

Prevalence of *Oestrus ovis* in goats of Shiraz, southern Iran

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ABSTRACT

One thousand nine hundred and ninety eight heads obtained from goats slaughtered at the Fars abattoir (Shiraz, South Iran) between April 2006 and April 2007 were examined for the presence of *Oestrus ovis* larvae. Of the 1998 heads, 261 (13.1%) were infested with *O. ovis* larvae. *O. ovis* larvae were observed in both sexes and all age groups in each season of the year. A total of 1356 larvae were collected. The overall larval intensity for the infested goats was 5.2, with 3.2 in spring, 3.8 in summer, 4.6 in autumn and 6.8 in winter. Prevalence ranged from 6.6% in spring to 17.9% in winter. Increased infestation was observed in older animals.

Key words: *Oestrus ovis*, prevalence, goats, Iran

Introduction

Oestrus ovis (Linne 1761, Diptera: Oestridae), is a well known parasite of the nasal cavities and adjoining sinuses in sheep and goats. *O. ovis* infestation may be considered a zoonosis (WALL and SHEARER, 1997). *O. ovis* causes ophthalmomyiasis, respiratory and non-respiratory manifestations of human pharyngeal myiasis which is reported from Iran (JANBAKHSH et al., 1977; MASOODI and HOSSEINI, 2003), Mediterranean and the Middle East regions too (AMR et al., 1993; CAMERON et al., 1991; GRAMMER et al., 1995). Furthermore, *O. ovis* can thrive in different environments (BREEV et al., 1980; HORAK, 1977; PANDEY and OUHELLI, 1984) and can survive winter in a diapause state as larvae in the sinu-nasal passages of the host (COBBETT and MITCHELL, 1941; HORAK, 1981). This adaptability of the parasite allows for the persistence of infestation and presents difficulties in its control.

Caprine oestrosis has been reported with a high prevalence from numerous areas all over the world including (in chronological order), 48.3% in India (JAGANNATH et al.,

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1989), 31.3% in Mexico (MARTINEZ et al., 1992), 4% in Argentina (TREZEGUET, 1996), 14% in Morocco (BERRAG et al., 1996), 91% in Greece (PAPADOPOULOS et al., 1997), 53.8% in Nigeria (BIU and NWOSU, 1999), 28.4% in France (DORCHIES et al., 2000), 24% in Jordan (ABO-SHEHADA et al., 2003) and 45% in Spain (ALCAIDE et al., 2005). Infestation by *O. ovis* has been linked to production losses in small ruminants (ILCMANN et al., 1986). Despite the popularity of goat breeding in Iran, the prevalence of this myiasis in caprine livestock has never been documented. Therefore this study was undertaken to investigate the prevalence and intensity of infestation by *O. ovis* in goats in Shiraz, southern Iran.

Materials and methods

Animals and study site. The study was carried out on goats slaughtered at the Fars abattoir, 20 km south of Shiraz (29°50'N, 52°46'E) from April 2006 to April 2007. The goats slaughtered at the abattoir came from surrounding villages covering a radius of up to 150 km. Climatological information regarding the location during the course of the study is summarized in Table 1.

Examination procedure. Goat heads were obtained from the abattoir, and the sex and age of the animals recorded. The animals were aged 6 months to 2 years (444), >2 to 4 years (764) and >4 to 5 years (790).

The goat heads were cut through the longitudinal axis with an electric saw. All larvae present were collected from the nasal passage, septum and the middle meatus (site 1) and the conchae and sinuses (site 2).

Statistical analysis. The prevalence data were analyzed using Chi-square tests; Kruskal-Wallis and Mann-Whitney tests were also used to compare seasonal differences in *O. ovis* larval intensities (SPSS for Windows, version 11.5, SPSS Inc, Chicago, Illinois). All values of $P \leq 0.05$ were considered significant.

Results

A total of 1998 goat heads were examined, and 261 (13.1%) heads were found to be infested with *O. ovis* larvae. The seasonal prevalence ranged from 6.6% in spring to 17.9% in winter (Table 1). The percentages of larvae per infested goat in two head locations are given in Table 2. The larvae were obtained from both sites within the study period. The highest prevalence and total number of larvae per infested goat were found in winter and the lowest in spring ($P < 0.05$, Tables 1 and 2). The mean intensity of infection (total number of larvae per infested goat) was 5.2 (Table 2). Infestation rates were significantly higher in 4-5 year old goats compared to the 2-4 year old and 6 months to 2 year old groups ($P < 0.05$, Table 3). Infestation rates did not differ significantly between two sexes of goats ($P > 0.05$, Table 3).

Table 1. Climatological data and the seasonal prevalence of *Oestrus ovis* larvae infestation in goats from Shiraz

Season	Air temperature (°C) †	Relative humidity (%) †	Total No. of animals examined	Prevalence of infested goats (%)
Spring	21.4 ± 4.5	39.7 ± 13.6	496	33 (6.6) ^a
Summer	27.9 ± 2.5	29.2 ± 1.0	310	35 (11.3) ^b
Autumn	14.2 ± 7.6	48.5 ± 13.3	610	89 (14.6) ^b
Winter	7.6 ± 3.5	59.7 ± 7.5	582	104 (17.9) ^c
Total			1998	261 (13.1)

† Mean ± S.D. climatological data for the experimental year (from April 2006 to April 2007) from the Shiraz Meteorological Center. ^{a, b, c} Show a significant difference between different superscript letters for the same column (P<0.05).

