Gasterophilosis in Turkmen horses caused by *Gasterophilus pecorum* (Diptera, Oestridae)

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**Abstract.** *Gasterophilus* spp. (Diptera, Oestridae) are known as botflies and their larvae cause gastrointestinal myiasis in equids. In February 2015, nine mares from a free-range herd of 80 Turkmen horses in northeastern Iran became acutely ill and died. To determine the cause of death all of them were necropsied. In gross examination of gastrointestinal tract, numerous botfly larvae attached to mucosal surface of esophagus and nonglandular part of the stomach were observed. All animals necropsied were infested with these larvae. Parasitological examination showed the larvae were third stage larvae of *Gasterophilus pecorum*. This is the first record of this botfly species in horses from Iran. Although these larvae were not determined as the causative agents of acute illness and death, but with regard to their adverse health effects, treatment of horses and donkeys with macrocylic lactones was recommended in infested areas.

**Keywords:** *Gasterophilus pecorum*; Esophageal and gastric myiasis; Turkmen horse; Iran.

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**Introduction**

The Turkmen horse is the most important and valuable horse breed in Turkmenistan, Kazakhstan, Afghanistan and northern Iran. This breed is a tall, bony horse with large head and ears. In Iran, Turkmen horses are raised in northeastern country and used for long distance races due to their great speed and endurance in hard and long routes (Hendricks, 2007).

With all the values that this breed of horse has, parasites are important issues that always threaten the horse industry incomes and cause major economic losses (Touré, 1994). *Gasterophilus* is a genus of obligatory myiasis-causing flies in the family Oestridae and known as horse bot fly. Worldwide, there are nine different species of this genus which their larvae cause inflammation and ulceration by attaching to gastrointestinal mucosa of the host and produce gastrointestinal myiasis. *Gasterophilus pecorum* is a parasite specific to horses, donkeys and zebras (Zumpt, 1965). While bot flies such as *G. intestinalis*, *G. nasalis*, *G. haemorrhoidalis* and *G. inermis* usually lay eggs on the surface of the horse's body, *G.*
pecorum is an exception that lays its eggs on vegetation that is subsequently consumed by the horse (Gunn, 2012). The larvae of G. pecorum have three instars. The first instar larvae come out from the eggs in the mouth after the eggs have been consumed and penetrate the mucosal membrane of the mouth. After burrowing in tongue, lip, gum and hard palate they reach to the root of tongue and soft palate (Zumpt, 1965). The first-stage larvae may settle in the root of tongue and soft palate or attach to the walls of the pharynx, esophagus or stomach for 9-10 months until fully developed (Taylor et al., 2007). The third instar larvae are barrel-shaped with the length of 16 to 20 mm that are usually found clustered together. They use their sharp sickle shaped mouth hooks to attach the wall of digestive tract. The attachments of the larvae induce inflammatory reactions that result in ulceration (Gunn, 2012). Finally, fully developed larvae (L3) will detach from the attachment sites and pass out with the faces (Taylor et al., 2007). G. pecorum has the most pathogenic larvae among Gasterophilus species. In the esophagus, larvae induce inflammatory reactions that with enough numbers of larvae will result in constriction of esophagus that could be sufficient enough to be fatal (Taylor et al., 2007). In the current paper occurrence of gasterophilosis caused by third stage larvae of G. pecorum in a herd of Turkmen horses is reported from Iran.

Presentation of the case

In February 2015, nine mares from a herd of 80 Turkmen horses died over a period of two weeks in Maneh and Samalghan County (37.116667°N, 56.066667°E) located in the North East of Iran. These horses were grazed on the pasture without extra feed. The owner of the herd raised these racing horses for sale. The illness began with lack of appetite and loss of weight. Consequently, the sick horses became recumbent and died two or three days after recumbency. To determine the cause of death, all dead animals were necropsied systematically. In gross examination of gastrointestinal tract, numerous botfly larvae attached to mucosal surface of esophagus and non-glandular part of the stomach were observed (figure 1). All animals necropsied were infested with the larvae. A number of these larvae from each animal were detached and transferred to separate tubes containing ethanol 70%. The specimens were sent to parasitology laboratory of Faculty of Veterinary Medicine, Ferdowsi University of Mashhad, Iran. It is noteworthy that gross lesions including ulcers and erosions were observed in the attachment site of each larva but no perforations were seen (figure 2).

