

Myiasis in Animals and Humanbeings in Turkey

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Summary

This study was carried out to detect etiological agents of myiasis occurred in animals and humanbeings in Turkey, between the years of 2006-2010. Twenty-eight myiasis cases were examined in this period. Twenty-two of them were traumatic myiasis while two anal myiasis, two aural myiasis, one nasomyiasis and one oral myiasis were detected. Twenty-three cases were detected in the animals, while five cases occurred in the humanbeings. Five species; *Wohlfahrtia magnifica*, *Sarcophaga haemorrhoidalis*, *Lucilia sericata*, *Calliphora vicina* and *Eristalis tenax* were identified as etiological agent of the myiasis. *W. magnifica* was detected as predominant species in the traumatic myiasis cases. *L. sericata* was found as secondary agent in the all cases. The other species were detected in only one each case.

Keywords: Myiasis, *Wohlfahrtia magnifica*, *Sarcophaga haemorrhoidalis*, *Lucilia sericata*, *Calliphora vicina*, *Eristalis tenax*, Turkey

Türkiye'de Hayvanlarda ve İnsanlarda Myiasis

Özet

Bu çalışma Türkiye'de, insan ve hayvanlarda görülen miyaz olgularında miyaza neden olan türlerin belirlenmesi amacıyla 2006-2010 yılları arasında yapılmıştır. Bu süre içerisinde 28 miyaz olgusu incelenmiştir. Bu olguların 22'sini travmatik miyaz oluştururken, iki anal, iki aural, bir nasal ve bir de oral miyaz olgusu tespit edilmiştir. Hayvanlarda 23 miyaz olgusu saptanırken insanlarda beş miyaz olgusuna rastlanmış ve bu olgularda *Wohlfahrtia magnifica*, *Sarcophaga haemorrhoidalis*, *Lucilia sericata*, *Calliphora vicina* ve *Eristalis tenax* olmak üzere beş tür tespit edilmiştir. Travmatik miyaz olgularında *W. magnifica* baskın tür olarak saptanırken, onu ikinci baskın tür olarak *L. sericata* izlemiştir. Diğer türlere sadece birer olguda rastlanmıştır.

Anahtar sözcükler: Miyaz, *Wohlfahrtia magnifica*, *Sarcophaga haemorrhoidalis*, *Lucilia sericata*, *Calliphora vicina*, *Eristalis tenax*, Türkiye

INTRODUCTION

Myiasis is infestation of live humans and vertebrate animals 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. In myiasis cases, the eggs or larvae of some flies in the order Diptera may laid on the wounds or nasal, oral, genital and aural cavities. The feeding activity of the larvae found in the wounds may cause severe tissue damage, resulting in a loss of production, reproduction problems, blindness, lameness and even death ².

Myiasis can be classified based on the degree to which fly species are tied to a host. Three types of myiasis

are recognized; obligatory, facultative and accidental (pseudomyiasis) myiasis. Some flies are rarely involved in myiasis, whereas for others it is the only way of life ³. Also, it may classified traumatic, cavicole, cuticole, gastricole depending on the anatomical sites.

The flies that caused myiasis belonging to the families Calliphoridae, Sarcophagidae, Hypodermatidae, Oestridae and Gasterophilidae, especially. However, some species belonging to the other families such as Muscidae, Psychodidae etc. may cause myiasis rarely. The flies belonging to the Hypodermatidae, Oestridae and Gasterophilidae cause obligator myiasis in animals such as



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cattle, sheep and goat, and equids, respectively. However, these flies may cause accidental myiasis in humanbeings and the other animals ¹.

Wohlfahrtia magnifica in the family Sarcophagidae and *L.sericata* in the family Calliphoridae are predominant agents of traumatic myiasis in the humanbeings and animals in the worldwide. There are many studies relevant with myiasis cases in humanbeings and animals in the worldwide ^{1,2,4-8} and Turkey ⁹⁻³³.

It was stated that nosocomial oral myiasis caused by *Sarcophaga* sp. in a child ³², subungual myiasis caused by *Calliphora* sp in a women ¹¹, urogenital myiasis caused by *Psychoda albipennis* in a women ²⁰, nasomyiasis caused by *Sarcophaga* sp in a child ²⁷ and *W. magnifica* in a human-being ³⁴ were recorded in Turkey. It was also reported that vulvar myiasis ³¹, aural myiasis ^{9,12,34}, and furuncular myiasis ²⁶ caused by *W. magnifica* in the humanbeings in Turkey.

