

PREVALENCE AND CHEMOTHERAPY OF WARBLE FLY INFESTATION IN GOAT POPULATION OF DISTRICT KHUSHAB, PAKISTAN.

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ABSTRACT: Warble fly (WF) is one of the serious threats affecting the goat production in Pakistan. The objective of the current study was to find out the prevalence and control of goat warble fly infestation (GWFI) in district Khushab, Pakistan. In the field, 780 goats were examined for the period of one year. Out 780 goats, 106 (13.58%) were found infested with WF. The rate of infestation in young animals (9.24%) was low as compared to the older animals (16.18%). Higher prevalence was observed in males (15.11%) as compared to the females (12.83%). The highest prevalence of GWFI was recorded in December. The nodules appearance on infested animals started in September and ended in the month of February. Geography of the study area favors the onset of fly activity and enhances the prevalence of the disease. Ivermectin was found highly effective against all development stages of *Przhevalskianasilenus* (WF) and no side-effects were observed.

Keywords: *Przhevalskianasilenus*, Epidemiology/prevalence, Ivermectin, Goats, Warble Fly Infestation, Pakistan.

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INTRODUCTION

Pakistan is an agriculture based country where most of the rural population is involved in rearing livestock for food as well as to earn their livelihood by selling the agro-livestock products. Among the goat producing countries in the world, Pakistan is ranked third largest goat producer after China and India. Goats grow faster among all other small ruminants. Present goat population in Pakistan is 66.6 million with 2.7% increase per annum (GOP, 2014).

Parasitic diseases adversely affect the health and production of small ruminants in developing countries like Pakistan. Among these diseases, goat warble fly infestation (GWFI) is the notorious and serious threat affecting the hide of the goat as well as milk and meat production. GWFI is a cutaneous myiasis which is caused by larvae of *Przhevalskianasilenus* (Tafti *et al.*, 2012) and is characterized by the presence of nodules on the lumbar and dorsal parts of infected animals. *Przhevalskiana silenus* (*P. silenus*) infestation, reduces the value of hides and requires carcass trimming that reduces carcass yield (Yosef and Yagoob., 2013). This disease was first observed in Italy and was later reported in many parts of the world (Azizi *et al.*, 2007; Papadopoulos *et al.* 1997; El-Azazy, 1996).

The warble fly infestation is endemic in cattle, buffalo, sheep and goats in semi-hilly, mountainous and riverine areas of Pakistan (Khan *et al.*, 1994). District Khushab (Latitude 32°-48' North & 71°-52' East longitude) is located in northern Punjab, between the

cities of Sargodha and Mianwali, near the river Jhelum. GWFI is known as also "Miru" by the local livestock farmers and community and they believe that GWFI is caused by beating the animals with stick of local plant named *Grewia asiatica*. The data regarding GWFI is less as compared to cattle hypodermosis as little work has been done on GWFI. Therefore, there is a scanty information related to epidemiology of the disease in study area.

The main aim of the current study is to find out the prevalence of GWFI in district Khushab, Pakistan. The effectiveness of different control measures was also investigated in the present study.

MATERIALS AND METHODS

A total of 780 goats of different age and sex were randomly selected and screened for the prevalence of GWFI in study area. Visual and hand palpation method was used to count the warbles present on back, hump and flanks of the infected goats. Ethanol (70%) was used for the preservation of the larvae dropped on the ground from these warbles. These larvae were identified according to previously described methods (Zumpt, 1965).

Prevalence of GWFI was calculated on the basis of age and sex of the examined animals. Months-wise distribution of the prevalence of the disease was also recorded. The prevalence of disease was declared significant ($P \leq 0.05$) or non-significant ($P \geq 0.05$) using the Pearson chi-square test (Azizi *et al.* 2007, Panadero, 2010)

A trial was also conducted to evaluate the efficacy of Ivermectin against WGFI. The naturally infested animals having warbles on the back were treated with injectable Ivermectin (MSD Netherland) subcutaneously at dose rate of 1ml per 50 kg of body weight. The evaluation of efficacy of Ivermectin and response of the drug was based on the number of warbles observed on treated and untreated goats.

RESULTS AND DISCUSSION

Warble fly infestation is one of the major parasitic problem of livestock in Pakistan. It causes low productivity and skin damages in livestock which led to severe economic losses to the farmers (Shah *et al.*, 1981). Goats were also affected by the warble fly infestation. Out of 780 goats examined in the field area of district Khushab, 106 (13.58 %) were found infested with GWFI. The highest prevalence (36.04 %) was recorded in the month of December, while the lowest prevalence (10.60 %) was recorded in the month of September (Table-1 and Fig-1). The rate of infestation recorded in Khushab was lower as compared to previously recorded in area of Chakwal and Feth Jhang which was 60.9 % and 50.0 % respectively (Shah *et al.*, 1981; Ayaz, 1998). Previously, high prevalence of disease (up to 71.68 %) was also reported from India, Iran, Italy, Greece and Jordan (Papadopoulos *et al.* 1997; Rafdar and Hajmohammadi, 2012).

