


## Geographical Distribution of Hypodermosis (*Hypoderma* sp.) in Northern Punjab, Pakistan

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### Summary

The purpose of the present study to determine the geographical distribution of *Hypoderma* in the Northern Punjab, Pakistan. One thousand cows were examined by palpation method for the presence of warbles in different areas from northern Punjab from August 2010 to February 2011. The overall prevalence was 18.40% with significant differences in the geographical distribution of *Hypoderma*, when the grazing pattern, Topography, Water Bodies and Village were considered in different geographic areas. The prevalence was higher in hilly and semi-hilly areas as compared to the plane areas.

**Keywords:** *Hypodermosis, Geographical distribution, Cattle, Northern Punjab, Pakistan*

## Pakistan'ın Kuzey Pencab Bölgesinde Hypodermosis'in (*Hypoderma* sp.) Coğrafi Dağılımı

### Özet

Sunulan bu çalışmanın amacı, Pakistan'ın Kuzey Pencab Bölgesi'nde *Hypoderma*'nın coğrafik dağılımını belirlemektir. Ağustos, 2010 ile şubat, 2011 arasında 1.000 siğir Kuzey Pencab'ın farklı bölgelerinde nokranın varlığını araştırmak için palpasyon yoluyla incelenmiştir. Değişik coğrafik alanlardaki otlatma modeli, topoğrafya, sulak bölgeler ve köylerin durumuna göre ortalama prevalans %18.4'tür. Prevalans tepelik ve yarı tepelik bölgelerde, ovalık alanlara göre daha yüksekti.

**Anahtar sözcükler:** *Hypodermosis, Coğrafi dağılım, Siğir, Kuzey Pencab, Pakistan*

### INTRODUCTION

Ectoparasitic infestations are one of the major veterinary problems affecting livestock in many parts of the world <sup>1</sup>. Amongst these, the warble fly infestation (WFI) by *Hypoderma* and *Przhevalskiana* (Diptera: Oestridae) is a notorious and common disease of cattle, buffaloes and goats in Pakistan <sup>2</sup>.

Hypodermosis is a parasitic disease caused by the development of the larval stages of insects of genus *Hypoderma*. Each species of this genus is strictly a parasite

of a ruminant species. *H. diana* and *H. actaeon* are specific of deer, *H. tarandi* of reindeer and *H. bovis* and *H. lineatum* of cattle. Cattle hypodermosis is widely spread over each continent of the northern hemisphere <sup>3</sup>.

Hypodermosis is common in the USA, Canada and in many parts of Africa and Europe, for example in Spain where levels of parasitism have been estimated to be between 26% and 42% depending upon the region studied <sup>4,5</sup>. Hypodermosis can be the cause of economic



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losses due to meat trim at slaughter, and the effect on hides is well established <sup>6</sup>. The importance of the disease has led to the formation of official campaigns to control and/or eradicate the parasite in several countries such as Britain <sup>7</sup>. and Denmark <sup>8</sup>. Financial losses prior to the start of the eradication campaign were suggested to be £13 million in Britain <sup>9</sup>. Similar estimates suggest losses of more than £600 million in the USA <sup>10,11</sup>.

Pakistan is an agricultural country with semi arid landscape and subtropical climate. Most of the people earn their livelihood from selling agro-livestock products and rearing of livestock (cattle, sheep, goats and buffaloes). The prevalence of WFI has been reported in buffaloes, cattle and goats from different areas of Pakistan <sup>12,13</sup>. In different endemic areas, the prevalence of WFI was 20-84% in goats and 22-24% in cattle <sup>14</sup>. In Chakwal district (northern Punjab) the prevalence of hypodermosis in buffalo is 5.20% <sup>15</sup>.

Keeping in view the importance of cattle in this country an epidemiological survey was conducted to establish the prevalence and geographical distribution of hypodermosis in different areas of Northern Punjab (Pakistan).

## MATERIAL and METHODS

### Location and Sample Size

The present study was carried out in the Northern part of Punjab Province, Pakistan (30°34' N and 70°74'E). Covering area is about 13.000 km<sup>2</sup> which is 2.9% of Punjab total area. The area of Pakistan covered by this province is a

total of 205.345 km<sup>2</sup> with 8 Divisions and 32 Districts.