Traumatic myiasis were stated in dogs caused by *L. sericata* ¹⁷ and *W. magnifica* ³⁰. Oral myiasis cases caused by *L. sericata* in a dog ³⁵, cutaneous ¹⁸ and genital myiasis ²⁴ caused by *L.sericata* in a gazelle, ophthalmomyiasis caused by *L.sericata* in a cat ¹⁷ and caused by *Calliphora vomitoria* in a dog ²³ were reported in Turkey.

This study was performed to detect causing agent of myiasis in animals and humanbeings in Turkey. Obligator myiasis was not evaluated in this study.

MATERIAL and METHODS

In this study, a total of 28 myiasis cases were investigated to detect the etiological agents. The materials were obtained from wounds, aural ducts, oral and nasal cavities and anus in the animals and the humanbeings. In twenty of them, the larvae were collected from the wounds in the hospitalized animals in the clinics of our faculty. In three cases the larvae recovered from the animals in different cities were sent to us for identification. In remain five cases, the larvae removed from the wounds or cavities in humanbeings were sent to us for identification.

The larvae washed in distilled water and killed in alcohol 70% and cleared in KOH 10% for a few days. After that, they were dissected under the stereomicroscope and mounted on slides in Canada balsam. Species were identified depending on the morphological characters of the anterior spiracles, cephalo-pharyngeal skeleton and slits of the posterior spiracles in the peritrem. In some cases, when the larvae freshly collected from the host were reared to the adult stages and larval identifications were verified.

Chi-square test was applied for statistical analyses (P<0.05).

RESULTS

In this study, total 28 myiasis cases, 23 (82.14%) in the animals and five (17.86%) of them occurred in the humanbeings, investigated for etiological agents of myiasis. It was showed that the myiasis agents, hosts and their sexes, ages, anatomical sites found of the larvae in the host and locality in *Table 1*. Twenty-two of them were traumatic myiasis while two anal myiasis, two aural myiasis, one nasomyiasis and one oral myiasis were detected (*Table 1*). Five species; *Wohlfahrtia magnifica*, *Sarcophaga haemorrhoidalis*, *Lucilia sericata*, *Calliphora vicina* and *Eristalis tenax* were identified as etiological agent of the myiasis (*Table 1* and *2*). Most myiasis were determined (P<0.05) in the dogs when compare to other species. *W. magnifica* (*Fig. 1* and *2*) was detected as primer myiasis-causing agent, and *L. sericata* (*Fig. 3* and *4*) was found as secondary agent among the all cases. *C. vicina*,



Fig 1. *Wohlfahrtia magnifica* larvae in the wound in neck of the dog
Şekil 1. Köpek boynundaki yarada *Wohlfahrtia magnifica* larvaları

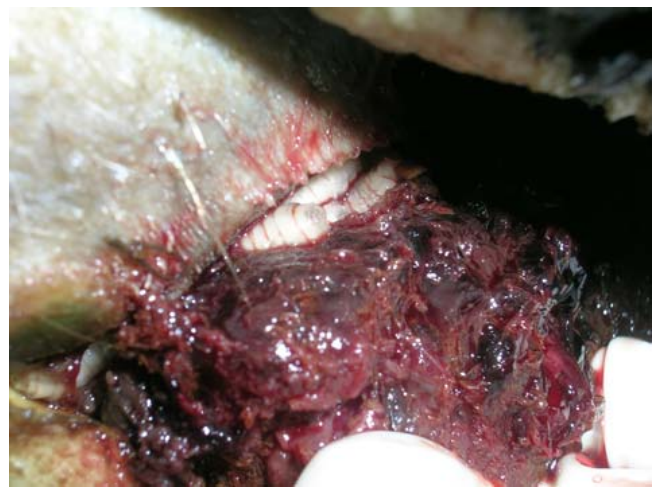


Fig 2. *Wohlfahrtia magnifica* larvae in interdigital region in the cattle
Şekil 2. Sığırdı, tırnak arasında *Wohlfahrtia magnifica* larvaları

Table 1. Myiasis cases occurred in animals and humanbeings in Turkey**Tablo 1.** Türkiye’de insan ve hayvanlarda görülen miyaz olguları

