

Prevalence of Sheep Mange in District Dera Ghazi Khan (Pakistan) and Associated Hematological/Biochemical Disturbances

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ABSTRACT

The present study was carried out to assess the prevalence of mange mite infestation in district Dera Ghazi Khan (D.G. Khan) and to investigate the effect of sheep mange on different blood and biochemical parameters. Total 400 sheep of different age, sex and breeds were examined from 20 flocks selected in 14 union councils (UC) of Taunsa Shareef. Of 400 selected sheep, only 40 sheep suspected for having clinical signs of mange were examined for presence of different mites through skin scraping examination. For comparison of hematological and biochemical parameters of healthy and infected animals, nine healthy and nine infested sheep of Pak Karakul breed were selected from Livestock Experiment Station, Rakh Khairwala. Prevalence of mange in sheep was recorded as 6% and only one species *Sarcoptes scabiei* var. *ovis* was found infesting in Tehsil Taunsa Shareef District D.G. Khan. Maximum cases (8.9%; 4/45) were recorded from UC Vehoa and Nari. Higher prevalence of mange mite was observed in younger animals aging less than six month old (6.9%), male sheep (10%) and Desi breed of sheep (7.6%). In mite infested animals, total erythrocyte count (TEC), hemoglobin (Hb) and packed cell volume (PCV) was found to be lower, while erythrocyte sedimentation rate (ESR) and total serum proteins (TP) were higher as compared to healthy animals. Additionally, eosinophilia was also observed in infested sheep. Mange mite infestation is an important problem in the study area, which needs proper attention of the concerned quarters.

Key Words: *Sarcoptes scabiei*; Sheep; Prevalence; Hematology

INTRODUCTION

The common external parasites of sheep are flies, lice, mange mites and ticks (Hungerford, 1975). Among these, mange mites are the notorious ectoparasites of sheep and are responsible for great economic losses due to damaged skin and wool, anemia, poor physical condition, decreased milk and meat production and suboptimal lambing and growth rates (Soulsby, 1982; Fthenakis *et al.*, 2000). The mange mites produce a number of local and generalized diseased conditions and diseased animals become more prone to other bacterial and viral infections (Blood *et al.*, 1983).

Mange may occur in farm animals of any age, especially those kept under poor management. Mange mites spread through direct contact between sheep or from ewe to lamb, while suckling (Schmidt, 1949). It may infest the sheep throughout the year but mostly occur in winter (Neog *et al.*, 1992). Mange mites are mainly of four types i.e., sarcoptic, chorioptic, psoroptic and demodectic (Radostits *et al.*, 1994). In sheep, *Sarcoptes* spp. is an important cause of mange that leads to itch, dermatitis and intense pruritis due to which animals loose much of the grazing time and hence loose general body condition. Later on, vesicles and papules appear, skin becomes thickened, covered with pale scabs and wool is lost (Radostits *et al.*, 1994). It has also a zoonotic importance as the infection can be transferred from sheep to human beings during milking or sheep husbandry

(Dominguez *et al.*, 1977). Chorioptic mites are less common in sheep and goats as compared to cattle and horses (Soulsby, 1982). Demodectic mange causes significant losses due to damage to skin and hides; if animals remain un-treated death may occur due to secondary bacterial invasion (Radostits *et al.*, 1994).

Despite its importance, mange has not been given due attention and its prevalence is still un-known in many areas of Pakistan. Keeping in view the importance of mange mites, this study was planned to determine the prevalence of various species of mange mites and to investigate the hematological/biochemical disturbances associated with mange in sheep.

MATERIALS AND METHODS

Study area. The study was carried out in Tehsil Taunsa Shreef, district D.G. Khan located in South-west of Punjab province (Pakistan). The district of Dera Ghazi Khan covers an area of 8493 km². The district is a long narrow strip of country, 317 km in length, sloping gradually from the hills, which form its western boundary to the river Indus on the east. Below the hills the plain is high and arid, generally level, but sometimes rolling in sandy undulations and much intersected by hill torrents, 201 in number.

Selection of animals. Twenty flocks of sheep, with at least 40 animals each, were selected from 14 union

councils (UC) of Tehsil Taunsa Shreef viz. Vehoa, Tibbi Qaisrani, Nutkani, Kotani, Kohar, Mitthay Wali, Binda, Mithwan, Litra, Sabu Khail, Jarwar, Kot Qaisrani, Raitra and Dona basti. Twenty animals from each flock were randomly selected for the study.

