



## Study on economical effect of warble fly in goats in Iran

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### ABSTRACT

**Introduction:** Goat warble-fly infestation is caused by *przhevalskiana silenus* (Diptera Oestridae) larvae and it is characterized by the presence of warble under the hide of the back and flanks of the animal. **Material and Method:** This study was carried out from March 2009 to March 2010 on the hides sent to the khorasan leather industries for grading, processing and tanning. **Results:** This study demonstrated from 340,797 goat hides examined 37,090 (11.11 %) were infested by *przhevalskiana silenus*. The highest damaged hides due to warble infestation saw in southern provinces of Iran with an average 13.86% and Northern provinces had the least infestation with an average 8.48%. The number of the holes in each hide ranged from 2 to 81 with an average 20.65 holes per hide. The highest average of hole per hide reported in central provinces of country and southern provinces had the least holes per hide with an average 18.26 holes per hide. Economic losses of the Khorasan leather industries due to devaluation of goat hides to *przhevalskiana silenus* infestation were calculated about 958,000,000 Rials equal to 95,800 US\$. **Conclusion:** These losses warrant on immediate attention of the veterinarians for prevention, control and treatment of goat warble fly by prescription macro cyclic lactones drugs such as Ivermectin and cypermectin for limitation of economic losses due to devaluation of hides, reduction of products, growth rate and other accompanied diseases.

**Key words:** *Przhevalskiana silenus*, Goat warble fly, Myiasis, Economic losses, Khorasan province, Iran

### INTRODUCTION

Goat warble fly infestation was first reported in Sicily (1) and occurs in many European and Eastern countries and the prevalence of the infestation considerably differs throughout the world due to the geographical and meteorological variations and grazing pattern (2). Despite extensive investigation on the etiology, taxonomy, epidemiology, therapy and immunology of bovine hypodermis's, Goat warble fly infestation has attracted little attention, and only very few studies have been undertaken on this subject (3,4,5,6). Goat warble-fly infestation is caused by

*przhevalskiana silenus* (Diptera Oestridae) larvae and it is characterized by the presence of warble under the hide of the back and flanks of the animal (4). After emerging from the egg, the first instar larva (L1) developed into the second (L2) and third stage larva (L3) in the subcutaneous tissue of the back without going through further internal migration. This infestation can cause animal health problems and considerable economic losses to the leather industry due to damaged hides (7). According to the National Veterinary Organization of Iran of 26,000,000 goats are present in Iran. These goats were mostly freely grazing. Based on the climate, the adult *p.silenus* is active from April to June in different parts of Iran (3, 8). The aim of the present study was to provide information about economical losses of *p.silenus* in leather industries of Iran.

## MATERIAL AND METHODS

This study was carried out from March 2009 to March 2010 on the hides sent to the Khorasan goat leather industries for grading, processing and tanning. Khorasan province is the most important center of goat leather industry in Iran. These hides were sent to the factories from abattoirs in different parts of Iran consist of Khorasan, Kerman, (Eastern) Isfahan, Yazd Qom, (Center) Mazandaran and Golestan (Northern) Fars, (southern), west Azerbaijan, Ilam, (Western) provinces of Iran as the trial area. In this period of time 340,797 hides were examined and graded by experienced experts in the factories according to the goat leather standard. First class hide has no hole, second class has less than ten holes per hide and third class hide has more than 10 holes per hide (ISIRI, 1457). The price of hide in each class was determined in this period of time, and devaluation of hide in the market was assigned, so economical losses were exactly manipulated for Khorasan goat leather industries. In addition the total populations of slaughtered goat from March 2009 to March 2010 were obtained from National Veterinary Organization of Iran to draw the total economic losses due to for whole of the country. Statistical analyses, paired T-Test and ANOVAs were performed by using Spss, version 11.0 and  $p < 0.05$  was used to indicate statistical significance.

## RESULTS

Table 1 and 2 summarize the result of the present study. Of the 340,797 goat hides examined 37,090 (11.11 %) were infested by *przhevalskiana silenus*. The highest damaged hides due to warble infestation saw in southern provinces of Iran with an average 13.86% and statistical analysis confirmed that infestation rate of goat hides in southern provinces is higher than other parts of the country ( $p < 0.05$ ). Northern provinces had the least infestation ( $p < 0.05$ ) with an average 8.48%. Fig.1 shows the distribution of examined and damaged hides for Goat warble fly infestation.

