

Presence of *Gasterophilus* Species in Arabian Horses in Sanliurfa Region

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SUMMARY: In this study, ivermectin was administered orally to 12 Arabian horses for detection of *Gasterophilus* species in the Sanliurfa region between June-July 2006. Eleven (9.82%) Arabian horses were found to be infected by larvae of *Gasterophilus* spp. A total of 409 third stage larvae (L3) were collected from fecal samples. In the Sanliurfa region, the prevalence of three species of *Gasterophilus* was identified as follows: *Gasterophilus intestinalis* (6.25%), *G. nasalis* (2.67%) and *G. pecorum* (0.89%).

Key Words: *Gasterophilus*, Arabian horse, Sanliurfa

Şanlıurfa Yöresindeki Arap Atlarında Tespit Edilen *Gasterophilus* Türleri

ÖZET: Bu çalışmada, *Gasterophilus* türlerini belirlemek için Haziran-Temmuz 2006 tarihleri arasında Şanlıurfa yöresinde bulunan 12 Arap atına oral yolla ivermectin uygulanmıştır. 11 at (%9,82) *Gasterophilus* türü larvalarıyla enfeste bulunmuştur. İncelenen dışkı örneklerinden toplam 409 adet üçüncü dönem (L3) larva elde edilmiştir. Şanlıurfa yöresinde üç *Gasterophilus* türü teşhis edilmiş ve dağılımları; *Gasterophilus intestinalis*%6,25, *G. nasalis* %2,67 ve *G. pecorum*%0,89 olarak bulunmuştur.

Anahtar Sözcükler: *Gasterophilus*, Arap atı, Şanlıurfa

INTRODUCTION

The genus *Gasterophilus* (Diptera, Oestridae) includes nine species. Larvae of the flies cause gastrointestinal myiasis in equids. They are present for about 10 months in different regions of the equid gastrointestinal tract (7, 11, 12, 23).

The larval stages of *Gasterophilus* are obligate parasites in the gastrointestinal tract of horses. They are currently worldwide distribution and originally from Palaearctic and Afrotropical regions (19, 22).

Gasterophilosis is characterized by difficulties in swallowing, gastrointestinal ulcerations, gut obstructions or volvulus, rectal prolapses, anemia, diarrhea and digestive disorders (12, 14, 17, 19). In addition to their significance as parasites of horses, there are reports of human myiasis associated with *Gasterophilus* spp. larvae. Subcutaneous-creeping or ophthalmo-myiasis by *Gasterophilus* spp. first and second stage larvae (L1, L2) have been reported by James, (6) and Royce *et al* (16).

The presence of *Gasterophilus* species has been investigated in different countries such as Belgium (1), Ireland (21), France (3) and Germany (15) between the rates of 43 and 69%, respectively.

Only six *Gasterophilus* species were detected in Turkey, namely *Gasterophilus intestinalis*, *G. nasalis*, *G. hemorrhoidalis*, *G. inermis*, *G. nigricornis* and *G. pecorum*. Data on the presence and prevalence of *Gasterophilus* species in Turkey are limited. Although Gasterophilosis has been studied in Turkey, no information is available for Arabian horses (10, 18).

Arabian horse breeding is very important in Sanliurfa region and the total horse population is approximately 2500 according to 2006 data. Of this number about 2000 were Arabian horses and remaining were 500 crossbred (2).

The aim of the present study was to determine the presence of *Gasterophilus* species in Arabian horses from Sanliurfa district, Southeastern Anatolian region of Turkey.

MATERIALS AND METHODS

This study was conducted in Sanliurfa district (37.1°N, 38.8°E). The area has a continental climate and the average altitude is approximately 600 m above the sea level.

The slaughter study for the diagnosis of *Gasterophilus* spp. larvae is difficult and expensive because the horse meat has not been consumed in Turkey. Thus, current research has been based on application of antiparasitic drug (ivermectin).

All the horses were varying ages (1-21 years), both sex (28 male and 84 female) and breeding types (72 Stallion and 40 non-stallions). Age, localization, breeding system and sex of each horse were recorded. Between June-July 2006, oral ivermectin (Equimax® paste, Virbac corp.) at dose rate of 0.2

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mg/kg was administered to 112 Arabian horses. Any anti-parasitic medication and copro-parasitological examination were not administered to all horses during one year.

Gasterophilus larvae were collected and counted from two days the all fecal samples of each horse after from ivermectin administration. All larvae collected were washed in saline solution (NaCl 0.9%) and identified using a stereo-microscope (Olympus-SZ4045TR) with magnification capacity from 6.7X to 40X. Larvae were identified on the basis of peritreme structures and arrangement of the spines on the surface of the segments. After identification the larvae were stored in 70% ethanol.

