



## RESEARCH PAPER

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## Prevalence of hypoderma infestation and cattle hypodermosis in Tabriz slaughterhouse, Iran

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### Abstract

To determine the infestation status of the species in four seasons Hypoderma in Tabriz abattoir took on the cows. The study area Hypoderma bovis was the predominant species in cattle. Out of 400 cattle examined, 55 (13/75%) were infested with warble fly in the slaughter house. Highest prevalence of 13/75% was recorded in the month of December in slaughter house . The number of nodules present on the back region, flank region and hump of the animals ranged from 3 to 41. Prevalence of hypodermosis was greater in males than in females. In slaughter house, the prevalence was 26 (13%) and 22(11%) in males and females . In slaughter house, 4 , 4/5 , 6/5 , 9 % prevalence was found in bullock, cow, heifers and calves respectively. The nodule formation started in the first week of September and the perforation by the *Hypoderma* larvae from the skin was noticed in the month of November.

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## Introduction

Larvae of *Hypoderma* spp. cause a subcutaneous myiasis of domesticated and wild ruminants throughout the world (James, 1947; Zumpt, 1965). In particular, six species of *Hypoderma* have been reported. These include *Hypoderma bovis* and *H. lineatum* mainly affecting cattle; *H. diana*, *H. actaeon* and *H. tarandi* affecting roe deer, red deer and reindeer, respectively. Cattle hypodermosis caused by *H. bovis* and *H. lineatum* is characterized by a migration of first stage larvae ( $L_1$ ) in internal organs (i.e., rachidian channel & oesophagus, respectively) and by the presence of subcutaneous warbles in the dorsal and lumbar region, where larvae develop into the third mature stage ( $L_3$ ) before dropping in the environment.

For the past fifty years cattle hypodermosis has represented one of the most significant parasitic diseases in many countries of the northern hemisphere. Since, it impairs livestock production not only by inducing mechanical damage to internal organs and skin but also by down-regulating the immune system of host (Boulard, 2002). Over the past few years usage of avermectines has greatly decreased the spread of hypodermosis in many European and North American Countries. In fact, chemotherapy used against adult fly and first larval stage significantly reduces the economic impact of this disease and may even eradicate the disease from large areas as demonstrated in several European countries (Boulard, 2002). In contrast, hypodermosis is still spreading in poor socio-economic settings (Otranto *et al.*, 2005), mainly in Asiatic countries where routine treatments against these flies are not carried out. In this situation the prevalence of hypodermosis and the intensity of the infection may be high, thus causing great losses to the livestock. Cattle hypodermosis by *Hypoderma* spp. was in the last century, with a prevalence of infection at the clinical parasitological examination of up to 2.2 million cattle was almost 80% in Czech and Slovak Republics, 49.2% in Greece, 85% in Italy, 52.3% in Spain, 40% in United Kingdom and 32-43% in Romania (O'Brien, 1997).

Iran is an agricultural country, but there is no national register of the cattle population. Farmers generally keep 1 to 13 animals per house. Most of people earn their livelihood from selling agro-livestock products and rearing of the livestock (i.e., cattle, sheep, goats & buffaloes). Cattle are mainly kept to provide milk for domestic use. Among the parasitic diseases hypodermosis is a major problem to the livestock and mainly affects cattle, sheep and goat (Shah *et al.*, 1981; Khan *et al.*, 1991; Ayaz, 1998). It is endemic in cattle in semi-hilly and mountainous areas of Iran (Khan *et al.*, 1994; Khan *et al.*, 2006) and causes huge economic losses due to the damage to hide, milk and meat productions. Although few studies have been done in this area in North-west of Iran, similar studies have been conducted on cattle hypodermosis. Taghipour bazargani (2009) studied 200 heads of cattle slaughterhouse in Urmia and reported 11% incidence of *Hypodermosis*. However, epidemiological studies on Hypodermosis in West of Iran are insignificant and especially, the roles of climate in the degree of Fly dispersion may be somewhat unclear so that they are more likely to be the main aims of this study.

## Materials and methods

### *The study area*

Tabriz city is located in North-west of Iran. The study was conducted in Tabriz abattoir. Slaughterhouse was conducted in four seasons, and the intervals between inspections on average once every two weeks, respectively. After recording the gender and estimate the age of the animal and the condition of the teeth, the presence of larvae *Hypodermosis* slaughtered animals were examined.

### *Experimental Animals and Parasitological Techniques*

A total of 400 cows (200 female and 200 male) in the age group 1/5 year and more than 1/5 year of age were studied. To find larvae in cattle inner surface of the skin, subcutaneous tissue, spinal canal and esophagus were examined. Larvae observed carefully using forceps removed from its place in a small plastic or glass containers were collected. First stage larvae

were immediately transferred to a freezer and larvae of second and third stages were preserved in 70% alcohol containing 2% glycerin. Samples collected in opportunities for species identification *Hypodroma* in Veterinary Parasitology laboratory of Islamic Azad University, Tabriz branch taken on the basis of diagnostic keys (zumpt, 1965) were identified.

#### Data Analysis

Independent t-test and chi-square test to compare the intensity of infection, respectively, the mean number of larvae in the subcutaneous tissue and relative frequency of use and the amount of pollution  $P < 0.05$  was considered as statistically significant level. Prevalence of hypodermosis (%) was calculated based on the age, sex and breed of cattle. Month-wise distribution of the prevalence of the disease was also recorded. The data thus obtained provided the picture of the disease in the study area.

