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FIRST OCCURENCE OF *Thelazia callipaeda* IN FOXES (Vulpes vulpes L.) IN SERBIA

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Summary: Thelazia callipaeda is a vector-borne zoonotic eye worm, parasitizing at the conjunctiva sac of domestic and wild carnivores (dogs, cats, foxes, and wolves), and humans. Over the last decade, infection with that spirudida is increasingly occurring in dogs and cats in the numerous European countries including the Balkans area. In Serbia we also established infection with this parasites in foxes during 2014. Adult nematodes were retrieved from the conjunctival sacs of 3 animals (2 from Belgrade area and 1 from Braničevo district) hunted during control effect of oral vaccination of foxes against rabies. In total we extracted 23 parasites, 10 males and 13 females. This is the first report of autochthonous cases of *T. callipaeda* infection in red foxes in Serbia.

Keywords: foxes, Serbia, *Thelazia callipaeda*

Introduction

Thelazia callipaeda (Spirurida, Thelaziidae), is a nematode parasite that lives in the conjunctival sac of domestic and wild carnivores and humans (Rossi and Bertaglia,1989; Anderson,2000; Otranto and Dantas-Torres,2013). Parasites are also known as the "oriental eye worm" due to its geographical distribution in the former Soviet Republics and in many far eastern countries (Otranto and Dantas- Torres,2015). Infection cause the adult and larval stages (Anderson,2000) In the infected hosts, the presence of worms may induce different degrees of clinical signs, ranging from mild (e.g., conjunctivitis, epiphora, and ocular discharge) to severe (e.g., keratitis, and corneal ulcers and blindness) ocular disease. Over the last decade, infection with that parasites is increasingly occurring in dogs and cats in the numerous European countries (e.g., Italy, France, Germany, Switzerland, Spain, Portugal) (Rossi and Bertaglia,1989; Lia et al.,2000; Otranto et al.,2003a; Dorchies et al.,2007; Miró et al.,2011; Rodrigues et al.,2012). During last few years infection are established in the Balkans countries too (Serbia, Romania, Croatia, Bosnia and Herzegovina) (Hodžić et al.,2014; Mihalca et al.,2015). The first autochthonous cases of dogs and cats infection by *T. callipaeda* in Serbia established during 2012 (Gajić et al.,2014). At same time, we had report about its occurrence on foxes in Italy Switzerland and Bosnia and Herzegovina (Otranto et al.,2003a,2009; Malacrida et al.,2008; Hodžić et al.,2014). In Serbia we also established infection with thelazia in foxes and in this paper we reported first cases of autochthonous fox's thelaziosis on different localities in Serbia.

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Material and Methods

Throughout the realisation of the Project Fiche – IPA centrallised programmes for the Control/Eradication and Classical Swine Fever and Rabies in Republic of Serba, in period 2012-2014 were submitted the heads of hunted foxes to the review to determine the effect of oralne vaccination. During 2014, while opservation of heads of foxes, we established presence of adult nematodes from the conjunctival sacs of 3 animals (2 from Belgrade area and 1 from Braničevo district - Požarevac). The collected nematodes were fixed in glacial acetic acid and preserved in 70% ethanol. For further examination, parasites were cleared in lactophenol and nematodes were identified by its morphometric characteristics described by Skrjabin et al. (1967). Determinate of parasites measurement were performed by ocular micrometers. We measured body length and maximal width of adult parasites, number and position of postcloacal papillae and spicule length in males, as well as the position of the vulva in females. The numbers and measure of pre-cloacal and postcloacal papillae in males differ among species. Also, the location of the vaginal opening and the number of cuticular transverse striations differ among species and use to identification a thelazia species.

Results And Discussion

During our examination we collected 23 samples of T. Callipaeda - 10 males and 13 females (Table 1).

Table 1. Occurrence of *T.callipaeda* at foxes in Serbia

No	Locality	Parasite location	Number of parasites	
			total	* m / f
1	Belgrade	left eye	7	2 / 5
2	Belgrade	left eye	11	4 / 7
3	Požarevac	left eye	5	1 / 4

All parasites located in left eye of foxes (Figure 1).

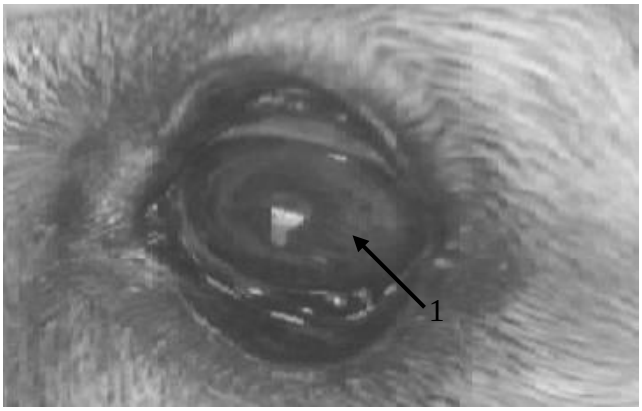

Figure 1. Thelazia callipaeda in fox eye

Worms are creamy white with non-segmented body and strong oral and anal part. In both, males and females, the corners of the mouth are without the lips and hexagonal consisting of two concentric rings of flattened papilla around a central aperture. They do not have sharp spines or hooks in the mouth or elsewhere on the body.

Male worms ranged from 10.21-13.46 mm in length, and 337-442 μm in width. All male worms had five pairs of postcloacal papillae on the ventral side of the body. The distance from the position of the cloaca to the end of the tail ranged from 71-83 μm. Right spicule was shorter and length ranged from 142-155 μm. Left spicule was much longer length, ranged from 1.423-1.779 mm (Figure 2).

Figure 2. Male tale of Thelazia callipaeda

Female worms ranged from 14.51-17.45 mm in length, and 401-433 μm in width. At female worms vulva was situated anterior to the oesophago-intestinal junction and the distance between the vulva and buccal extremity ranged from 567-632 μm in length (Figure 3).

Thelazia callipaeda (Spirurida, Thelaziidae) is an arthropod-borne disease. The worms are viviparous, and the first-stage larvae are passed by females into the lachrymal secretions where they are ingested by non-biting Diptera flies (Hong et al.,1988). Larval development takes place in the thorax and abdomen of the vector, and infective stages are present in 18–25 days. Development to the adult stage takes place without migration, and the prepatent period is between 3 and 6 weeks. The first stage larva of Thelazia is very short-lived in the lachrymal secretions, only surviving a few hours, and transmission depends upon the continuous presence of the vectors. For this reason, thelaziasis has a seasonal occurrence according to the seasonality of the intermediate hosts The expansion of this nematode is related to the occurrence of its vector, Phortica variegata (Drosophilidae, Steganinae), which is a lachrymophagous fly with a zoophilic behaviour (Otranto et al.,2005,2006). These flies buzz around the eyes of animals and humans at the daytime, finally landing on the eyes and releasing the infective larvae on the host conjunctiva (Otranto and Dantas-Torres,2015).

Figure 3. Female *Thelazia callipaeda*

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Conclusion

Our results are the first report of autochthonous cases of T. callipaeda infection in red foxes in Serbia and present important epidemiological data about spread of thelazia in Serbia

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