppression of the immune system. It is known that larvae in muscles in buffaloes remain alive for more than 5 months. A significant part of them passes into the mammary glands and they are waiting to be picked up by the buffalo calves. The flow of larvae into the mammary glands continues for about a month after childbirth. It is also known that this period can be extended. Infective L3, which is ingested by buffalo calves during milk sucking, develops directly in the intestines without undergoing visceral migration. Infection in Buffalo calves is also generally this way. In studies, it is reported that Buffalo calves are not infected by passing larvae to the fetus via the placental route or by oral ingestion of infected eggs (Adanir, 2004; Aydenizöz, 2012; Çelik et al., 2022).

Most of the studies conducted in Turkey have been performed on cattle, sheep or dogs (Kenar and Özdemir, 2013). The number of studies conducted on Anatolian buffaloes is small and we believe that this study will make an important contribution to the literature. In Buffaloes although it is known that the *T. vitulorum* parasite exists, in Buffalo calves in Iğdır province there have not been any studies on *T. vitulorum*. In this study, our aim is to Buffalo calves in Iğdır province it is the investigation of the prevalence of *T. vitulorum*.

MATERIALS AND METHOD

The animal material of the study consists of 116 Buffalo calves up to 6 months with the necessary approval from private small-scale enterprises in Iğdır region between the years 2021-2022 (Figure 1).



Figure 1. Map of Turkey and map of Iğdır province

Stool samples were collected directly from the rectum using disposable latex gloves and placed in stool containers. Stool samples were brought to the laboratory on a cold chain. Then, the Fulleborn saturated salt solution method was applied to 116 samples (Kassai, 1999). Then it was examined under a microscope for *T. vitulorum*.

RESULTS AND DISCUSSION

116 of the samples, 2 (1.7%) had it was found to be positive for *T. vitulorum* (Figure 2).

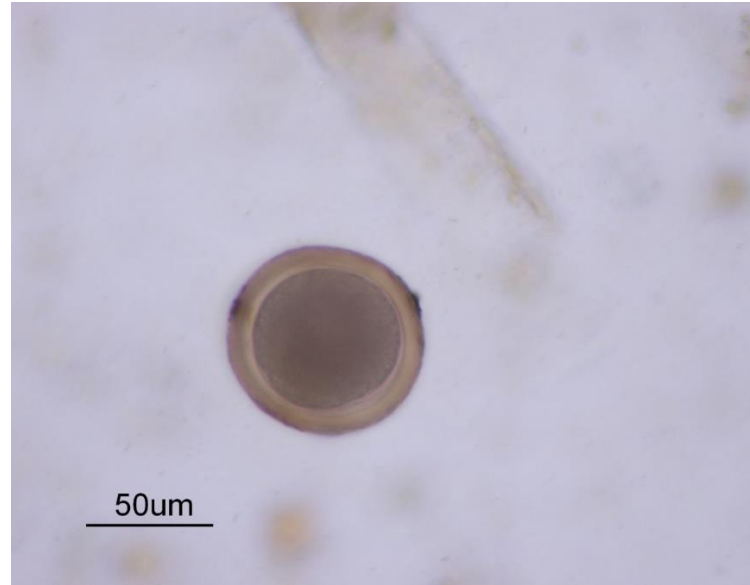


Figure 2. Microscopic image of a *T. vitulorum* egg

Ascaridiosis is observed in many tropical and subtropical regions with a humid climate. As the parasite can be transmitted directly, the presence of transmission through the placenta and milk makes it difficult to control the disease, and if the disease is not properly controlled, its prevalence can reach up to 100% (Çelik et al., 2022). Although *T. vitulorum* is considered one of the most pathogenic parasites of buffalo calves, it has been reported that there are rare data on ascaridiosis in buffaloes in the literature review. When studies are examined, toxocariasis infection is usually detected using stool examination methods and (Rast et al., 2013; Rizk et al., 2018; Gürler and gürler 2018), in addition, it is seen that the diagnosis was made by searching for parasite larvae in milk in newly-born buffaloes (Abdel-Rahman and El-Ashmawy, 2013). Worldwide, the infection rate has been reported between 25.5-34% in buffalo calves according to fecal analysis. In cattle from Turkey it is reported that *T. vitulorum* is found between 0.5-28.9% (Gürler and Gürler 2018). This work we have done is 1.7 T%. *T. vitulorum* has been detected. This result is included in the average values of the studies conducted.

According to Çelik et al. (2022), according to the research conducted they noted that there may be different prevalence rates in studies conducted in different parts of the World about *T. vitulorum*, and this value is on average 0.9% and 63%. The first detailed study on the prevalence of the disease in Turkey was conducted by Güralp et al. (1985) 0.8% positivity was reported, in addition, 16% and 17.7% in Van and 2.2% in Bursa, 0.63% in Samsun, 7.5% in Kars, 1.76% in Thrace, 28.96% in Hakkari, 1.1% and 22.2% in Erzurum, 0.28% in Konya for young people and 0.41% for adults and 0.83% in Afyon, respectively, according to the provinces in Turkey. they recorded it. In this research, 2 out of 116 feces were found positive in buffaloes aged 0-6 months in Iğdır province. This result, which is between the average rates in Turkey and the world, shows that the presence of this parasite has also been detected in the province.

The Turkvet data and the visited livestock enterprises showed that buffalo breeding was also carried out in this region. The fact that the public is not sufficiently aware of diseases, this issue is not carried out protection control, infectious diseases, especially parasitic infections, have become a province where it is seen intensively. We believe that the studies conducted on diseases are valuable in this sense.

CONCLUSION

As a result, it was concluded that this study conducted in buffaloes will shed light on other research and attract the attention of relevant units. Thus, every study carried out in Iğdır province on the need to take protection controls related to diseases and to raise public awareness is of importance in this work, as it is valuable. It is also thought that it will contribute to the literature.

CONFLICT OF INTEREST

No conflict of interest was declared by the authors.

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