INTERNATIONAL JOURNAL OF AGRICULTURE & BIOLOGY
ISSN Print: 1560–8530; ISSN Online: 1814–9596
08–039/IVM/2008/10–3–337–339
http://www.fspublishers.org

Full Length Article

Surveillance of Cattle Hypodermosis in District Chakwal, Pakistan

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ABSTRACT

Cattle are mainly reared for milk and draught purpose in this region. An epidemiological survey was conducted to find out the prevalence of hypodermosis in cattle in district Chakwal, Punjab, Pakistan. Total 4000 cattle were examined clinically in the field (n=2000) and slaughter house (n=2000), for grub infestation in the study area. The prevalence was 35.50 and 23.50% in the slaughter house and field, respectively. Prevalence was higher in males than in the females. In slaughter house, it was recorded as 39.50 and 31.50%, while in the field 26.50 and 20.50% in male and female respectively. Highest prevalence (41.81%) was recorded in calves. Hypodermosis was recorded only from September to December, which suggested that change of climatic conditions in the study area favours the fly activity and contributes towards the onset of disease.

Key words: Hypodermosis; Prevalence; Warble; Cattle; Chakwal-Pakistan

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 Slovac Republics, 49.2% in Greece, 85% in Italy, 52.3% in Spain, 40% in United Kingdom and 32-43% in Romania (O'Brien, 1997).

Pakistan 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 Pakistan (Khan *et al.*, 1994; Khan *et al.*, 2006) and causes huge economic losses due to the damage to hide, milk and meat productions. The aim of the present study was to determine the prevalence and dissemination of cattle hypodermosis in northern Punjab.

MATERIALS AND METHODS

Chakwal district (Latitude 30º-56′ & 72º-54′ longitude,

To cite this paper: Hasan, M., M.N. Khan, Z. Iqbal, I.A. Khan, S.A. Chaudhry and M.S. Sajid, 2008. Surveillance of cattle hypodermosis in district Chakwal, Pakistan. *Int. J. Agri. Biol.*, 10: 337–9

6609 square kilometers) is located in northern Punjab, Pakistan, borders by Rawalpindi and Attock -north, Jhelum-east, Khushab-south and Mianwali-west. The total population of the cattle in the Chakwal during study was 338387. A total of 4000 cattle (2000 each from field & slaughter house) of different age and sex were clinically examined for the prevalence of Hypoderma infestation.

The clinical examinations of infested and non infested animals were carried out in the field. The total number of warbles appeared on the back, flank and hump region of the infected animals were counted by the visual and hand palpation method. Larvae dropped on the ground from these warbles were collected and preserved in 70% ethanol (James, 1947) and identified (Zumpt, 1965). Prevalence of hypodermosis (%) was calculated based on the age, sex and breed of cattle. Months-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 AND DISCUSSION

Out of 2000 cattle examined, 710 (35.50%) were infested with warble fly in the slaughter house while 470 (23.50%) in the field. Highest prevalence of 71.45% was recorded in the month of December in slaughter house and 81.43% in field conditions (Table I). The number of nodules present on the back region, flank region and hump of the animals ranged from 2 to 61. Prevalence of hypodermosis was greater in males than in females. In slaughter house, the prevalence was 39.50 and 31.50% in males and females, while it was 26.50 and 20.50% in the field conditions (Table II). In slaughter house, 36.66, 28.22, 34.18 and 41.81% prevalence was found in bullock, cow, heifers and calves respectively. In the field, 24.22, 18.22, 22.63 and 28.36% prevalence was found respectively in bullock, cow, heifers and calves. 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.

In the last century, no proper research work has been conducted on the bovine hypodermosis in Punjab (Pakistan). Even, the information related to basic epidemiology of the disease in Pakistan 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 Slovac 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).

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).

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 Pakistan. Therefore, for the control of hypodermosis, proper prophylactic measures are imperative to reduce the intensity of damage caused by that parasite.

Table I. Month-based prevalence of hypodermosis in cattle in Chakwal, Pakistan

Months	Slaughter House		Field	
	Examined	Infested (%)	Examined	Infested (%)
May	166	-	166	-
June	166	-	166	-
July	167	63 (37.72%)	167	-
August	167	75 (44.91%)	167	-
September	167	86 (51.49%)	167	107 (65.26%)
October	167	97 (58.08%)	167	115 (69.64%)
November	167	103 (61.67%)	167	118 (74.25%)
December	167	121 (71.45%)	167	130 (81.43%)
January	167	91 (54.49%)	167	
February	167	72 (43.11%)	167	-
March	166		166	-
April	166	-	166	-
Total	2000	710 (35.50%)	2000	470 (23.50%)

Table II. Sex-based prevalence of hypodermosis in cattle in Chakwal, Pakistan

Animal category	Slaughter House		Field	
	Examined	Infested (%)	Examined	Infested (%)
Bullock	450	165 (36.66%)	450	109 (24.22%)
Calves	550	230 (41.81%)	550	156 (28.36%)
Total	1000	395 (39.50%)	1000	265 (26.50%)
Female				
Cows	450	127 (28.22%)	450	82 (18.22%)
Heifers	550	188 (34.18%)	550	123 (22.36%)
Total	1000	315 (31.50%)	1000	205 (20.50%)

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(Received 02 February 2008; Accepted 26 February 2008)