The infestation rate (number of nodules observed on the back region of affected goats) was

comparatively higher in males than in females. In the examined animals, the prevalence was 15.11 % and 12.83 % in males and females, respectively (Table-2 and Fig-2). However, the observed difference was found to be non-significant ($P < 0.05$), which confirmed results of previous studies reported by (Yadav *et al.*, 2011 and Mosaet *et al.*, 2010).

Age was also found to be a factor involved in the higher percentage of GWFI. Older animals were found to be more affected. The prevalence of the disease was 16.11 % in two year old animals and 9.42 % in one year old animals (Table-3). These results were in accordance with the previous study conducted in the different region of the world (Yadav *et al.*, 2011). The low prevalence up to one-year old goats in comparison to two year-old goats might be due to stall feeding and clostral immunity in young animals (Yadav *et al.*, 2011) as well as grazing behavior of goats.

In the present study, 3rd stage larvae and nodules formation in subcutaneous tissue were observed in September and the perforations left by the *P. silenus* larvae were seen in November. From March to August, no larvae were observed in the examined animals. The observations regarding the months of infestation provide evidence on the life cycle of GWFI in the study area. It was observed that the adult flies were active in the study area from March to June due to favorable climatic conditions as compared to winter season (Tarry, 1980). These results were in accordance with the work of (Puccini *et al.*, 1986), indicating higher activity of adult flies from April to June.

Table-1. Month-wise prevalence of goat warble fly infestation in district Khushab.

Months	Examined Goats	Goats Infested with Warble Fly	Non Infested Goats
January	70	20 (28.6 %)	50 (71.4%)
February	68	09 (13.2 %)	59 (86.7%)
March	50	0	50 (100%)
April	55	0	55 (100%)
May	60	0	60 (100%)
June	58	0	58 (100%)
July	62	0	62 (100%)
August	60	0	60 (100%)
September	66	07 (10.6 %)	59 (89.3%)
October	70	15 (21.4 %)	55 (78.6%)
November	75	24 (32.0 %)	51 (68%)
December	86	31 (30.0 %)	55 (70%)
Total	780	106 (13.6 %)	674 (86.4%)

Many drugs have been used for the control of GWFI throughout the world. A trial was carried out in the present study to evaluate the efficacy of Ivermectin for the treatment of GWFI. The avermectin is closely related to macrocyclic lactone derivatives which were produced as fermentation metabolites of *Actinomycetes* of the

genus *Streptomyces*. These derivatives had a wide spectrum activity against nematodes and arthropod parasites (Benakhla *et al.*, 1994). In this study Ivermectin was used @ 1ml per 50 Kg body weight for the treatment of GWFI. It was also observed that the goats treated with Ivermectin gave a good response at day 21 post-

treatment. All the nodules degenerated following Ivermectin injection showed no perforations in the skin in any of the treated goat. However, control animals were found to be infested with warble flies. The results in present study were found to be highly effective against warble fly infestation which confirmed the findings of (Khan *et al.*, 1994; Cozma and Suteu, 1995; Ayaz., 1998 and Ma *et al.*, 2003). It is evident from the results of the present study that Ivermectin was a better insecticide for the control of GWFI. It is also worth mentioning that in contrast to the percent control in number of warbles on

treated animals, the number of warbles remained the same in untreated control group.

Warble fly infestation is a serious threat to the economic significance of goats in Pakistan and its eradication is strongly recommended. The warble fly is prevalent in the study area (district Khushab). The warble formation, perforation in the skin and shedding of larvae occurs in the months of September till February. Ivermectin was found to be highly effective and is recommended as a drug of choice for the treatment of GWFI.