Arabian horse naturally infested with *Gasterophilus* spp. for slaughter studies is often difficult and expensive since horse meat has not been consumed in Turkey. Thus, current research has been based on application of antiparasitic drug (ivermectin).

Differences among prevalence in relation to sex, age and breeding types classes were tested by Chi square test and the differences were considered to be significant when $P < 0.05$.

RESULTS

Gasterophilus spp. larvae were found in 11 of 112 Arabian horses (9.82%). The number and percentage of positive and negative Arabian horses, grouped according to age, sex and breeding types are shown in Table 1.

Table 1. Number and percentage of positive and negative Arabian horses grouped according to age, sex and breeding type

Parameters		Positive		Negative		Total	
		No	%	No	%	No	%
	Horses	11	9.82	101	90.18	112	100
Age	1-3 yrs	2	15.38	11	84.62	13	11.60
	>3 yrs	9	9.09	90	90.91	99	88.40
Sex	Male	1	3.57	27	96.43	28	25.00
	Female	10	11.90	74	88.10	84	75.00
Breeding type	Stallion	4	5.55	68	95.45	72	64.28
	Non-stallion	7	17.5	33	82.5	40	35.72

Table 2. Number and percentage of *Gasterophilus* species in Arabian horses and number of larvae for each species

Species	Horse infested		Larval number	
	No	%	No	%
<i>G. intestinalis</i>	7	63.63	372	90.95
<i>G. nasalis</i>	3	27.27	34	8.31
<i>G. pecorum</i>	1	9.10	3	0.74
Total	11	100.00	409	100.00

Three *Gasterophilus* species were determined in infested horses. *Gasterophilus intestinalis* was the most common species (63.63%) followed *G. nasalis* (27.27%) and *G. pecorum* (9.10%). A total of 409 third stage bot fly larvae (L3) were determined from fecal samples (n=112) (Table 2).

In each infested animal, only a species of *Gasterophilus* was found. The minimum and maximum numbers of larvae in a single horse varied from 3 to 83. In the majority of the horses (63.63%), it was harvested less than 50 larvae.

There was no significant difference in larval prevalence or abundance between male and female Arabian horses for gasterophilosis. Similarly, there was no evidence of any association between age of the host and the numbers of *Gasterophilus* larvae. But, there was significant difference in breeding type between stallion and non-stallion ($P < 0.05$).

DISCUSSION

The prevalence of *Gasterophilus* spp. has been investigated in different countries. Infestation with larvae of *Gasterophilus* spp. is widespread in horses in the world (1, 3-5, 7-9, 13, 20, 21).

The prevalence of gasterophilosis in Sanliurfa (9.82%) is lower than reported in Belgium (58%) England and Wales (52.7%), France (34%) but is similar to those of Germany (8.7%), Sweden (12.3%) and Israel (11.1%) respectively (1, 3-5, 15, 20). This low prevalence may be explained to the current extensive use of anti-parasitic drugs with larvicidal activity. Similarly, decline in bot populations has been reported in many parts of the world for the past 25 years due to the use of organophosphates in early years, and more recently, extensive treatment of equids with ivermectin and moxidectin (9). Prevalence and larval burdens of *Gasterophilus* in different countries are probably due to climatic differences or to different animal husbandry methods.

In Sanliurfa, the summer temperatures reach above 35 °C from May to September, while winter temperatures average 10-15 °C in January. This suggests that fly activity continues throughout all seasons. It is well known that prevalence of *Gasterophilus* species is influenced by seasonal factors and geographical location. Furthermore, this prevalence may be strongly influenced by the use of antiparasitic drugs of broad spectrum against other parasitic infections (19). Our results were at lower than other studies (1, 3-5, 20). This can be originated from different examination methods (fecal & necropsy).

There was significant difference in breeding type between stallion horses and non-stallions ($P < 0.05$) for gasterophilosis. The differences may be explained by management factors. Non-stallion horses have been grazed outside all day. However, stallions are mostly kept in shelters.

In conclusion; it was not found a large number of *Gasterophilus* larvae (9.82%) at fecal examination in Arabian horses from Sanliurfa district. However, antiparasitic treatment of gasterophilosis is necessary for Arabian horses and other equids such as donkeys, mules and colts at least once a year in the same region.

REFERENCES

1. Agneessens J, Engelen S, Debever P, Vercruyse J, 1998. *Gasterophilus intestinalis* infections in horses in Belgium. *Vet Parasitol*, 77: 199-204.
2. Anonim, 2006. Şanlıurfa Tarım İl Müdürlüğü, Hayvan Sağlığı Şube Müdürlüğü (Kişisel Görüşme).

