

Prevalence and Chemotherapy of Mites Infestation in Sheep: A Case Study of District Bolan, Balochistan

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Abstract

Present study sought to determine the prevalence and chemotherapy of mite's infestation in sheep as the case study of district Bolan, Balochistan Pakistan. A total of 200 sheep were randomly selected so as to detect the prevalence of mites' infestation. Data was maintained describing date wise observations. The prevalence was checked by applying Chi-square design by using SPSS software. While chemotherapy results were analyzed by using the One-Way-ANOVA. A probability level of <0.05 were considered as significant differences. Results shows that total 200 sheep were observed by using the standard procedure of scraping technique and 30 sheep were found positive for mite's infestation and an overall prevalence was 15% (30/200). Most of cases for mite in sheep were noted from union council Jalal Khan of District Bolan. High prevalence was observed in male sheep. Out of 50 Balochi sheep breed 11 sheep were found positive for mite's infestation. After that next highest prevalence was noticed in Rakhshani sheep breed. Out of 50 Rakhshani sheep breed 9 sheep were found positive for mite's infestation. Statistical analysis showed chi square value is 32.1667 and p value is 0.0001 that a probability level $p > 0.05$ were considered as significant. Data shows association between age and mite's infestation is strong.

Keywords: Balochistan, Bolan, chemotherapy, mites, sheep

Introduction

Sheep (*Ovis aries*) is one of the chief sources of meat, wool, skin and dung for domestic use by the residents of Pakistan (Durrani *et al.*, 2008). The most common parasites that are found outside body of sheep are flies, lice, mange mites and ticks (Hungerford *et al.*, 1975). Ectoparasites are a global problem, and affect the quality of wool and skin and cannot be eliminated completely therefore, ectoparasites usually managed and treated with insecticides, some also act as a vectors for other parasites. The mites also harm indirectly, disorder, rubbing, and grazing time reduced and in most of cases to self-wounding (Wall *et al.*, 2007). In between the Chelicerates, (mites and ticks) characterize the biggest and most wide spread taxon, with a valued 0.5–1 million species. More than 48,000 species defined (Halliday *et al.*, 2000).

However, most common parasites that lives outside of body of sheep are mites and are mainly accountable for skin damage and low quality wool, anemia, effect body condition, decrease growth rates, low milk and reduced meat production (Soulsby, 1982; Fthenakis *et al.*, 2000). Approximately US\$ 14.4 million production losses around the world due to mite's infestation These make a number of restrained and unselective diseased situations due to which animals become more prone to subsidiary infections (Blood *et al.*, 1983).

Sarcoptic, demodectic, psoroptic and chorioptic are four basic types of mites, which are the reason of mite's infestation in livestock (Radostits *et al.*, 1994). *Psoroptes ovis*, is an extensively distributed specie of mites in the world which mainly infest skin of sheep. Chorioptic mites is the specie that is found more in sheep and goats and less in cattle and horses (Soulsby *et al.*, 1982). Mites that may damage hide and skin is demodex so due to this major losses occurs; if mites infested sheep remain untreated then animal may expire due to lack of treatment and secondary infection (Radostits *et al.*, 1994). The disease is described by different incubation period of a few weeks to several months (O'Brien, 1999; Berriatua *et al.*, 1999). Mites may spread during suckling of lambs or it by direct contact with infected sheep (Schmidt *et al.*, 1949). Mange mites infestation in sheep is a common skin problem and is mostly caused by various mites species (Sweetman *et al.*, 1958) resulting in 30 % loss in body weight of sheep (Kirkwood, 1980).

Sheep scab is present in many sheep producing countries of the world. Sheep scab was eradicated from UK early 1950 but again infection was found when infected sheep were imported. Mange may occur at any age of sheep under poor management. Mite infested sheep are more susceptible to different secondary infections, due to which sheep production is costly. Effects of temperature and season have been studied earlier in India and in a foreign country (Basu *et al.*, 1952) and mites infestation was high during cold climate. In autumn and winter due to low temperature and high humidity favors the multiplication of mite's infestation in sheep. So that's the reason that cases of mite's infestation was maximum. According to season spread of mites infestation differs, the infestation of mites being present in areas such as axillae, infra-orbital fossa, hearing canal and found during spring, summer and early autumn season (Urquhart *et al.*, 1996) and also in winter.