Table 1- Situation of damaged hides due to warble fly infestation in different area of Iran.

Area Provinces	Number of examined hides	Number of infested hides	Percentage of infested hides	Min number of holes	Max. number of holes	Average Number of holes
Southern	70,112	9719	13.86	2	56	18.26
Northern	51,031	4324	8.48	5	77	19.08
western	32,140	3102	9.65	5	62	22.43

Eastern	105,013	11312	10.77	6	70	21.84
Central	82,501	8653	10.49	3	81	27.19
Total	340,797	37,090	11.11	4.2	69.2	20.65

The number of the holes in each hide ranged from 2 to 81 with an average 20.65 holes per hide. The highest average of hole per hide reported in central provinces of country ( $p < 0.05$ ) and southern provinces had the least holes per hide with an average 18.26 holes per hide.

Table2- Economic losses due to warble fly infestation of goat hide in leather industries of Khorasan

Goat hide grade	number	Percentage %	Value Rials	Devaluation Per hide	Total devaluation Rials
First	303,707	98.11	73920	-	-
Second	33,649	9.87	49000	24920	838,533,080
Third	3,441	1.24	39200	34720	119,471,520
Total	340,797	100	-	-	958,004,600

According to the national standard of Iran for goat and sheep hide grading 37090 (11.11%) of goat hides sent to the Khorasan leather industries from different area of country were damaged by *przhevalskiana silenus* which depend on the number of holes per hide, 33,649 (9.87%) were graded in second class and 3,441 (1.24%) in third class. Economic losses of the Khorasan leather industries due to devaluation of goat hides to *przhevalskiana silenus* infestation were calculated about 958,000,000 Rials equal to 95,800 US\$ from March 2009 to March 2010.

## DISCUSSION

The warble flies of the *silenus* group of *przhevalskiana* spp. infests goats in tropical, subtropical and even no tropical areas (9). There is a wide variation in the prevalence of goat warble fly myiasis among different parts of the world. For example in Saudi Arabia cutaneous myiasis caused by *przhevalskiana silenus* reported 1.7% although the prevalence rate of this infestation in Turkish goats was found 44% and in Syrian goats was found to be 37% (10). In northern Jordan goats the prevalence rate of goat warble fly infestation was recorded 10% to 30% in different seasons (11). The prevalence rate of infestation in different cities of Fars province of Iran was reported from 7.0% to 18.9% (8). In this study the prevalence of goat warble fly infestation in the examined hides was 11.11% in Khorasan goat leather industries. This variation in the rate of

prevalence of goat warble fly myiasis in different areas might be due to the difference in the environmental conditions (topography of the land, season, humidity, temperature, rain fall, wind velocity) affecting the development of the warble flies. Other determinants affecting prevalence might include host specificity, breeds, husbandry and the use of insecticides (12). In the previous study in Southern areas of Iran (Fars province) was carried out from October 2006 to December 2008 the maximum and minimum warbles whole per animal was reported 3 and 78 with an average rate of 26.2 holes which is similar to the results of this study reported in table 1 (max 56, min 2 and average 18.26). In this study a total of 958,000,000 Rials equal to 95,800 US\$ from March 2009 to March 2010 economic losses due to devaluation of goat hides have been calculated only in Khorasan goat leather industries. According to the 4700,000 goat hides which enters to the leather industries of Iran (13) and notification the results of the present study it is estimated the commercial losses due to warble fly infestation of goat hides in whole country is about 13,212,000,000 Rials equal to 1,321,200 US \$ per year. Rahbari and Ghasemi in 1997 were estimated the economical losses based on different levels of infestation in 160 untreated goats aged 14 to 17 months over 400,000,000 Rials annually. It seems difference between devaluation amount of this report and present study could be due to prevalence rate. In Rahbari and Ghasemi (1997) report prevalence rate of warble fly was 93 % but in present study prevalence rate is reported 11.11 % and in similar study Iran (8) prevalence rate was reported from 7.0% to 18.9 % which confirm prevalence of our study. These losses warrant on immediate attention of the veterinarians for prevention, control and treatment of goat warble fly by prescription macrocyclic lactones drugs such as Ivermectin and cypermectin for limitation of economic losses due to devaluation of hides, reduction of products, growth rate and other accompanied diseases.

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