A total of 1.000 animals were examined randomly from different herds from Attock, Chawkal, Rawalpindi and Jhelum districts, from august 2010 to February 2011.

In the present study geographical information were taken in the form of questionnaire from different villages of Northern Punjab, Pakistan. The animals were observed in different herds belonging to different villages of northern Punjab in different from august 2010 to February 2011.

### Geographical Factors Considered for Risks Analysis

The geographical information's were collected in the form of questionnaire. It comprises of District, Village, Topography, Water Bodies and Grazing Pattern

### Statistical Analyses

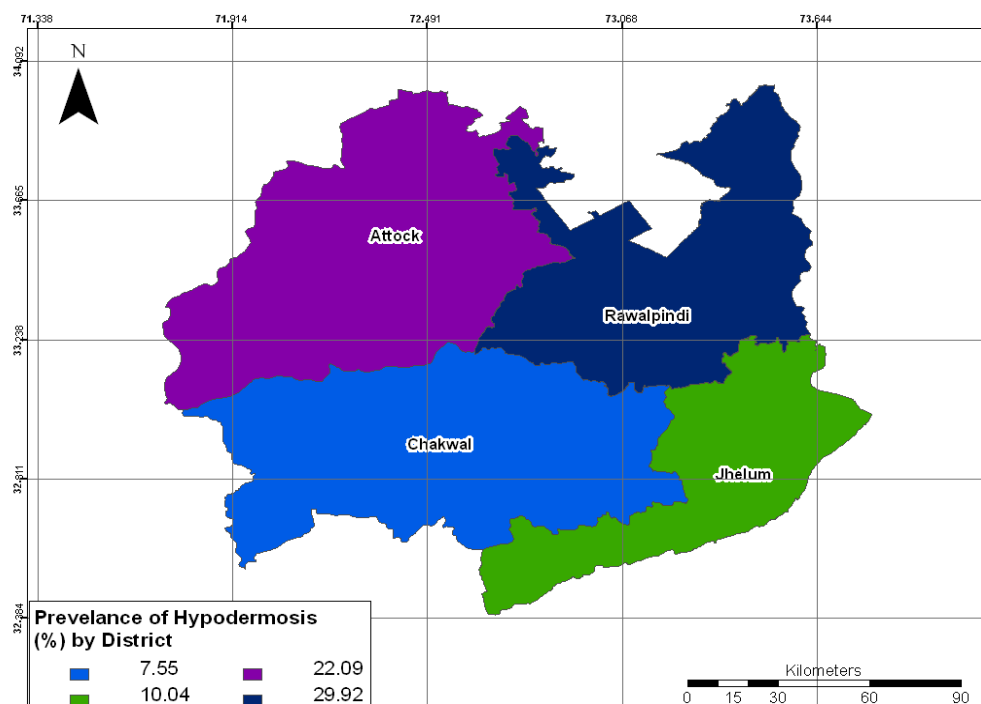
The Statistical analyses was done by using the statistical package SPSS for Windows 18.0 and SPSS answer Tree 3.1 (SPSS Inc., Chicago, IL USA) and the maps showing the geographical distribution were prepared by using Geographical Information System, ArcInfo.

## RESULTS

In the present study, the Prevalence of the bovine hypodermosis was 18.4% (95% CI 2.2-4.5). In the present study a total of four districts were studied for the geographical distribution of bovine hypodermosis. The results show that in the district Rawalpindi and Attock the prevalence was higher, as 29.92% and 25.34% respectively.