Case No	Kind of Myiasis	Myiasis Agent		Host				Date	Locality
		Species	Larval Stage	Species	Age	Sex	Anatomical Site		
1	Oral	<i>W. magnifica</i>	III	Sheep	?	♀	Oral cavity	13.03.2005	Kırıkkale
2	Traumatic	<i>W. magnifica</i>	III	Dog	1.5 y	♂	Genu	03.07.2006	Konya
3	Traumatic	<i>E. tenax</i>	III	Dog	?	♂	Perianal	09.07.2006	Nevşehir
4	Anal	<i>L. sericata</i>	III	Humanbeing	67 y	♀	Anus	27.07.2006	Konya
5	Nasal	<i>S. haemorrhoidalis</i>	III	Humanbeing	82 y	♂	Nasal cavity	28.07.2006	Konya
6	Traumatic	<i>L. sericata</i>	III	Cat	1 y	♂	Perianal	24.07.2006	Konya
7	Traumatic	<i>W. magnifica</i>	III	Dog	?	♂	Preputium	20.08.2006	Konya
8	Traumatic	<i>L. sericata</i>	III	Dog	6 y	♂	Preputium	08.09.2006	Konya
9	Traumatic	<i>W. magnifica</i>	III	Dog	?	♂	Shoulder	10.10.2006	Konya
10	Traumatic	<i>L. sericata</i>	III	Dog	2 y	♀	Head	28.05.2007	Konya
11	Aural	<i>W. magnifica</i>	III	Humanbeing	27 y	♂	Aural cavity	01.06.2007	Konya
12	Traumatic	<i>L. sericata</i>	III	Dog	?	?	Femoral	03.06.2007	Konya
13	Traumatic	<i>W. magnifica</i>	III	Dog	25 d	?	Ungular	06.06.2007	Konya
14	Traumatic	<i>W. magnifica</i>	III	Sheep	5 y	♀	Perianal	27.07.2007	Konya
15	Traumatic	<i>W. magnifica</i>	III	Sheep	4 y	♀	Udder	29.07.2007	Konya
16	Traumatic	<i>W. magnifica</i>	III	Goat	5 y	?	Neck	17.09.2007	Konya
17	Traumatic	<i>W. magnifica</i>	III	Dog	4 m	?	Femoral	21.09.2007	Konya
18	Traumatic	<i>C. vicina</i>	III	Cattle	15 d	♂	Tibial	21.04.2008	Konya
19	Traumatic	<i>L. sericata</i>	III	Cattle	20 d	?	Inguinal	28.05.2008	Konya
20	Traumatic	<i>W. magnifica</i>	III	Dog	3 y	♂	Pad	02.06.2008	Konya
21	Traumatic	<i>L. sericata</i>	I	Carrion Crow	?	?	Abdominal	27.07.2008	Burdur
22	Anal	<i>W. magnifica</i>	II	Dog	6 m	?	Anus	29.08.2008	Konya
23	Traumatic	<i>S. haemorrhoidalis</i>	II, III	Humanbeing	64 y	♂	Facial	01.09.2008	Kırıkkale
24	Aural	<i>W. magnifica</i>	III	Humanbeing	82 y	?	Aural cavity	07.09.2009	Konya
25	Traumatic	<i>W. magnifica</i>	III	Cattle	3 y	♀	Interdigital	27.09.2009	Konya
26	Traumatic	<i>L. sericata</i>	III	Dog	?	?	Perianal	17.05.2010	Konya
27	Traumatic	<i>L. sericata</i>	II, III	Long-legged Buzzard	?	?	Humeral	17.05.2010	Konya
28	Traumatic	<i>W. magnifica</i> <i>L. sericata</i>	II, III III	Dog	5 y	♀	Perianal	17.08.2010	Konya

?: Unknown, d: day, m: month, y: year

S. haemorrhoidalis and *E. tenax* were only detected in a one each case. *W. magnifica*, and *L. sericata* were detected in eleven cases and in nine cases, respectively as myiasis-causing agent in the traumatic myiasis cases.

DISCUSSION

There are many literatures about myiasis in animals or humanbeings in the worldwide ^{1,2,5,7,8,36}. Zumpt ¹ explained information in his valuable paper about myiasis occurred in man and animals. Dinçer ³⁴ reviewed and summarized myiasis cases reported in animals and humanbeings in Turkey up to 1997. According to Dinçer, the authors were detected *W. magnifica*, *Protophormia terrae-novae* and *Oestrus ovis* in aural myiasis, *E. tenax* (= *Tubifera tenax*) and *W. magnifica* in nasal myiasis and, *P. terrae-novae* in wound myiasis cases in the humanbeings as myiasis-causing

agent in Turkey. Later, case reports relevant myiasis in either animals or humanbeings had increased in the country. It was stated that *W. magnifica* ^{12,26,30,34,37} and *L. sericata* ^{17,18,24,33,35} were detected as predominant species most of the cases.

