

The first case of traumatic myiasis caused by *Musca domestica* in a dog in Konya, Turkey

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Received: 20.03.2018 • Accepted/Published Online: 06.07.2018 • Final Version: 12.10.2018

Abstract: A case of traumatic myiasis caused by the *Musca domestica* (Linnaeus 1758) housefly was detected in a dog in Konya, Turkey. A 4-year-old Kangal breed dog injured in a traffic accident was brought to the surgery clinic of the Faculty of Veterinary Medicine at Selçuk University in Konya, Turkey for treatment. Several dipterous larvae were collected from the wound of the dog, placed in a petri dish with 70% ethanol, and sent to the parasitology laboratory for identification. The larvae were examined macroscopically. The specimens were identified as third-instar larvae of *M. domestica*. This is the first report of traumatic myiasis caused by *M. domestica* in a dog in Turkey.

Key words: Diptera, housefly, myiasis, *Musca domestica*, dog

1. Introduction

Myiasis is a parasitic infestation of a live mammal with dipterous larvae which, at least for a certain period, feed on the host's dead or living tissue, liquid substances, or ingested food (1–3). In myiasis cases, eggs or larvae of some flies in the order Diptera are deposited in wounds or nasal, oral, aural, anal, or gastrointestinal cavities of vertebrate hosts. The feeding activity of the larvae found in wounds may cause severe tissue damage, resulting in reproductive problems, blindness, lameness, and even death (4). Myiasis can be classified as obligatory, facultative, or accidental based on the type of host–parasite relationship, as well as dermal, cutaneous, gastric, nasal, auricular, anal, intestinal, etc., depending on the anatomical site where the larvae are located (3,5). There have been many studies conducted on myiasis caused by several Dipteran species throughout the world (1,2,4,6–9), including Turkey (10–14). Some flies belonging to the families Sarcophagidae, Calliphoridae and, rarely, Muscidae can cause traumatic myiasis, as well as nasal, genital, oral, and ocular infestation. *Wohlfahrtia magnifica* (Schiner 1862) and *Lucilia sericata* (Meigen 1826) in the families of Sarcophagidae and Calliphoridae, respectively, are the predominant agents of traumatic myiasis in humans and animals in Turkey (3).

Musca domestica (Linnaeus 1758), commonly known as the housefly, lives in houses and stables, typically in large numbers. These insects can cause irritation and

gastrointestinal and traumatic myiasis in humans and animals (1,2,5,7–9,15–21). *Musca domestica* larvae were found in the feces of 2 children who had loss of appetite, abdominal pain, diarrhea, occasional nausea, and vomiting in India with gastrointestinal myiasis (18). Ferraz et al. (17) reported a case of traumatic myiasis on the head of a patient in Brazil, caused by 3 dipteran species: *Chrysomya megacephala* (Fabricius 1794), *Sarcophaga ruficornis* (Fabricius 1794), and *M. domestica*. A total of 470 cases of myiasis were reported among dairy animals in Punjab, India, of which 3.8% were identified as *M. domestica* (22). Dehghani et al. (9) reported a case of wound myiasis caused by *M. domestica* in a Persian horned viper (*Pseudocerastes persicus*) in Iran; however, myiasis cases caused by *M. domestica* are rare. There has only been one report of myiasis caused by *M. domestica* in a child in Turkey (23). To date, no account of myiasis caused by *M. domestica* in dogs or other animals in Turkey has been described.

We present a case of traumatic myiasis caused by *M. domestica* in a dog in Konya, Turkey in this study. In addition, some misidentifications in the literature are discussed.

2. Case history

A 4-year-old Kangal breed dog, injured in a traffic accident, was brought for treatment to the surgery clinic of the Faculty of Veterinary Medicine of Selçuk University

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in Konya, Turkey in August 2017. During clinical examination, some larvae in a wound of the fore extremity were discovered and removed by the surgeon with forceps and preserved in 70% ethanol. A total of 5 larvae were sent to the parasitology laboratory for identification. The larvae (Figure 1) were cleared in 10% potassium hydroxide for 3 days, rinsed in distilled water for a few hours, transferred to 70% ethanol, and then stored in 99% ethanol. The specimens were examined morphologically, dissected under a stereo zoom microscope, and mounted on slides using Canada balsam. Based on the morphological characteristics of the anterior spiracles, cephaloskeleton, and posterior peritremes (Figures 2–4), they were identified as third-instar larvae of *M. domestica*.

3. Results and discussion

Wohlfahrtia magnifica and *L. sericata* are the main agents of traumatic myiasis of livestock in many European, African, and Asian countries (4,7), as well as in Turkey (3). Dogs are reportedly the most commonly affected animals. *Wohlfahrtia magnifica* were detected in 54 of 55 cases in Israel (7). Similarly, in myiasis cases detected in Konya Province of Turkey, dogs were found to be the most affected animals with *W. magnifica* and *L. sericata* detected as primary and secondary myiasis-causing agents, respectively (3). *Wohlfahrtia magnifica* was the predominant species in traumatic cases, detected in 11 cases, and *L. sericata* was detected in 9 cases in the corresponding report (3). However, it was reported that



Figure 1. Third-instar larvae of *Musca domestica* (original).