![Figure 1](image-url)  
**Figure 1.** Blood red color botfly larvae attached to lower part of esophagus (A) and non-glandular part of stomach (B) in autopsied horses.
Results and discussion

Identification of larvae in laboratory was performed using a stereomicroscope and based on criteria presented by Soulsby (1982). The examined larvae were third stage larvae of *G. pecorum*. This horse botfly species is still unknown in Iran and so far no sufficient attention has been paid to it. Despite having hundred thousands equids distributed in different climatic conditions in Iran, the published data about their parasites is scant. According to Zumpt (1965) *G. pecorum* have been distributed over Africa, Europe and the Palearctic parts of Asia. But up to now there is no report of infestation with this bot fly species in horse from Iran and this is the first record of it. *G. pecorum* larvae also have been found recently in stomach of Persian onager (*Equus hemionus onager*) in Khartouran National Park, Iran (Zaheri et al., 2014). Tavassoli and Bakht (2012) necropsied 49 donkeys, four horses and three mules from different regions of Iran and showed infestation of these animals with *G. nasalis, G. intestinalis* and *G. inermis* larvae but no *G. pecorum* larva was found. Horse infestation with *G. pecorum* larvae has been reported from Kazakhstan, Turkey, China, Italy and Namibia (Krecek et al., 1995; Otranto et al., 2005; Gokcen et al., 2008; Wang et al., 2014; Ibrayev et al., 2015). Accurate determination of infestation with botflies in equids usually requires post-mortem examination and presumably this is the main reason that why there is limited data on epidemiological aspects of gastrointestinal myiasis caused by these botflies.

We found *G. pecorum* larvae attached to lower half of the esophagus and non-glandular part of stomach in post-mortem examination and these findings were in agreement with Zumpt (1965). The third-stage larvae of *G. pecorum* larvae were recovered from the non-glandular region of the stomach of horses in Italy (Otranto et al., 2005). Unlike the present study, in the latter study the larvae have not been found in esophageal wall. The third-stage larvae of this fly species also have been recorded attached to soft palate of a pony in UK (Smith et al., 2005).

The free-ranging horses necropsied in the present study grazed in a region with hot summers and cold winters and all of them were infested with third stage larvae of *G. pecorum*. Without any doubt climatic conditions influence presence and prevalence of *Gasterophilus* species in a certain geographical region. Based on review literature, it seems that this fly species is more prevalent in areas with continental climate like Kazakhstan and Xinjiang in China (Wang et al., 2014; Ibrayev et al., 2015). One exception is low prevalence of this fly species in Sanliurfa Region in Turkey reported by Gokcen et al. (2008) despite having continental climate. This discrepancy can be attributed to different methodology, which used in this study. Two study in Italy with Mediterranean-type climate showed *G. pecorum* was considerably less frequent compared to *G. intestinalis, G. nasalis* and *G. inermis* (Principato, 1989; Otranto et al., 2005). However more epidemiological data is needed to prove this hypothesis.
Although in the mentioned herd the larvae of *G. pecorum* were not as causative agents of acute illness and death, the presence of these larvae in gastrointestinal tract can adversely affect animal health and production. Furthermore, infestation of all necropsied animals showed that the rate of infestation was very high in the herd. Therefore, treatment of horses in this region in mid-autumn with broad-spectrum anti-parasitic drugs such as macrocyclic lactones is recommended. The donkeys also should be treated because they act as reservoirs for *Gasterophilus* species.

References