**Fig 1.** District-wise geographical distribution of Bovine Hypodermosis in Northern Punjab

**Sekil 1.** Pakistan'ın Kuzey Pencab Bölgesi'nde sığır Hypodremosis'inin bölgesel coğrafik dağılımı

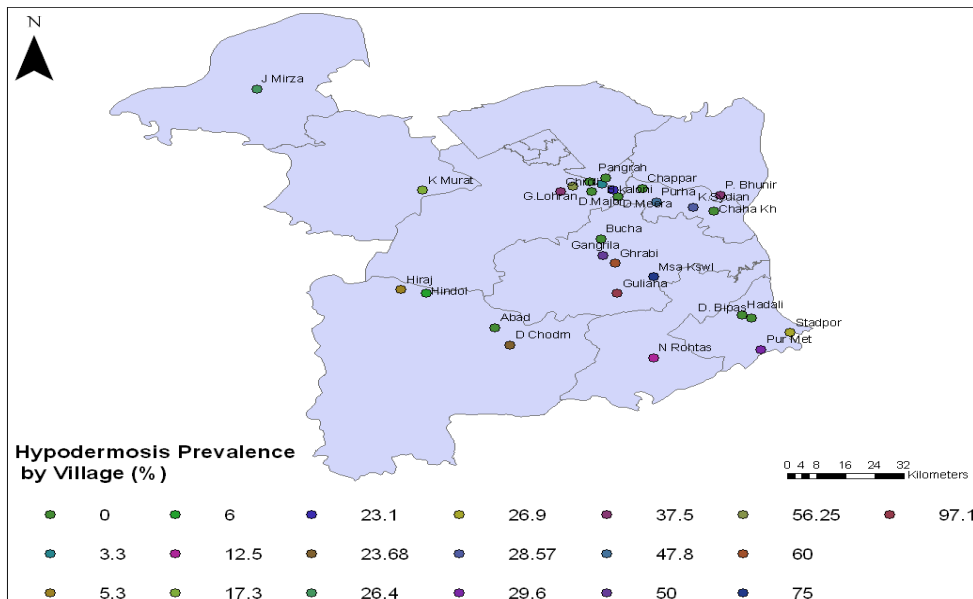


Whereas, in Jehlum and Chakwal district the prevalence 10.04% and 7.55% respectively. The results show that there is a significant difference in the geographical distribution of bovine hypodermosis in all the districts of northern Punjab (Fig. 1).

The village wise geographical distribution of bovine hypodermosis was also determined during this study. In the present study a total of twenty nine villages from the different districts of northern Punjab, Pakistan were examined for the geographical distribution of bovine hypodermosis in the northern Punjab, Pakistan. Different villages from the district Jehlum were examined for the geographical distribution of bovine hypodermosis. In village Hadali and D. Bypass the geographical distribution of bovine hypodermosis were 0%, while in village Stad pur, Purana metha and N. Rhotas were 26.9% (14/52), 29.6% (8/27) and 12.6% (3/24) respectively. In the Rawalpindi district the different villages were examined for the geographical distribution of bovine hypodermosis. There were no WFI were found in the village Dhoke Amban, Pangrah, Dhoke Meera, Chappar, Chohah Chalsa, Buccha were non-infested. While the geographical distribution of bovine hypodermosis in the village Ghroli, Ghoran Lohran, Mankiala, Dhoke Major, Purha, Kallar Sydian, Pidh

Bhunir, Gangrila, Missa, Guliana, Ghrabi, 37.5% (9/27), 56.9% (9/17), 23.1% (6/26), 3.3% (4/122), 47.8% (11/23), 28.9% (4/14), 37.5% (3/8), 50% (7/14), 50% (15/200), 75% (15/20), 97.1% (33/34) and 60% (3/5) respectively. In the district Chakwal the four villages were examined for the geographical distribution of bovine hypodermosis. There were no WFI were found in the village Ibrahim Abad, while in the Hiraj, Hindol, Dhoke Chodrian the geographical distribution of bovine hypodermosis were 5.3% (5/95), 6% (3/50) and 23.7% (9/38) respectively. In the Attock district the different villages were examined for the geographical distribution of bovine hypodermosis. The hypodermosis was geographical distributed in the Kharimurat and Jhund Mirza, where it was 17.3% (14/81) and 26.4% (24/91) respectively (Fig. 2).

The Topography of the villages is very important factor in the geographical distribution of bovine hypodermosis. Three type of location were Hilly, Semihilly and plain were existing in this area. In the plane area the distribution was 8.9% (43/484). In semihilly area distribution was 30.8% (105/341). In the hilly area the distribution was 20.6% (36/175) (Fig. 3). The grazing pattern is a very important geographical factor influencing the epidemiology of bovine hypodermosis. The geographical distribution in