3. **Bernard N, Collobert C, Tariel G, Lamidey C**, 1994. Epidemiological survey of bot infection in horses at necropsy in Normandy from April 1990 to March 1992. *Rec Med Vet*, 170: 231-235.
4. **Edwards GT**, 1982. The prevalence of *Gasterophilus intestinalis* in horses in northern England and Wales. *Vet Parasitol*, 11: 215-222.
5. **Hoglund J, Ljungstrom BL, Nilsson O, Lundquist H, Osterman E, Uggla A.**, 1997. Occurrence of *Gasterophilus intestinalis* and some parasitic nematodes of horses in Sweden. *Acta Vet Scand*, 38: 157-165.
6. **James MT**, 1947. *The flies that cause myiasis in man*. U.S. Dept. Agric., Miscel. Pub No: 631, Washington DC.
7. **Kettle DS**, 1993. *Medical and Veterinary Entomology*. CAB International, Wallingford, UK. p. 262-284.
8. **Lyons ET, Swerczek TW, Tolliver SC, Bair HD, Drudge JH, Ennins LE**, 2000. Prevalence of selected species of internal parasites in equids at necropsy in central Kentucky (1995-1999). *Vet Parasitol*, 92: 51-62.
9. **Lyons ET, Tolliver SC, Drudge JH, Swerczek TW, Crowe MW**, 1987. Common intestinal parasites found in the stomach, large intestine and cranial mesenteric artery of thoroughbreds in Kentucky at necropsy (1985-1986). *AJVR*, 48: 268-273.
10. **Mimioglu M**, 1973. *Veteriner ve Tibbi Artropodoloji*. Ankara Üniv Vet Fak Yayın No: 295. p. 152-158.
11. **Mukbel R, Torgorson PR, Abo-Shehada M**, 2001. Seasonal variations in the abundance of *Gasterophilus* spp. larvae in donkey in northern Jordan. *Trop Anim Health Prod*, 33: 501-509.
12. **Otranto D, Milillo P, Capelli G, Colwell DD**, 2005. Species composition of *Gasterophilus* spp. (Diptera, Oestridae) causing equine gastric myiasis in southern Italy: Parasite biodiversity and risks for extinction. *Vet Parasitol*, 133: 111-118.
13. **Pandey VS, Ouhelli H, Elkhalfane A**, 1980. Observations on the epizootiology of *Gasterophilus intestinalis* and *G. nasalis* in horse in Morocco. *Vet Parasitol*, 7: 347-356.
14. **Principato M**, 1988. Classification of the main macroscopic lesions produced by larvae of *Gasterophilus* spp. (Diptera: Gastrophilidae) in free-ranging horses in Umbria. *Cornell Vet*, 78: 43-52.
15. **Ribbeck R, Heide H, Schicht W, Heipe T**, 1983. Contribution to the parasitic fauna of the GDR (German Democratic Republic) 7. Occurrence of *Gasterophilus* larvae (Diptera: Gastrophilidae) in horses. *Angew Parasitol*, 24: 39-49.
16. **Royce LA, Rossignol PA, Kubitz ML, Burton FR**, 1999. Recovery of a second instar *Gasterophilus* larva in a human infant: a Case Report. *Am J Trop Med Hyg*, 60: 403-403.
17. **Sandin A, Skidell J, Haggstrom J, Girma K, Nilsson G**, 1999. Post-mortem findings of gastric ulcers in Swedish horses up to one year of age: a retrospective study 1924-1996. *Acta Vet Scand*, 40: 109-120.
18. **Sayin F, Mimioglu M**, 1968. Türkiye'de tek tırnaklılarda bulunan *Gasterophilus* türleri üzerine araştırmalar. *Ank Üniv Vet Fak Derg*, 14: 75-91.
19. **Sequeira JL, Tostes RA, Oliveira-Sequeira TC**, 2001. Prevalence and macro- and microscopic lesions produced by *Gasterophilus nasalis* (Diptera: Oestridae) in the Botucatu Region, SP, Brazil. *Vet Parasitol*, 102: 261-266.
20. **Sharir B, Pipano E, Markovics A, Danieli Y**, 1987. Field studies on gastrointestinal infestation in Israeli Horses. *Isr J Vet Med*, 43: 223-227.
21. **Sweeney HJ**, 1990. The prevalence and pathogenicity of *Gasterophilus intestinalis* larvae in horses in Ireland. *Irish Vet J*, 43: 67-73.
22. **Wall R, Shearer D**, 1997. *Veterinary Entomology, Arthropod Ectoparasites of Veterinary Importance*. First ed. Chapman & Hall, London. pp. 197-226.
23. **Zumpt F**, 1965. *Myiasis in Man and Animals in the Old World*. Butterwoths, London, UK. pp. 111-128.