



## Seasonality of goat warble fly infection by *Przhevalskiana silenus* (Diptera, Oestridae) in Italy<sup>☆</sup>



G. Gaglio<sup>a,\*</sup>, E. Brianti<sup>a</sup>, M.C. Ferrara<sup>b</sup>, L. Falsone<sup>a</sup>, E. Napoli<sup>a</sup>, S. Giannetto<sup>a</sup>

<sup>a</sup> Dipartimento di Scienze Veterinarie, Polo Universitario Annunziata, 98168 Messina, Italy

<sup>b</sup> Istituto Zooprofilattico Sperimentale "Mirri", sezione di Barcellona, 98051, Italy

### ARTICLE INFO

#### Article history:

Available online 19 December 2015

#### Keywords:

Goat  
*Przhevalskiana silenus*  
Myiasis  
Italy

### ABSTRACT

Among factors that negatively impact on livestock, parasite infections represent a serious challenge to the health, welfare, productivity and reproduction of goats. In Mediterranean countries for example larvae of *Przhevalskiana silenus* (Diptera, Oestridae) cause a myiasis known as goat warble fly infestation that may induce significant economic losses to goat productions. In this study carcasses of 580 goats (551 females and 29 males) from 48 farms, regularly slaughtered in southern Italy, were examined for *P. silenus* presence across two years (from January 2011 to December 2012). For each carcass, the skin and subcutaneous tissues were examined for larvae of *P. silenus* and, when retrieved, specimens were counted and classified according to their developmental stage. Overall, *P. silenus* larvae were detected in 42 (87.5%) out of 48 farms and in 285 (49.1%) out of 580 goats. The number of larvae ranged from 1 to 38 per infested goat, with a mean of 5.2 larvae ( $\pm 4.8$ ). A total of 1209 larvae were retrieved of which 385 were identified as first stage (L1), and 394 and 430 as second (L2) and third (L3) stage, respectively. The prevalence rate of infestation was significantly higher in younger goats compared to older ( $p = 0.0298$ ). Dynamic of larvae in inspected animals showed different patterns being higher in August, November and March for L1, L2 and L3, respectively.

Results of this study showed that *P. silenus* infection is widespread among farms of the study area. Nevertheless, as it occurs in other Mediterranean countries, *P. silenus* infection is still an overlooked infestation in Italy and more awareness on this infection and adequate control strategies are advocated.

© 2015 Elsevier B.V. All rights reserved.

### 1. Introduction

Small ruminant farming plays a prominent role in the sustainability of rural communities around the world (Park and Haenlein, 2006). Amongst the factors that negatively affect livestock production, parasite infestations represent a serious challenge to the health, welfare, productivity and reproduction of farm animals (Morgan, 2013).

Larvae of *Przhevalskiana silenus* (Brauer, 1858), a dipterian fly belonging to the family Oestridae, cause a myiasis known as "goat warble fly infestation" (GWFI). Female flies lay their eggs on the hair of goats and rarely, in sheep and gazelle (Taylor et al., 2007). The first stage larvae (L1) penetrate into the subcutaneous tissues (Madel and Nahif, 1971) mainly in the back and flank, and mature

into the second and third stage (Taylor et al., 2007). Unlike *Hypoderma bovis* and *Hypoderma lineatum* affecting cattle, larvae of *P. silenus*, do not migrate to any internal organs in the host body, but remain in the subcutaneous tissues until they mature into third stage larvae (L3) to abandon the host and pupate in the outside environment (Otranto and Puccini, 2000). Therefore, the parasitic damage is limited to the skin with various pathological effects depending on the larval stage development and the intensity of the parasitic infestation (Oryan et al., 2009).

Direct diagnosis is possible only when subcutaneous nodules are palpable, while the use of indirect diagnostic methods such as an ELISA test have been shown to be useful instrumentally to the early diagnosis of this parasite (Otranto et al., 1999b).

Epidemiological studies conducted in Italy showed a prevalence of GWFI in flocks ranging from 30 to 90%, according to geographical and climate variations (Giangaspero and Lia, 1997; Scala et al., 1998). In spite of the wide distribution in Italy (Giangaspero and Lia, 1997; Otranto and Puccini, 2000; Faliero et al., 2001), Greece (Papadopoulos et al., 1997), Egypt (Morsy et al., 1998), Iran (Azizi et al., 2007; Oryan et al., 2009), Saudi Arabia (El-Azazy, 1997) and

<sup>☆</sup> This paper is part of a Special Issue entitled "SIPAOC Conference 2014". Guest Edited by Annunziata Giangaspero, Agostino Sevi and Maria Manfredi.

\* Corresponding author. Fax: +39 0903503842.

E-mail address: [ggaglio@unime.it](mailto:ggaglio@unime.it) (G. Gaglio).

**Table 1**

Prevalence and larval stage frequency and abundance of *Przhevalskiana silenus* infected goats according to the class of age (class 1, from 1 to 3 years; class 2, from 4 to 6 years; class 3, over 6 years).

Classes of age (number of animals)	Number of positive animals (prevalence)	<i>Przhevalskiana silenus</i> larval stages frequency (number of larvae)				Nodules
		First-stage larvae	Second-stage larvae	Third-stage larvae	Total number of larvae	
Class 1 (n = 120)	70 (58.3%)	17 (95)	6 (61)	27 (142)	298	21 (252)
Class 2 (n = 249)	109 (43.8%)	34 (162)	20 (233)	34 (250)	645	23 (151)
Class 3 (n = 211)	106 (50.2%)	34 (128)	49 (100)	16 (38)	266	8 (37)
Total (n = 580)	285 (49.1%)	81 (385)	75 (394)	77 (430)	1209	52 (440)

the severe economic losses caused (Abul-Hab and Al-Sadi, 1974; Liakos 1986; Oryan et al., 2009, 2012; Yadav et al., 2012) GWFI has attracted limited scientific attention.

