Case Report

TJVR 2020; 4 (2): 99-101

Turkish Journal of Veterinary Research

http://www.dergipark.gov.tr/tjvr

e-ISSN: 2602-3695

Ectoparasites detected on a red fox (Vulpes vulpes Linnaeus, 1758) in Turkey and the first case of Hippobosca longipennis (Diptera: Hippoboscidae)

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Received: 04.03.2020 Accepted: 19.03.2020

ABSTRACT

The aim of this case presentation is to report ectoparasites detected in one red fox. The adaptation of red foxes to urban environments and their increasing number result in an increased risk of transmission of some ectoparasites and pathogens originating from ectoparasites to humans and domestic animals. In this study, one red fox (*Vulpes vulpes*) which was after a traffic accident was examined for ectoparasites in the Clinic of Hatay Mustafa Kemal University, Faculty of Veterinary. A total 14 flies, 13 ticks and 4 fleas were collected from the red fox. As a result of the microscopic examinations of ectoparasites, *Hippobosca longipennis* (9 ♀, 5 ♂), *Rhipicephalus turanicus* (8 ♀, 5 ♂), *Ctenocephalides felis* (1 ♀) and *Pulex irritans* (2 ♀, 1 ♂) were identified. With this study, *Hippobosca longipennis* was recorded from foxes for the first time in Turkey.

Keywords: *Ectoparasite, Fly, Tick, Flea, Vulpes vulpes*

INTRODUCTION

The red fox (*Vulpes vulpes*) is a canid species which has adapted to various habitats and climate conditions. It has a long nose, large ears in comparison with its head size and a long tail with a white tip (Larivière and Pasitschniak-Arts, 1996). Red foxes, animals and human beings are the final hosts of numerous endoparasites including zoonosis pathogens such as *Echinococcus multilocularis* and *Toxocara canis* (Gıcık et al., 2009). Red foxes that have adapted to urban environments and are increasing in number are reported to carry the risk of transmitting some ectoparasites and ectoparasite-induced pathogens to humans and domestic animals (Kočišová et al., 2006).

The aim of this case presentation is to report ectoparasites detected in one red fox.

CASE

One young male red fox (*Vulpes vulpes*) was wounded after a traffic accident on the Antakya-İskenderun road was examined for ectoparasites in the Clinic of Hatay Mustafa Kemal University Faculty of Veterinary on 26.05.2018. As a result of the examination, a total 14 hippoboscid flies, 13 Ixodid ticks and 4 fleas were collected from the red fox and taken to the laboratory in glass bottles containing 70% ethyl alcohol. Ticks and hippoboscid flies from the ectoparasites brought to the laboratory were examined under stereo microscope. Fleas were examined under binocular light microscope after being made transparent in 10% KOH solution during one day and by passing through alcohol series (Girişgin et al., 2018). As a result of the examination carried out by taking into consideration the morphological criteria in the related literature (Iwasa and Choi, 2013; Estrada-Peña et al., 2018), *Hippobosca longipennis* (9 ♀, 5 ♂) from flies (Figure 1), *Rhipicephalus turanicus* (8 ♀, 5 ♂) from Ixodid ticks, *Ctenocephalides felis* (1 ♀) and *Pulex irritans* (2 ♀, 1 ♂) from fleas were identified.