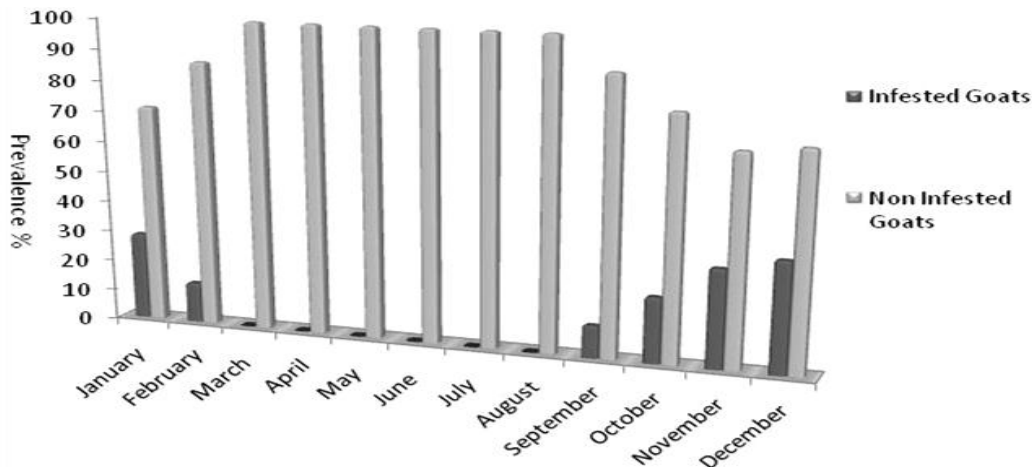


Fig-1. Month-wise prevalence of goat warble fly infestation in district Khushab.

Table-2. Sex-wise prevalence of goat warble fly infestation in district Khushab

Male		
AnimalCategory	Examined	Infested
Male Goat	143	29 (20.3 %)
Male Kid	115	10 (8.7 %)
Total	258	39 (15.1 %)
Female		
AnimalCategory	Examined	Infested
Female goat	345	55 (15.9 %)
Female Kid	177	11 (6.2 %)
Total	522	67 (12.8 %)

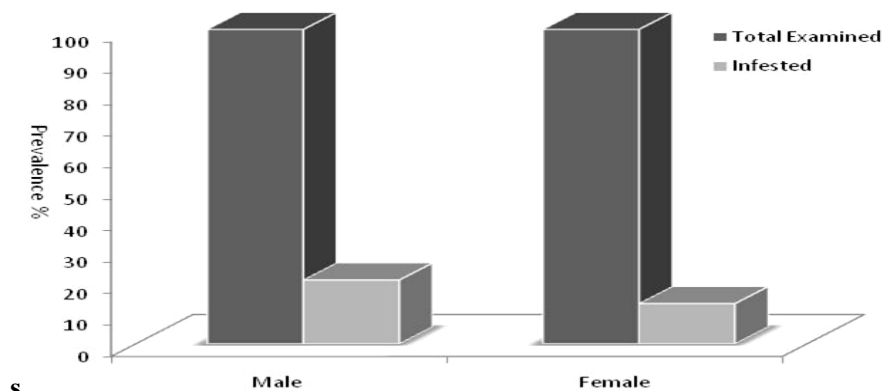


Fig-2. Sex-wise prevalence of goat warble fly infestation in district Khushab.

Table-3. Age-wise prevalence of goat warble fly infestation in Khushab.

Age (Months/Years)	Khushab Examined	Per cent Infested
>1year	292	27 (9.2 %)
<1year and >2 Year	488	79 (16.2 %)

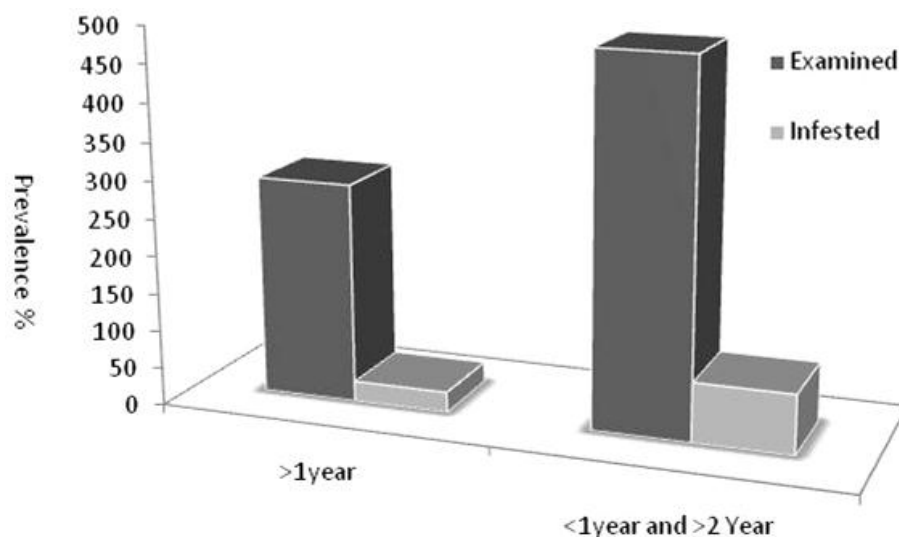


Fig-3: Age-wise prevalence of goat warble fly infestation in district Khushab.

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