Table 2. Larval intensities in the infested goats per season and per site of collection

Season	Larval intensity for infested goat	Larval location			
		Nasal passage, septum, middle meatus		Conchae and sinuses	
		Total No. of larvae	Larval intensity for infested goat (%)	Total No. of larvae	Larval intensity for infested goat (%)
Spring	3.2	52	1.6 (8.7) ^a	53	1.6 (8.7) ^a
Summer	3.8	67	1.9 (10.3) ^a	67	1.9 (10.3) ^b
Autumn	4.6	196	2.2 (11.9) ^a	214	2.4 (13.1) ^b
Winter	6.8	416	4.0 (21.7) ^b	291	2.8 (15.3) ^c

^{a, b, c} Show a significant difference between different superscript letters for the same column (P<0.05).

Table 3. Age and sex wise *Oestrus ovis* larval prevalence in goats of Shiraz

	Total No. of animals examined	Prevalence of infested goats (%)
All animals	1998	261 (13.1)
Age		
6 months - 2 years	444	33 (7.4) ^a
2 - 4 years	764	100 (13.1) ^a
4 - 5 years	790	128 (16.2) ^b
Sex		
Male	1098	132 (12)
Female	900	129 (14.3)

^{a, b} Show a significant difference between different superscript letters for the same column (P<0.05).

Discussion

The prevalence of *O. ovis* infestation (17.9%) found in the present study reaffirms the fact that *O. ovis* is a very common parasite of goats and widespread within the Shiraz goat population. This finding was higher than that reported from Argentina (4%) (TREZEGUET, 1996) and Morocco (14%) (BERRAG et al., 1996), but less than what was seen in India (48.3%) (JAGANNATH et al., 1989), Mexico (31.3%) (MARTINEZ et al., 1992), Greece (35.2%) (PAPADOPOULOS et al., 2006), Nigeria (53.8%) (BIU and NWOSU, 1999), France (28.4%) (DORCHIES et al., 2000), Jordan (24%) (ABO-SHEHADA et al., 2003) and Spain (45%) (ALCAIDE et al., 2005). The figure was also found to be significantly different from the 91% from Greece (PAPADOPOULOS et al., 1997), and 73.9% from Mexico (ANGULO-VALADEZ et al., 2009). The lowest mean number of larvae was seen in spring which gradually increased towards winter, a finding which was similar to that of Mexico (ANGULO-VALADEZ et al., 2009).

The peak in larval infestation seen during winter months can be ascribed to the deceleration in larval development during these months along with the deposition of new larvae by gravid female flies, which causes a pooling effect. *O. ovis* larvae have the capacity to adjust their developmental cycle during the parasitic phase, depending on the particular climatic conditions. When environmental conditions are adverse, larvae cease their development (hypobiotic period) (COBBETT and MITCHELL, 1941; HORAK, 1981). Many environmental factors can affect the prevalence and intensity of *O. ovis* infections in goats and inter-annual variations are not rare. External reintroductions of *O. ovis* can occur very easily in well-treated sheep flocks (TERNOVOI and MIKHAILENKO, 1973). Considering these risks, the reduction in *O. ovis* infestations that was observed during the spring and summer months could be a consequence of the intensive use of effective drugs during the summer (when numerous flies lay first stage larvae on sheep) and during the beginning of the hypobiotic period.

The high prevalence of *O. ovis* infestations in Shiraz goat flocks may be attributed to several factors. Many sheep/goat breeders do not perform routine and regular anti-parasitic treatment of their animals even during summer and autumn seasons. Usually, farmers consider treatment only after severe clinical signs manifest in the affected animals and since the early spring infections or re-infections do not present with marked naso-sinusal signs, treatment is not readily provided. Findings from experiments with tracer lambs showed that low grade infections occur in spring (DORCHIES et al., 1996). A low larval dose, insufficient to cause any reaction, is associated with spring infestations and may be the reason that no overt clinical signs are seen. When the second or third fly generations are active, symptoms like nasal discharges and sneezing become evident even though the primary attack had happened a month or two beforehand. Since goats develop less severe manifestations from *O. ovis* infestations than sheep (JAFARI SHOORIJEH et al.,

2009), goat oestrosis is seldom treated in Iran; therefore, goats could act as a reservoir for the parasites during the winter months.

The use of long acting anti-parasitic drugs or frequent de-worming of stocks can be successful in decreasing both the prevalence and intensity of *Oestrus ovis* infections in goats. A concerted control program if applied rigorously could exploit the need for the larvae to perform hypobiosis in winters and theoretically offer the possibility of *O. ovis* eradication in such areas. In countries where hypobiosis is present, large scale systematic treatments in late autumn or winter could be of great value. However, in countries where *O. ovis* infestations occur year round as in tropical countries, strategic treatments seem to be of less interest (JACQUIET and DORCHIES, 2002). To control and eradicate *O. ovis*, it would be necessary to use systemic insecticides such as avermectin (JAFARI SHOORIJEH and MOAZZENI JOLA, 2001) at the beginning of the hypobiotic period in October or November.

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SAŽETAK

Ukupno je pregledano 1998 glava koza zaklanih u klaonicama Fars (Shiraz, Južni Iran) u razdoblju od travnja 2006. do travnja 2007. Ličinke kukca *Oestrus ovis* bile su dokazane u 261 (13,1%) životinje bez obzira na spol i dob. Ukupno je bilo sakupljeno 1356 ličinki. Prosječna jačina invazije iznosila je 5,2 ličinke s time da su prosječno 3,2 ličinke dokazane u proljeće, 3,8 ljeti, 4,6 u jesen i 6,8 ličinki zimi. Učestalost se kretala od 6,6% u proljeće do 17,9% zimi. Veća učestalost bila je dokazana u starijih životinja.

Ključne riječi: *Oestrus ovis*, učestalost, koze, Iran