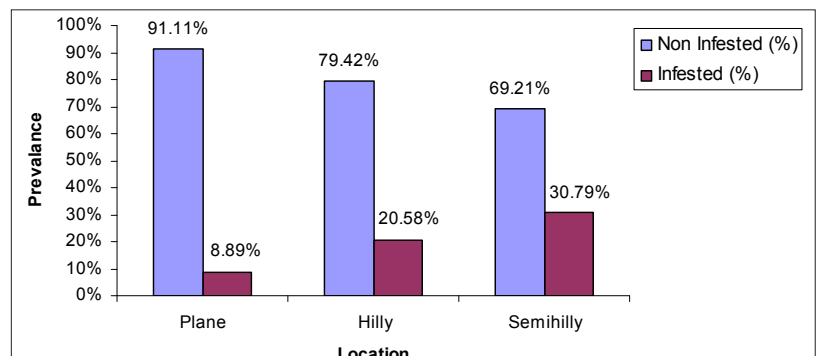


**Fig 2.** Geographical distribution of Bovine Hypodermosis in different herds of Northern Punjab, Pakistan

**Sekil 2.** Pakistan'ın Kuzey Pencab Bölgesi'nin farklı sürülerinde sığır Hypodermosis'inin coğrafik dağılımı

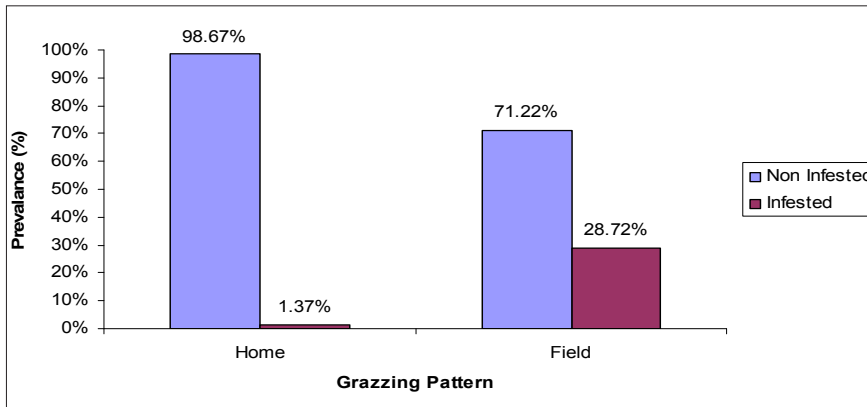
**Fig 3.** Role of Location in the geographical distribution of Bovine Hypodermosi from different districts of Northern Punjab, Pakistan

**Sekil 3.** Pakistan'ın Kuzey Pencab Bölgesi'nin farklı alanlarında sığır Hypodermosis'inin coğrafik dağılımında lokalizasyonun rolü



the animals having gone to field was 28.8% (179/622). The animal kept at home having distribution of hypodermosis was 1.3% (5/378) (Fig. 4). The presence of Water-bodies is very important factor in the geographical distribution of bovine hypodermosis. In the area where the water-bodies were not present the distribution of bovine hypodermosis were 10.8% (61/563). In the area where the water-bodies were present the distribution of bovine hypodermosis was 28.1% (123/437) (Fig. 5).

Dera Ismail Khan, Kohat, Malakand and Abotabad districts of NWFP<sup>16</sup> and Dera Ghazi Khan & Barkhan districts<sup>16,18</sup>. Similarly, the Prevalence of hypodermosis in cattle in Kars, Afyonkarahisar and Nigde province of Turkey were 31.9%<sup>19</sup>, 2.96%<sup>20</sup>, 5.08%<sup>21</sup> respectively. This variation in the rate of geographical distribution of bovine hypodermosis in different areas might be due to the differences in the environmental conditions (topography of the land, season, humidity, temperature, climate, rain fall, wind velocity)

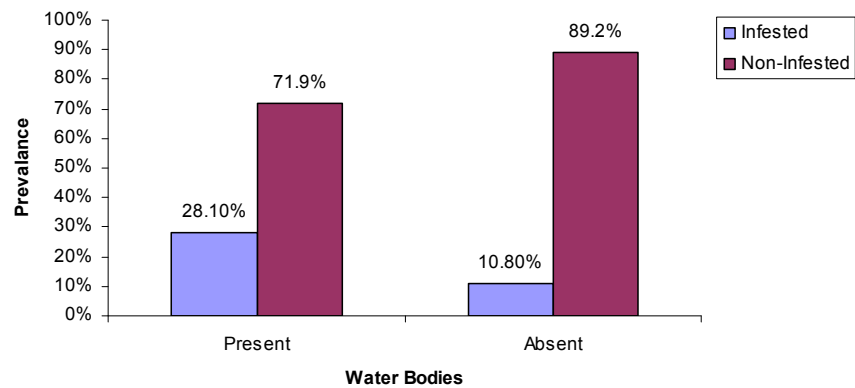


**Fig 4.** Role of Grazing Pattern in the geographical distribution of Bovine Hypodermosis from different districts of Northern Punjab, Pakistan