Estimated population of sheep in Pakistan is 27.8 million. According to livestock census sheep population showed an increasing trend of 0.12% per annum during 1996-2010 in Pakistan. A similar development was witnessed in the sheep rearing area of Baluchistan (GoP, 2009-10). Pakistan having Balochistan province which comprises 44 percent of the total land area of Pakistan. Though, out of the total population of country only 4.9% people exist in Balochistan province. Maximum part of Balochistan is rangeland and less is arable. Balochistan province contribute 20% of national level. Because of low manufacturing capacity and less availability of infrastructure, the province economy has kept the province less developed (FAO, 2002). In Agriculture is 55%, 11.4% of National GDP of Pakistan and more than 47% in the economy of Balochistan. 93% area of the Balochistan province includes rangelands out of which just 28% are considered fair to good for livestock production. Balochistan province contributes 46% of total sheep population of country. Small ruminants of Balochistan have important share in livestock of province contributing 28% sheep and 22% goat population. Sheep population in Bolan is 124,569.

Problem statement

Area wise Balochistan is the biggest province of the Pakistan but underprivileged area within term of physical infrastructure, extreme poverty and low human indexes. Four distinct the breeds of sheep found in Balochistan such as Balochi, Bibrik, Harnai and Rakhshani. So far no research has been conducted at that province level in this regard lack of information's were existed regarding the prevalence and chemotherapy of mites in sheep particular, in tehsil Bhag district Bolan, Balochistan. At national level earlier research studies were conducted by Alvi and Khan (1963), Hassan (1989) Afzal *et al.*, (1995) and Hafeez *et al.*, (2007), shows that Psoroptes, Sarcoptes and Chorioptes are three most important genera of mites which affect livestock population of Pakistan (Afzal *et al.*, 1995, Hafeez *et al.*, 2007). Mite's infestation has also a zoonotic significance as the infection can be shifted when human beings come in direct contact with infected animal during milking or handling (Dominguez *et al.*, 1977). Keeping in the view significance of study present was carried out so as to determine the prevalence and chemotherapy of mite's infestation in sheep as the case study of district Bolan, Balochistan Pakistan.

Study objectives

Following were the specific objectives of the study:

- To check the prevalence of mites in sheep in the study area
- To check the efficacy of Ivermectin, Seguvan, Nicotiana Tobacum in infested sheep in the study area.

Methodology

A total of 200 sheep were randomly selected to study the prevalence of mites' infestation. Data was maintained describing date wise observations. Technique of skin scrapings was obtained from selected sheep that were have lesion. Selected sheep were sampled throughout the study.

- Skin scrapings was taken from the part of the lesions, scrapings were done on three areas of each animal and approximately, 1 to 2 cm area was scraped from each site.
- Before sampling scalpel blade was dipped into glycerin.
- 6-8 cm² area of skin scraped sample was obtained. Sampling was done to check the mites (e. g. Sarcoptes species) until the oozing of blood from the scraped area (Hendrix *et al.* 1998).
- Skin scraping sample from every sheep was moved into a Petri dish.
- Within 6 hrs. of collection Samples were examined.

- Skin scraping was transferred in a test tube containing 5 or 10 ml of KOH 10%.
- Then tubes were kept in a water bath having temperature of 60-80°c for 15 minutes then centrifugation was done with a speed of 1500-2000 rpm for 5 minutes.
- Supernatant was discarded and sediment was mixed properly in a test tube.
- With the help of pipette some drops were taken from the sediment of sample, placed them on a glass slide and covered it with a cover slide.
- Then it was examined under microscope with x10, x40, x100 powers to confirm the presence of parasite for the diagnosis of species Prevalence of mite infestation in sheep was calculated by formula as described by (Thrushfield, M. *et al.*, 1995).

$$\text{Prevalence} = \frac{\text{No. of animals positive at particular point in time}}{\text{Total No. of Animals examined at particular point in time}} \times 100$$

Total No. of Animals examined at particular point in time

For chemotherapy 30 sheep positive for mange mites through skin scraping test were randomly selected and divided into 3 groups of viz A, B, C. Each group contain 10 no of sheep. Sheep's in group A were injected ivermectin at 0.2mg/kg bw subcut while the animals in group B were treated with trichloroforn in the form of 0.15% solution as topical application. The members in group C were treated topically with aqueous extract of *Nicotiana Tobacum* (tobacco). Treatment were done on day zero and repeated on day 15. The sheep in each group were examined in routinely and samples of skin scraping were collected at day 0, 7, 14 and 28 days (Habib *et al.*, 2009). The effectiveness of particular treatment was estimated on the basis of reduction of clinical sign and negative skin scraping. Nicotine is basic ingredient available in tobacco which is excellent miticidal effect against various health problems. It was used for treatment of mange infestation of sheep. Preparation of Aqueous *Nicotiana Tobacum* extract

1. *Nicotiana Tobacum* leaves were collected and dried.
2. Dried leaves were grounded to powder manually.
3. 100 ml water solution was made comprising 20 mg *Nicotiana tobacum* powder.

The prevalence was checked by applying Chi-square design by using SPSS software. While chemotherapy results were analyzed by using the One-Way-ANOVA. A probability level of <0.05 were considered as significantly differences.