#### Results

Out of 400 cattle examined, 55 (13/75%) were infested with warble fly in the slaughter house. Highest prevalence of 13/75% was recorded in the month of December in slaughter house (Table 1). The number of nodules present on the back region, flank region and hump of the animals ranged from 3 to 41. Prevalence of hypodermosis was greater in males than in females. In slaughter house, the prevalence was 26 (13%) and 22(11%) in males and females (Table 2). In slaughter house, 4, 4/5, 6/5, 9 % prevalence was found in bullock, cow, heifers and calves respectively. The nodule formation started in the first week of September and the perforation by the *Hypoderma* larvae from the skin was noticed in the month of November.

**Table 1.** Month-based prevalence of hypodermosis in cattle in tabriz slaughterhouse, Iran.

Months	Examined	Infested (%)
May	33	-
June	33	-
July	33	5 (1/25%)
August	33	5 (1/25%)
September	33	6 (1.5%)
October	33	8 (2%)
November	33	9 (2/25%)
December	33	11(2/75%)
January	33	7 (1/75%)
February	33	4 (1%)
March	35	-
April	35	-
Total	400	55 (13/75%)

**Table 2.** Sex-based prevalence of hypodermosis in cattle in tabriz slaughterhouse, Iran.

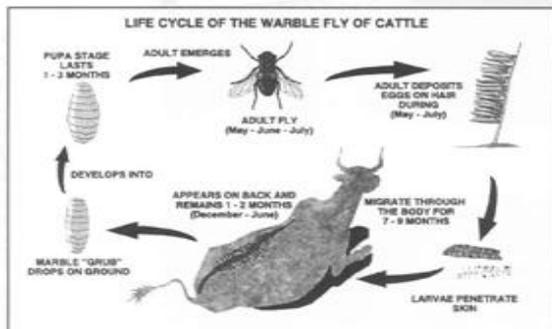
Animal category	Examined	Infested (%)
Bullock	90	8 (4%)
Calves	110	18 (9%)
Total	200	26 (13%)
Female	-	-
Cows	90	9 (4/5%)
Heifers	110	13 (6/5%)
Total	200	22 (11%)

#### Discussion

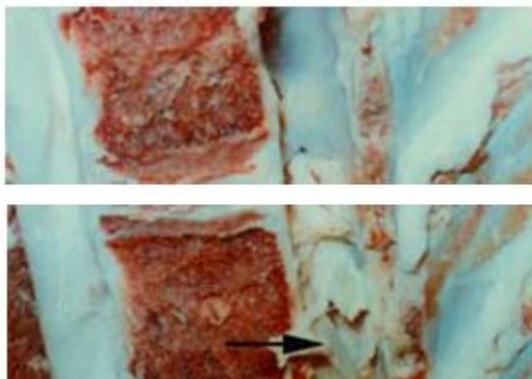
In the last century, no proper research work has been conducted on the bovine hypodermosis in Tabriz (Iran). Even, the information related to basic epidemiology of the disease in Iran is scanty. However, the prevalence of hypodermosis has wide

variation throughout the world, which may be due to the geographical distribution as well as the prevalence of the fly in the world. Many workers through out the world reported the prevalence of hypodermosis. In French cattle population of 20 million heads, the prevalence of hypodermosis in the year 1996 before

eradication was 40% (Boulard *et al.*, 1996). In the same year, the prevalence of hypodermosis in the cattle population of 2.2 million of Czech and Slovak Republics was 80% (Minar, 1997). In 2005, the prevalence of this disease in Kars province of Turkey that was 31.9% in a population of 1276 cattle (Kara *et al.*, 2005).



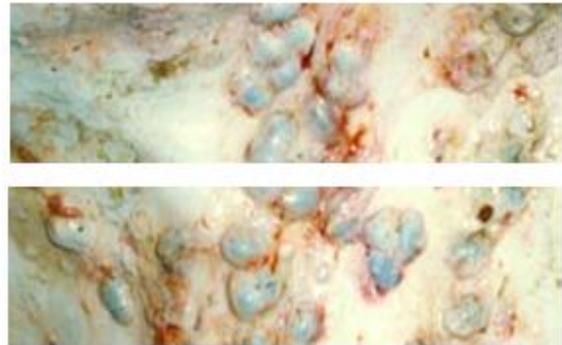
**Fig. 1.** Hypoderma bovis fly life cycle.



**Fig. 2.** Hypoderma bovis first stage larvae in spinal canal of cattle.

The prevalence of hypodermosis in cattle varies significantly among the different age group of studied animals. It is evident from the result that the old animals have lower rate of prevalence of hypodermosis than younger one. This difference might be due to the hard and thick skin as compared to the younger cattle and might be due to the development of immunity due to the previous exposures. Hence, it is difficult to penetrate the larvae of hypoderma in the old animals due to thicker skin. Many other factors can also influence the prevalence of hypodermosis like grazing pattern (Otranto *et al.*, 2001). Sex-based prevalence of hypodermosis in cattle showed significant difference in male and female. Higher prevalence in male than females may

be due to thicker skin of males than females and the grazing system in the study area (Khan *et al.*, 2006). Females under grazing system are more prone to infestation than males because mostly the males are kept tied and stall fed in the houses (Scholl & Weintraub, 1988).



**Fig. 3.** Hypoderma bovis third stage larvae in subcutaneous tissue of cattle.

The results of the present studies provide a baseline data for the prevalence of the disease in the region. Nevertheless, these results indicated that hypodermosis is a serious economic threat to livestock and leather industry in Iran. Therefore, for the control of hypodermosis, proper prophylactic measures are imperative to reduce the intensity of damage caused by that parasite.

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#### Competing interests

Authors have declared that no competing interests exist.

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