**Sekil 4.** Pakistan'ın Kuzey Pencab Bölgesi'nin farklı sürülerinde siğır Hypodermosis'inin coğrafik dağılımında otlatma şeklinin rolü

**Fig 5.** Role of Water Bodies in the geographical distribution of Bovine Hypodermosis from different districts of Northern Punjab, Pakistan

**Sekil 5.** Pakistan'ın Kuzey Pencab Bölgesi'nin farklı sürülerinde siğır Hypodermosis'inin coğrafik dağılımında su kaynaklarının rolü



## DISCUSSION

In the present study the Prevalence of bovine hypodermosis in cattle from northern Punjab was 18.4% (184/1000). The results show that the geographical distribution in the Rawalpindi and Attock district was higher as compared with Jehlum and Chakwal district was 10.04% and 7.55% respectively. Our results correlate with the distribution of hypodermosis in different areas of district Chakwal 23.50%<sup>15</sup>. There is a wide variation in the geographical distribution of WFI among different parts of the world<sup>4</sup> and even within Pakistan<sup>12</sup>. The distribution of hypodermosis was recorded 21.62-23.8 percent in cattle<sup>16</sup>. Warble fly infestation (WFI) in cattle was recorded to be 29% in cattle in Dera Ghazi Khan District and 26% in cattle of Rajanpur districts<sup>17</sup>. WFI has also been reported from

affecting the development of the warble<sup>7</sup>.

The Topography of the villages is very important factor in the geographical distribution of bovine hypodermosis. Three type of topography were Hilly, Semihilly and plain were existing in this area. In the plane area the distribution was 8.9% (43/484). In semihilly area, the distribution was 30.8% (105/341). In the hilly area the distribution was 20.6% (36/175). So it is concluded from the results that the geographical distribution of hypodermosis in the hilly and semihilly area is higher as compared to the plane locations. The intensity of hypodermosis in hilly and semihilly area is higher due to suitable climatic conditions that favors the life cycle of hypoderma. Our results correlates with the other studies as Hypodermosis, is an important ectoparasitic infection of cattle and goats prevalent in hilly and semihilly areas of Pakistan<sup>15</sup>. Similarly, the Hypodermosis is

an endemic disease reported in mountainous areas of Pakistan<sup>16</sup>.

The grazing pattern is a very important geographical factor influencing the epidemiology of bovine hypodermosis. The geographical distribution in the animals having gone to field was 28.8% (179/622). The animal kept at home having distribution of hypodermosis was 1.3% (5/378). Other determinants affecting the distribution might include host specificity, breeds, husbandry and the use of insecticides. Many other factors can also influence the distribution of hypodermosis like grazing pattern<sup>19</sup>. Similarly, it was observed that the major risk factor for hypodermosis herd's positivity is the free grazing practice. The waterbodies is an important geographical factor influencing the bovine hypodermosis. The presence of Water-bodies is very important factor in the geographical distribution of bovine hypodermosis as shown in the results. Because the areas have water bodies having environmental condition (Relative humidity, Wind speed) that favors the developmental stages of *Hypoderma* larvae. So the geographical factors, Villages, Topography, Grazing pattern and water bodies has a significant effect on the geographical distribution of Hypodermosis in Northern Punjab, Pakistan as Shown in figures.

In Pakistan hypodermosis is an endemic disease that has a significant effect on the economy, because Pakistan is a major exporter of hides, leather and their products, so infested hides were not able to export so resulting a major economic losses.

It is concluded from the present study that the hypodermosis is a serious problem in the cattle of different villages of Northern Punjab, Pakistan. So it is very important to explore these disease in future in different areas of Pakistan. The government should control this disease, because is very important in livestock sector of Pakistan. This study is very useful in determining the geographical distribution of hypodermosis in the cattle of Northern Punjab, Pakistan.

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