

Prevalence of *Sarcoptes scabiei* var. *caprae* infestation in goats of Multan, Pakistan

Mushtaq H. Lashari, Shumaila¹ Zahida Tasawar¹

Department of Life Sciences, The Islamia Unibversity of Bahawalpur

¹The Institute of Pure & Applied Biology, B. Z. University, Multan

*Corresponding author, E-mail address: mushtaqdashary@gmail.com

Abstract

Mange has posed a serious economic problem in small ruminants' animal production. It is contagious skin disease, reducing the meat quality by causing skin damage, weight loss, irritation and death in severe cases. This study was assessed the prevalence of *Sarcoptes scabiei* var. *caprae* in goats in selected areas of Multan. For this purpose, 200 goats (30 males and 170 females) were examined. Depending upon the age, these animals were divided into three groups: 5-27 (n=88), 28-50 (n=91) and 51-73 (n=21) months. Out of 200 hosts examined 71 were found infested with *S. scabiei* var. *caprae* showing an overall prevalence of 35.5%. The prevalence of *S. scabiei* var *caprae* in female hosts was 36.47% versus 30% in males, the difference was statistically non-significant (P>0.05). The prevalence was highest (46.15%) in age group of 28-50 months and lowest (25%) in age groups of 5-27 months. The difference was statistically significant (P<0.05). Among the three breeds (Nachi, Teddy and Beetal), the highest prevalence (40%) was recorded in Nachi while the lowest prevalence (29.68%) was recorded in Beetal. However, the difference was statistically non-significant (P>0.05). These results indicate that the sex or breed had no effect on the prevalence of *S. scabiei* var *caprae*.

Keywords: mange, age, sex, goat, breed

Introduction

Small ruminants occupy a very important position in livestock production by the rural populace in Pakistan. The economic survey of Pakistan (2016) puts the population of goat at 68.4 millions. Goats play an important and frequently underestimated role in a range of agricultural systems worldwide (Hoste et al., 2010). Goat farming is generally favored by farmers in countries with a relatively arid and unpredictable climate where the goat's greater ability to convert poor-quality forage into meat and milk makes it more valuable than other forms of livestock (Hoste et al., 2010).

Goats are affected by a variety of ectoparasite species, often sharing ectoparasitic diseases with sheep (Ganjali et al., 2014). Scabies is a common parasitic skin disease among the diseases of small ruminants and affects all species of animals. It has become an important disease problem causing the loss of up to 93% of small ruminants in severely affected areas (Blood et al., 1983). Animals can die from dehydration, toxic reactions, secondary infections, or hypothermia due to excessive hair loss (Baniecki and Dabaan, 2000). *Sarcoptic scabei* not only causes direct economic loss to the farmer through animal mortality and poor growth and reproduction, the skin of mange-infested animals often must be downgraded or rejected at the tannery. This leads to economic losses to the tannery industry and ultimately the country (Mekonnen et al., 1999).

Although considerable work has been done in

various parts of the world (Mahran and Saleh, 2004; Alterio et al., 2005; Yakhchali and Hosseine; 2006; Abu-Samra et al., 1984) and in Pakistan (Jabeen et al., 1998; Aatish et al., 2007; Aziz et al., 2013; Lashari et al., 2016) but no work has been done on goat scabies in different areas of Multan. Keeping in view the importance of parasite, the project was designed with following aims, to study the overall prevalence of mange, relationship between sex, age and breed of hosts and mange parasite.

Materials and Methods

Location of Study Areas

This study was carried out in seven private goat farms viz. (Band Bosen (n=20), Salar Wahn (n=40), Lutaf Abad (n=25), Basti Ratta (n=30), Basti Yary Wali (n=30), Nawab Pur (n=23) and Basti Nau (n=32) in and around Multan during January to March, 2013, to determine the prevalence of mange. The study area is about 400 feet above sea level and falls within latitudes 30.11'ON and longitudes 71.27'OE. The climate of the area is hot summer and cold winter. It receives a mean annual precipitation of 175mm. The mean temperature was 18°C during the study period.

A total of 200 goats including females (n=170) and males (n=30) were thoroughly examined for the prevalence of mange infestation like lesions on different parts of the body such as head, face, neck, breast, brisket and tail. A complete history of each animal like age,

sex and breed was recorded. The collected samples were transferred to labeled bottles containing 10% formalin as preservative. Permanent mounts were made to study the structure of mite in detail for the diagnosis of various species (Cable, 1985).

The mites were washed with distilled water to remove the fixative. The washed specimens were placed in 10% KOH until the host tissues dissolved. Then the parasites were washed with distilled water to remove the alkali. The specimens were dehydrated with graded series of alcohol i.e. 10%, 30%, 50%, 70%, 90% and 100% alcohol. The dehydrated specimens were cleared in xylene, mounted in Canada balsam and identified under the microscope.