The goal of the present study was to provide data on the presence and dynamics of GWFI by *P. silenus* in southern Italy.

## 2. Materials and methods

### 2.1. Study area

The study was carried out from January 2011 to December 2012 in a population of mixed breed goats bred and slaughtered in the province of Messina (Sicily, southern Italy; 38.048042°N; 14.975923°E). The climate in the study area is generally mild with warm winters, although in the mountainous areas the temperature can drop and a thick layer of snow cover the ground usually from December to February. The summer months (i.e., July and August) are generally hot and dry but the temperature rarely rises above 42 °C.

### 2.2. Slaughterhouse sampling

Samplings were conducted monthly at the slaughterhouse in Barcellona P.G. (38.85496°N; 15°12'40"68E, Messina province), where almost all the livestock of the province is slaughtered. At each time point all the slaughtered goats were inspected soon after being skinned to detect larvae of *P. silenus* (Fig. 1). Larvae were collected from subcutaneous tissues and stored in plastic vials containing 70% alcohol according to the examined animals. At the laboratory, the collected larvae were classified and staged using the morphometric keys proposed by Zumpt (1965). For each animal examined data on age, sex, farm and antiparasitic treatments were also registered. Examined goats were grouped according to their age: between 1 and 3 years (class 1), between 4 and 6 years (class 2) and over 6 years (class 3). All collected data on goats and larvae (size and stage) were entered into an electronic spread-sheet for further statistical analysis.

### 2.3. Statistical analysis

Data on the presence of *P. silenus* in the classes of age were compared using a chi-square (Yates correct). Statistical analyses were performed using GraphPad InStat (3.1 version) and  $p < 0.05$  was used to indicate statistical significance.

## 3. Results

A total of 580 carcasses (i.e., 304 in 2011 and 276 in 2012) were inspected for the presence of *P. silenus* larvae. The majority of the animals were females ( $n = 551$ ), while only 29 were males. The examined goats were aged from 1 to 13 years (mean 4.5 years  $\pm$  2.2) and were divided into three age classes as follows: class 1 = 120; class 2 = 249; class 3 = 211. The 580 animals came from 48 farms located in 22 municipalities of the province of Messina. Out of the 580 examined carcasses, 285 (49.1%) were infested by *P. silenus*;

**Table 2**

Number of positive animals and prevalence of infection by *Przhevalskiana silenus* in goats according to the month and year of sampling.

Month	2011	2012
	Positive/tested (%)	Positive/tested (%)
January	16/21 (76.2%)	9/14 (64.3%)
February	11/20 (55.0%)	8/13 (61.5%)
March	19/24 (79.2%)	14/22 (63.6%)
April	3/16 (18.8%)	1/11 (9.1%)
May	22/22 (100.0%)	10/13 (76.9%)
June	8/32 (25.0%)	8/26 (30.8%)
July	14/34 (41.2%)	18/42 (42.8%)
August	17/30 (56.7%)	9/25 (36.0%)
September	11/20 (55.0%)	12/12 (100.0%)
October	13/41 (31.8%)	14/20 (70.0%)
November	5/31 (16.1%)	10/36 (27.8%)
December	16/21 (76.2%)	17/42 (40.5%)

272 of these were females and 13 were males ( $p = 0.7750$ ). Specifically, 155 (51%) and 130 (47.1%) were positive in 2011 and 2012, respectively. The majority of the sampled farms (42/48; 87.5%) had *P. silenus* infested animals. Of the infested animals, 81 (28.4%) harbored L1, 75 (26.3%) L2 and 77 (27.0%) L3. Finally, 52 (18.2%) had nodules containing necrotic material, of which only 4 harbored both L1 and necrotic nodules. A total of 1209 larvae were isolated (i.e., L1 = 385, L2 = 394 and L3 = 430). The average length of L1 was 5.2 mm ( $\pm 0.5$ ), while L2 and L3 average lengths were of 7.9 mm ( $\pm 0.8$ ) and 17.5 mm ( $\pm 0.9$ ), respectively. The frequency of the myiasis and the abundance of various stage larvae according to the age classes are shown in Table 1. The goats grouped into the first age class were statistically more infested than those of the other classes ( $\chi^2 = 7.03$ ;  $p = 0.0298$ ). The monthly prevalence of infection varied from 19% (April) to 100% (May) in 2011 and from 9% (April) to 100% (September) in 2012 (Table 2). Throughout the observation period, goats infested with L1 were retrieved from June to September with a peak in August, those with L2 were found from September to December with a peak in December and L3 from January to March, peaking in this latter month. Necrotic nodules, consistent with damages caused by the emergence or death of L3, were found in April and May.

## 4. Discussion

The results of the present study showed that *P. silenus* infestation is common and highly prevalent in goat farms of the study area. Although infested animals were found throughout the whole study period, the occurrence and abundance of the three larval stages showed different patterns, likely correlated with the activity of the adult fly and with the time of development in the animal host.

Interestingly, five out of the six negative farms have a history of regular antiparasitic treatments (i.e., yearly or twice a year), including the use of avermectin drugs. The sixth negative farm was located in Island of Volcano (Eolian archipelago) and seems to have never had cases of GWFI as the farmer claimed. However, with regard to antiparasitic treatments, goats are usually dosed in the same way as sheep. This improper therapeutical approach leads to several prob-

Download English Version:

<https://daneshyari.com/en/article/2456760>

Download Persian Version:

<https://daneshyari.com/article/2456760>

[Daneshyari.com](https://daneshyari.com)