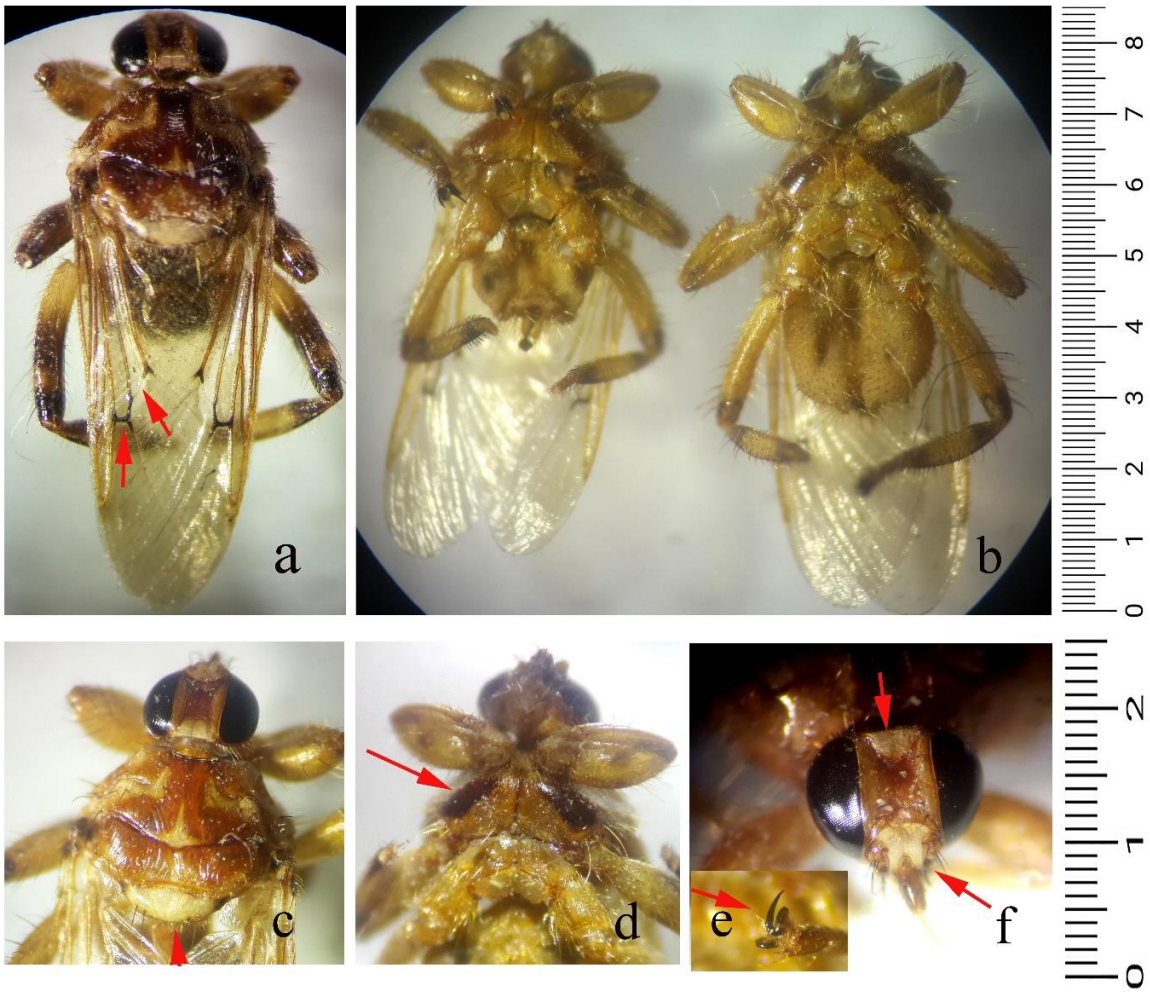

Figure 1. **a)** *Hippobosca longipennis* dorsal view, wing has two cross veins **b)** ventral view, left ♂, right ♀ **c)** Scutellum ivory-white **d)** Prosternum width greater than length **e)** nail structure **f)** The apical lobe of fronto-clypeus is regular and sharp triangular, the vertical plate on the medio-vertex has a semi-elliptical appearance, original

DISCUSSION

In studies that were conducted on red foxes around the world, cestodes, nematodes and trematodes (Letková et al., 2006; Gıcık et al., 2009; Jankovska et al., 2016) and protozoans such as *Hepatozoon canis* (Orkun and Nalbantoğlu, 2018) and *Isospora* spp. (Martínez-Carrasco et al., 2007) and various different louse, flea, tick, mite and fly species were reported (Sréter et al., 2003; Millán et al., 2007; Perrucci et al., 2016). In studies conducted in Turkey, *Ixodes kaiseri* (Orkun and Karaer, 2018), *Ixodes hexagonus*, *Haemaphysalis numidiana* (Aydın et al., 2011), *Haemaphysalis parva* (Orkun and Nalbantoğlu, 2018; Yaya et al., 2019), *Haemaphysalis sulcata*, *Haemaphysalis erinacei*, *Dermacentor reticulatus* (Yaya et al., 2019) *Rh. turanicus* (Orkun and Emir, 2019) tick species and *Ct. felis* (Aydın et al., 2011), *Ct. canis*, *P. irritans*, *Chaetopsylla globiceps* (Aydın et al., 2011; Yaya et al., 2019), *Chaetopsylla trichosa*, *Xenopsylla cheopis* and *Spilopsyllus cuniculi* (Yaya et al., 2019) flea species were reported to be found.

In the present study, four ectoparasite species, namely *H. longipennis*, *R. turanicus*, *Ct. felis* and *P. irritans* were identified in the red fox.

Hippobosca longipennis is a fly species which is extremely common in domestic dogs. This fly species, which can easily adapt to mild climates such as South Europe and the Mediterranean region, is a parasite that is originally found in wild carnivores in East Africa and is also commonly seen in foxes (Millán et al., 2007). The *R. turanicus* tick species, which shows a tendency to live in habitats in the Mediterranean region and across both Africa and Asia and uses various domestic and wild animals and sometimes even human beings for their developmental stage, is also seen in foxes (Millán et al., 2007; Chochlakis et al., 2014). The *Pulex* and *Ctenocephalides* flea species, which are important vectors of flea-based diseases, were determined in various carnivores, herbivores and omnivores mammals such as wild cats, canidae, skunks and badgers, Ground squirell, hares (Uslu et al., 2008; Dik and Uslu, 2018; López-Pérez et al.,

2018). In the present study, similar to various studies conducted around the world on red foxes, *Ct. felis* and *P. irritans* flea species were reported (Martínez-Carrasco et al., 2007; Foley et al., 2017).

In addition, the *R. turanicus* Ixodid tick, which is one of the ectoparasites determined in the red fox, was found in sheep, goat, cattle, red hawk (*Buteo rufinus*), fox and human beings (İnci et al., 2003; Ica et al., 2007; Açıcı et al., 2012; Oğuz et al., 2015; Gökpınar et al., 2017; Orkun and Emir 2019), while the *Ct. felis* (Aydın et al., 2011) and *P. irritans* (Aydın et al., 2011; Yaya et al., 2019) flea species were found in foxes (Aydın et al., 2011).

With this study, *H. longipennis* was determined for the first time in foxes in Turkey.

ACKNOWLEDGMENTS

Conflict of Interests: The authors declared that there is no conflict of interests.

Financial Disclosure: The authors declared that this study has received no financial support.

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