The prevalence of mange in goats of various groups, sex and breed was computed in percentage. Data obtained on number of animals infested with mange were summarized as percentage of the total number of animals observed. In order to see the magnitude of variation in the prevalence of mange among goats of various groups, sex and breed the data were analyzed statistically using Chi square test. $P < 0.05$ were considered statistically significant.

Results and Discussion

The present study demonstrated that mange mites are one of the most important ectoparasites of goats of all age groups and both genders. During the present study two hundred goats were examined. The overall

prevalence of mange in goats was calculated and the results are shown in Table 1. According to the present study *S. scabiei* var. *caprae* had an overall prevalence of 35.5%. Research has been carried out on the prevalence of *S. scabiei* in different parts of the world.

The higher 73% prevalence was reported by Leon-Vizcayno et al., 1999 in Spanish ibex captured in different areas of the nature park was naturally infected with the *S. scabiei*. Zeleke and Bekele (2001) assessed the prevalence rates of the major parasites of camels the prevalence rates for *S. scabiei* varied from 4.7% during the dry season to 21.7% during the rainy months. The low prevalence was recorded in dogs (7.0%) than the present study (Rodriguez-Vivas et al., 2003).

Tancredi et al. (2005) studied the host-relationship between *Psoroptes equi* and horses. Skin scrapings from 107 (9.5%) horses with signs of *Psoroptic* mange resulted in 37 (34.6%) positive animals for *P. equi*. According to Ganjali et al., 2014 out of 77 sheep, two sheep (2.6%) were infested by *S. scabiei* during their studies on the prevalence of ectoparasites fauna of sheep and goats flocks in Urmia suburb, (northwest region of Iran). Aatish et al. (2007) recorded 6% prevalence of *S. scabiei* in sheep during their survey in district Dera Ghazi Khan, Pakistan. More recently observed that of mange mite affecting the goat *Sarcoptes* is the most prevalent species in Pakistan, corroborating previous reports by the authors. The incidence might be associated with the dominant type of mite species in the current area of study.

Generally, the prevalence of mange was low 6% reported by Aatish et al. (2007) 8.11% for goats in Pakistan and 0.95% for goats in Ethiopia (Kassaye and Kebede, 2010). It is expected that mange mite infestation will be higher in ideal microclimate environment which favours the breeding and multiplication of mange mite eggs and their developmental stages (Pangui, 1994).

The sarcoptic mite is often correlated with poor feeding and general mismanagement, agreeing with previous reports by Radostitis et al. (2000). Furthermore, Yakhchali and Hosseine (2006) in a study on prevalence and ectoparasites fauna of sheep and goats in Iran revealed that maximum infestation by *S. scabiei* occurred in winter, confirming a review by Gonzalez-Candela et al. (2004) that most outbreaks occur in cold months of the year. This could partly account for lower rate of mange infestation in the environment under consideration characterized by high temperatures.

This difference in the prevalence of *Sarcoptes* spp. reported from various studies may be due to the differences in resistance to infection, host age, sex, crowding, poor nutrition, grazing habits and breeds of the host. The results of present study are in agreement with results of the studies conducted by Alterio et al. (2005 and Tancredi et al. (2005).

A possible explanation for this differences in the prevalence among different studies could be variations in environmental and host factors, study seasons,

owners knowledge of mites and animal husbandry and managements as has been argued previously (Ganjali et al., 2014). It also implies that the climatic conditions of the current study areas are more suitable for survival, reproduction and development of various stages of mites.

The relationship between sex and *S. scabiei* var. *caprae* in goats was examined and the results are shown in Table 2. According to these results the prevalence of *S. scabiei* var. *caprae* was higher in females 36.47% as compared to males 30%. Similar results were reported by Jabeen et al. (1998) the prevalence of sarcoptic mange in buffalo calves around Lahore city. Sex of the calf did not seem to influence the prevalence 51.42% for male calves and 48.58% for females. In camel 810 male and female camels and concluded that mange mites were more prevalent with a higher intensity in female than in male camels (Mahran and Saleh, 2004). In Barbary sheep recorded a higher infection rate in males 21.9% than in females 16.6% or young animals 5.1% (Gonzalez-Candela et al., 2004). The males over 5 years old were the worst affected group, followed by sub adults of both sexes. According to the study conducted by Soulsbury et al. (2007) *S. scabiei* had dramatically reduced red fox populations *Vulpes vulpes* in several countries. Mange infection reduced the reproductive potential of males and females: females with advanced mange did not breed; severely infected males failed to undergo spermatogenesis.