It was stated that *W. magnifica* is an obligate species causing to myiasis, and cause of traumatic myiasis on livestock in many European, African and Asian countries ^{2,38,39}. Farkas et al. ² reported that wound myiasis of sheep was a severe problem in Hungary and *W. magnifica* was the major cause while *L. sericata* was involved as a secondary cause of wound myiasis. Schnur et al. ⁸ examined 78 wound myiasis cases in animals in Israel. It was reported that the larvae of *W. magnifica* were collected from 54 dogs, one cat, two camels, five goats, three sheep and three horses. In addition to this, the larvae of *L. sericata* from one dog, three cats, two sheep and one horse were collected ⁸. Şaki

Host	Kind of Myiasis					Total
	Anal Myiasis	Traumatic Myiasis	Nasal Myiasis	Oral Myiasis	Aural Myiasis	
Humanbeings	1 <i>L. sericata</i>	1 <i>S. haemorrhoidalis</i>	1 <i>S. haemorrhoidalis</i>	-	2 <i>W. magnifica</i>	5 ^B
Dog	1 <i>W. magnifica</i>	12 * <i>W. magnifica</i> (8) <i>L. sericata</i> (4) <i>E. tenax</i> (1)	-	-	-	13 ^A
Cat	-	1 <i>L. sericata</i>	-	-	-	1 ^B
Sheep	-	2 <i>W. magnifica</i>	-	1 <i>W. magnifica</i>	-	3 ^B
Goat	-	1 <i>W. magnifica</i>	-	-	-	1 ^B
Cattle	-	3 <i>W. magnifica</i> (1) <i>L. sericata</i> (1) <i>C. vicina</i> (1)	-	-	-	3 ^B
Long-legged buzzard	-	1 <i>L. sericata</i>	-	-	-	1 ^B
Carrion Crow	-	1 <i>L. sericata</i>	-	-	-	1 ^B
Total	2	22	1	1	2	28

* *W. magnifica* and *L. sericata* were detected together in a case (case no: 28)
A, B: Different letters in the same column are statistically significant (Chi-square test, $P < 0.05$)



Fig 3. *Lucilia sericata* larvae in the wound in the wing of Long-legged buzzard

Şekil 3. Kızıl Şahin'in kanadındaki yarada *Lucilia sericata* larvaları

and Özer²⁵ reported that 52 myiasis cases, out of 47 were detected in sheep and the others in cattle. *W. magnifica* in the 51 cases and *L. sericata* in the one case were observed as myiasis-causing agent²⁵. In this study, *W. magnifica* was found as predominant myiasis-causing agent and, the larvae of *W. magnifica* was detected in 15 cases and *L. sericata* followed it as secondary cause and the larvae of *L. sericata* was detected in ten cases. Myiasis cases



Fig 4. *Lucilia sericata* larvae on the face in the dog

Şekil 4. Köpeğin yüzünde *Lucilia sericata* larvaları

observed in the animals, especially ($P < 0.05$) in the dogs, were formed a major part of the all myiasis cases examined in this study (Table 2); however, five cases occurred in humanbeings. Most of the cases were traumatic myiasis and except a case observed in humanbeing, all of the 22 traumatic cases which were detected in the animals. The other myiasis cases were generally detected in humanbeings, however, two cases; one out of in a sheep and the other in a dog were seen. Aural myiasis were detected in two cases while the nasal, anal and traumatic

myiasis was occurred in one case in the humanbeings.

Schnur et al.⁸ reported that the dogs were the most commonly affected animals and 54 out of 55 cases, the larvae retrieved were all *W.magnifica* in their study. In the other case concerned a dog with both *L. sericata* and *Chrysomya albiceps*. In the same study, of the four cats, three had infestation of *L. sericata* and the other one had *W. magnifica*. In this study, the dogs were the most affected animals and 13 dogs had myiasis. While *W. magnifica* was detected as primarily myiasis-causing agent, *L. sericata* was found the secondary agent in the dogs. Of the other myiasis cases occurred in the animals, three in sheep, three in cattle, one in cat, one in goat, one in Carrion crow and one in Long-legged buzzard were observed. In the humanbeings, *Sarcophaga haemorrhodialis* in two cases, *Wohlfahrtia magnifica* in two cases and *L. sericata* in a one case was detected as myiasis-causing agent.

W. magnifica was predominant species in the traumatic cases and it was seen in eleven cases, secondary myiasis-causing agent *L. sericata* was detected in nine cases. The larvae of *W. magnifica* were found at both traumatic myiasis and the other myiasis cases such as oral and aural myiasis. Except a single case which was detected in anal cavity of a humanbeing, all of *L.sericata* was occurred in traumatic cases.

It was observed that the third stage larvae were found in the most of the cases, however, first stage larvae in a case, second instar larvae in a case, and both second and third stages larvae together with in a case were detected. Generally, it was detected a single species in the all cases except a case in a dog which was infested both second and third stages larvae of *W. magnifica* and third stage larvae of *L. sericata*.

In conclusion, myiasis is a problem in animals and humanbeings especially living in rural area, traumatic myiasis is common in animals and primer agents of tarumatic myiasis are *W. magnifica* and *L. sericata* in Turkey.

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