Results

200 sheep of different breeds, age and area were examined. Chief effected areas were head, neck, hind legs. Severe itching and rubbing, loss of wool (alopecia) and progressive skin lesions with dried crusts on the back and the sides of the body are also witnessed (Kirkwood *et al.*, 1980).

Table. 1: Over all prevalence of Mange Mites in sheep in Tehsil Bhag of District Bolan

Total sheep	Positive	Overall prevalence%
200	30	15%

Total 200 sheep were observed by using the standard procedure of scraping technique and 30 sheep were found positive for mite's infestation and an overall prevalence was 15% (30/200) as shown in table-1. Most of cases for mite in sheep were noted from union council Jalal Khan of District Bolan. High prevalence was observed in male sheep.

Table. 2: Prevalence of Mange Mites according to breed

S. No	Breed	Total Observed Sheep	Positive Cases	Prevalence %	P value
1	Balochi	50	11	22%	0.001
2	Rakhshani	50	9	18%	
3	Biverigh	50	6	12%	
4	Hernai	50	4	8%	
Total		200	30		

The four breeds of Balochistan comprising of Balochi, Biverigh, Hernai, and Rakhshani were examined from different regions of Tehsil Bhag of District Bolan. Detailed general examination of sheep and by application of skin scraping technique results showed that highest prevalence was noted in Balochi sheep breed. Out of 50 Balochi sheep breed 11

sheep were found positive for mite's infestation. After that next highest prevalence was noticed in Rakhshani sheep breed. Out of 50 Rakhshani sheep breed 9 sheep were found positive for mite's infestation. On the other hand 6 out of 50 Biverigh sheep breed and 4 out of 50 sheep of Hernai sheep breed were observed positive for mite's infestation. Statistically results shows chi square value is 17.1677 and p value is 0.001 that a probability level $p > 0.05$ were considered as significant. There were very strong association between breeds and mites infestation as shown in table-2.

Table. 3: Prevalence of mange mites according to age

Serial Number	Age	Total Observed sheep	Positive Cases	Prevalence%	P value
1	Less than 1 year	50	12	24%	0.0001
2	1 year	50	10	20%	
3	2 year	50	5	10%	
4	3 years	50	3	6%	
Total		200	30		

200 sheep were studied. Sheep were divided in to 4 groups. Each group contain 50 sheep. Sheep of less than one years, one years, two year, 3 years were studied. Maximum prevalence was found in young animals as compare to old age. Statistical analysis showed chi square value is 32.1667 and p value is 0.0001 that a probability level $p > 0.05$ were considered as significant. Data shows association between age and mite's infestation is strong.

Table. 4: Therapeutic effects of different drugs

Groups	Animals cured at day n (%)			P value
	7	14	28	
A (n=10)	8 (80%)	9 (90%)	9 (90%)	0.40
B (n=10)	6 (60%)	7 (70%)	8 (80%)	
C (n=10)	7 (70%)	5 (50%)	6 (60%)	

Animals were negative both clinically and skin scraping test. The effects of different drugs including Nicotiana Tobacum (Tobacco), Seguvan and Ivermectin were observed. 30 animals were selected for chemotherapeutic trials and divided in to 3 groups viz A, B, C and each group contain 10 number of sheep. Sheep in group A were injected Ivermectin at 0.2mg/kg bwt subcut while the animals in group B, were treated with Seguvan (Trichlorofon) in the form of 0.15% solution as topical application. The members in group C were treated topically with aqueous extract of Nicotiana Tobacum (tobacco). Treatment were done on day zero and repeated on day 15. The sheep in each group were examined in routinely and samples of skin scraping were collected at day 0, 7, 14 and 28 days (Habib *et al.*, 2009). The result was concluded by using ANOVA to check the efficacy of different drugs. *P-value* of the treatment 0.40 so statistically results shows that data is significantly different ($p < 0.05$) between different drugs as shown in table 4.

Summary

A total of 200 sheep were randomly selected to study the prevalence of mites' infestation. Skin scraping technique was used. For chemotherapy 30 sheep positive for mange mites through skin scraping test were randomly selected and divided into 3 groups of viz A, B, C. Each group contain 10 number of sheep. Sheep's in group A were injected Ivermectin at 0.2mg/kg bwt subcut while the animals in group B, were treated with Trichloroform in the form of 0.15% solution as topical application. The members in group C were treated topically with aqueous extract of Nicotiana Tobacum (tobacco). Treatment were done on day zero and repeated on day 15. The sheep in each group were examined in routinely and

samples of skin scraping were collected at day 0, 7, 14 and 28 days (Habib *et al.*, 2009). The effectiveness of particular treatment was estimated on the basis of reduction of clinical sign and negative skin scraping.

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