Although the difference was not statistically significant, the slightly higher prevalence of *Sarcoptes* species in females may be due to lower resistance as compared to male hosts (Mahran and Saleh, 2004). The same factor could be responsible for the higher prevalence of parasite in male goats (Aatish et al., 2007).

The relationship between age and *S. scabiei* var. *caprae* in goats was studied and the results are presented in Table 3. According to these results, highest prevalence (46.15%) was observed in age group of 28-50 months and lowest prevalence 25% of parasite was recorded in age groups of (5-27) months. The difference was statistically significant ($P < 0.05$). A similar finding was reported in recent studies conducted by Lashari et al. (2016) in Dumbi sheep in Pakistan. The higher prevalence of sarcoptic and demodectic mites in adults than young goat in the current study is in line with the previous observations (Aatish et al., 2007) and most probably reflects the under-developed immunity in adult animals.

The present results are in agreement with the earlier studies of (Yeruham et al., 1999) Infestation rate was higher in older animals than in younger ones. Older camels were more susceptible than younger individuals (Mahran and Saleh, 2004). There was a higher infection rate in adult males (21.9%) than in females (16.6%) or young animals (5.1%). Males over 5 years old were the worst affected age group, followed by sub adults of both sexes (Yeruham et al., 1999).

The present results were contradicted as reported by Aatish et al. (2007) in district Dera Ghazi Khan, higher prevalence of mange mite was observed in younger animals aging less than six month old (6.9%). During the epizootic phase (1994-1995), juvenile and adult fox mortality increased. In the enzootic phase, juvenile mortality was significantly higher (Soulsbury et al., 2007).

The results of present study are in agreement with results of the studies conducted by Mahran and Saleh (2004); Alterio et al., (2005) showing higher prevalence in adults. According to all these studies the prevalence of *Sarcoptes* species is higher in adult hosts as compared to younger animals. According to studies conducted on the relationship of immunity and parasitic diseases, the parasitic diseases are more prevalent in younger hosts as compared to older hosts. But under certain circumstances the immunity in the older hosts may be lowered, due to various stresses, e.g. pregnancy, poor nutrition and reduced ovulation.

The relationship between breed and *S. scabiei* var. *caprae* in goats was examined. The results are presented in Table 4. According to these results, the prevalence of *S. scabiei* var. *caprae* was highest in Nachi breed 40% and lowest in Beetal 29.68%. Breeds of the hosts showed significant effect on the prevalence as reported in previous studies by Aatish et al. (2007) in sheep the higher prevalence of mange mite was observed in Desi breed 7.6% as compared to Kachhi breed in Dera Ghazi Khan.

Tasawar et al. 2007 found significant breed difference in vulnerability to parasitic infection. They clarify that the breed differences could be due to variation in resistance to parasitic disease, because some breeds have better resistance than others. The differences in the prevalence of *S. scabiei* var. *caprae* in different breeds of goats may be due to mange symptoms are activated more often in some breeds than others because of the weaker immune system (Rodriguez-Vivas et al., 2003). The mite produces a substance that can also lower the animal's resistance to the

mite. Moreover, in Pakistan the farmers are not well acquainted with modern livestock management practices.

In conclusion of this study point out that infestation of mange mites is a quite common problem of goat populations in Multan. Such infested goats are more susceptible to various viral and bacterial diseases, which may make goat production un-economical and put extra burden on goat growers. A mange eradication program should be launched for better and more profitable goat farming.

Table 1: The overall prevalence of *Sarcoptes scabiei* var. *caprae* in Multan

Name of parasite	No. of hosts examined	No. of hosts infected	Prevalence
<i>Sarcoptes scabiei</i> var. <i>caprae</i>	200	71	35.5%

Table 2: The relationship between sex and *Sarcoptes scabiei* var. *caprae* in Multan

Sex	Male	Female
No. of hosts examined	30	170
No. of hosts infected	09	62
Prevalence	30%	36.47%

The difference was statistically non-significant ($P > 0.05$).

Table 3: The relationship between age and *Sarcoptes scabiei* var. *caprae* in Multan

Age of hosts (months)	No. of hosts examined	No. of hosts infected	Prevalence
5-27	88	22	25%
28-50	91	42	46.15%
51-73	21	7	33.33%

The difference was statistically significant ($P < 0.05$)

Table 4: The relationship between breed and *Sarcoptes scabiei* var. *caprae* in Multan

Names of breeds	No. of hosts examined	No. of hosts infected	Prevalence
Nachi	90	36	40%
Teddy	46	16	34.78%
Beetal	64	19	29.68%

The difference was statistically non-significant ($P > 0.05$)

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