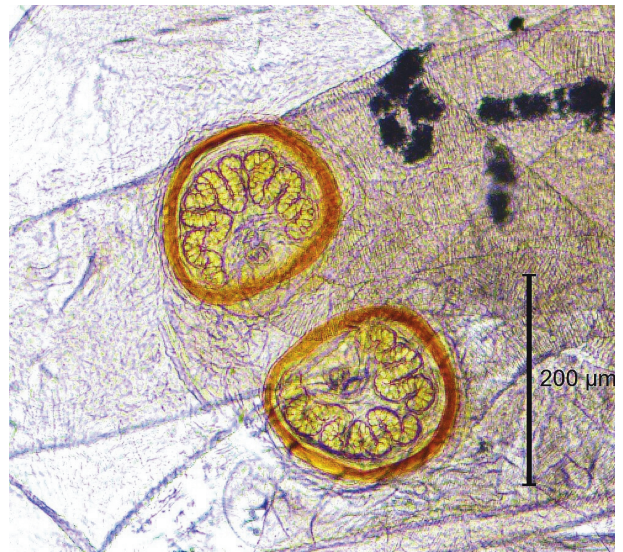


Figure 3. Posterior peritremes and slits of third-instar larvae of *Musca domestica* (original).

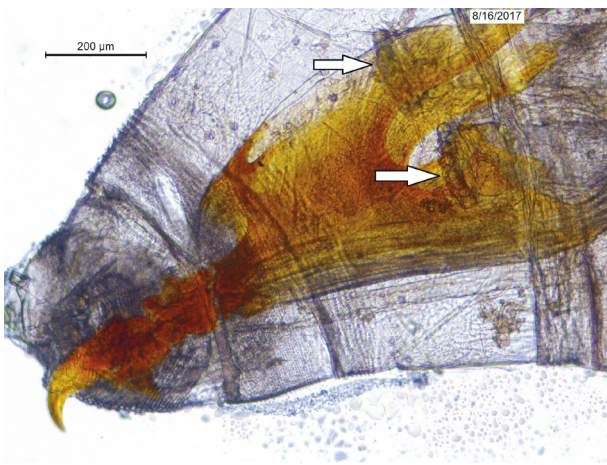


Figure 2. Cephaloskeleton and anterior spiracles (arrow) of third-instar larvae of *Musca domestica* (original).



Figure 4. Posterior peritremes and slits of third-instar larvae of *Musca domestica* (close-up) (original).

traumatic myiasis caused by *M. domestica* was very low (5.8%) in pet dogs in Punjab, India (24). Moreover, no myiasis cases caused by *M. domestica* in dogs or other animals in Turkey have been reported to date. In our case, several larvae of *M. domestica* were detected in the wound of a dog; therefore, this is the first report of traumatic myiasis caused by *M. domestica* in a dog in Turkey.

Musca domestica has been described as having the third-instar larva tapering anteriorly, anterior spiracles with 5 to 7 branches, and posterior peritremes, each with 3 tortuous slits (1). In the current study, the third-instar larva was pointed anteriorly (Figure 1), the anterior spiracles had 7 branches (Figure 2), and the posterior peritremes had 3 tortuous slits (Figures 3 and 4).

In previous studies conducted in Konya Province, several traumatic myiasis cases were reported in dogs, as well as in other animals and humans (3,25). No reports of myiasis caused by *M. domestica* in animals and humans in Turkey could be found, except in a study performed by Ucan et al. (23). However, there have been reports of myiasis caused by *M. domestica* in humans and animals throughout the world. Two gingival myiasis cases caused by *M. domestica* in children in India (8) and one gingival myiasis case in a human in Turkey (23) have been published. Nevertheless, the larvae in the figures in those papers do not resemble *M. domestica*. The authors did not provide any pictures of the anterior spiracles and posterior peritremes, which are the most important morphological characteristics used to identify the species of larva and their stages. Thus, it is very difficult to confirm the identity of the larvae and their stages in these previously published papers. Although the authors described the larvae as being early-stage larvae of *M. domestica*, they appear to be second- or third-instar larvae because the first-instar larvae of *M. domestica* are approximately 2 mm in length, thinner, and pointed in the anterior (1), unlike the figures presented in those papers. The larvae described appear more like that of Calliphoridae or Sarcophagidae.

Etiological agents of 2 intestinal myiasis cases in humans in India were stated to be *M. domestica* (21); however, the figure of the larvae in the manuscript does not resemble to *M. domestica* larvae but rather appear

to be Calliphorid or Sarcophagid because the larvae are thicker than that of *M. domestica*.

Dehghani et al. (9) reported that the fourth-instar larvae of *M. domestica* were found in a Persian horned viper in Iran, which is very interesting because *M. domestica* has 3 larval stages, there being no 4th stage in its life cycle. Therefore, while the authors correctly identified the species of larva, they misidentified the larval stage.

For identification of dipteran larvae, morphological characteristics such as cephaloskeleton, shapes and branches of anterior spiracles, and slits of posterior peritremes should be well known by the describer. If the larvae are still alive when they reach the laboratory, they can be grown to adult flies on organic matter or a liver in a jar or Petri dish at relative humidity (65%–85%) and temperature (25 °C–30 °C). This provides a more accurate method of confirming the identity of the larvae. However, the morphological characteristics of adult flies must be known to correctly identify the larvae once they have reached the adult fly stage. Some researchers (9,18) reared adult flies from larvae and verified their larval identifications. If the larvae could be recovered from the feces of patients, as in the study by Kandi et al., (18), the feces should be taken from the patient directly without insect contamination and examined quickly because some flies can lay eggs or larvae on feces after defecation, and these larvae can lead to subsequent misidentification of the original larval infestation. In the present study, it was impossible to rear adult flies from the larvae because the larvae had died while being transported to the laboratory.

For prevention of traumatic myiasis, wounds in the body of the host should be cleaned with an antiseptic solution and covered with gauze.

In conclusion, prior to this report, there had only been one traumatic myiasis case caused by *M. domestica* reported in Turkey; however, it was likely to be misidentified. Therefore, this is the first confirmed report of traumatic myiasis caused by *M. domestica* in a dog in Turkey. In a myiasis case, the larvae should be identified by an entomologist who is experienced on the subject. If the larvae are alive, some should be reared to the adult stage to verify larval identification.

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