Parasitological procedures. Twenty sheep selected from each herd were thoroughly examined for the presence of mange like lesions on different parts of the body such as head, face, neck, breast, brisket and tail. Skin scrapings were taken only from animals suspected for having clinical signs of mange by scraping 2.5 cm² area of the affected lesions in black plastic containers, following the method described by Fthenakis *et al.* (2000). A complete history of each animal and date of examination was recorded and all the samples were processed within 12 h after collection. Briefly, 20 mL of 10% KOH solution was added to each sample container and boiled for 5-10 min. After that, samples were centrifuged at 1500 rpm for 4-5 min, supernatant and sediment was examined under microscope and permanent mounts of mites were also prepared (Higgins, 1984). Identification of mites was carried out with the help of morphological characteristics (Soulsby, 1982).

Hematology and serum biochemistry. Hematological and biochemical parameters associated with mange infestation were studied at Livestock Research Station, Rakh Khairwala. Eighteen sheep (nine healthy & nine infested) of Karakul breed belonging to same age group and sex and kept under similar conditions were selected. Ten mL blood was collected, half of the collected blood was transferred to a clean test tube containing few drops of 1% EDTA, to investigate the different hematological disturbances and the remaining half was used for serum collection. Total erythrocyte count (TEC), hemoglobin (Hb), packed cell volume (PCV), erythrocyte sedimentation rate (ESR), differential leukocyte count (DLC) and total serum proteins (TP) were performed following the methods described by (Benjamin, 1978). The data was analyzed through student's t-test and Duncan's multiple range test using SAS software (SAS, 1998).

RESULTS

Only one type of mite, *Sarcoptes scabiei* var. *ovis* (*S. ovis*) was found to be infesting the sheep in the study area (Fig. 1). The suspected animals (30/400) were examined following the standard procedures of skin scrapings and 24 were found to be positive for mange mite infestation and thus, giving prevalence 6% (24/400). Maximum number of positive cases for mites infestation were recorded from UC Vehoa and Nari (Table I). Higher prevalence of mange mite was observed in younger animals aging less than 6-month old (6.9%), male sheep (10%) and Desi breed of sheep (7.6%) (Table II).

The values of TEC, Hb and PCV were significantly higher and those of ESR and TP were lower ($P < 0.05$) in

Table I. Prevalence of sheep mange in different Union Councils of Tehsil Taunsa Shreef, District Dera Ghazi Khan

Union Council	Total No. of Animals	Suspected Animals	Infested Animals	Percentage Infestation
Taunsa Shreef	45	3	2	4.4
Vehoa	45	4	4	8.9
Dona	50	4	3	6.0
Raitra	50	3	2	4.0
Tibbi	25	2	2	8.0
Litra	35	2	1	2.9
Lakhani	35	2	2	5.7
Mithwan	30	2	1	3.3
Kotani	40	3	3	7.5
Nari	45	5	4	8.9
Total	400	30	24	6.0

Table II. Age, sex and breed wise prevalence of sheep mange Tehsil Taunsa Shreef, District Dera Ghazi Khan

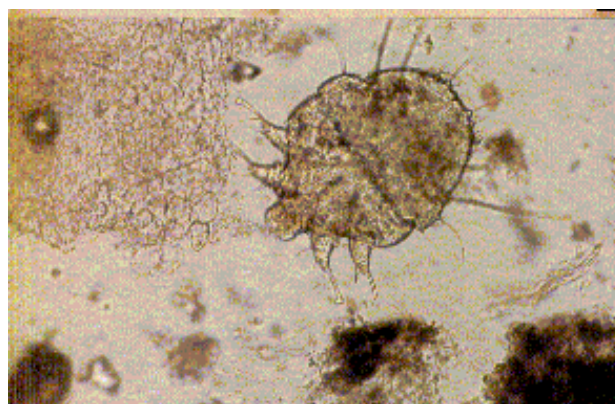
	Total No. of Animals	Suspected Animals	Infested Animals	Percentage Infestation
Age of Animals				
Adult (Above 6 Month)	328	22	19	5.8
Young (Below 6 Month)	72	8	5	6.9
Sex of Animals				
Female	390	28	23	5.9
Male	10	2	1	10.0
Breed of Animal				
Desi	250	21	19	7.6
Kacchi	150	9	5	3.3

Table III. Comparison of different blood/biochemical parameters of healthy and infested sheep

	Infested	Healthy
TEC (million μL^{-1})	7.3 \pm 0.3 ^B	12.0 \pm 0.6 ^A
Hb (g dL^{-1})	6.8 \pm 0.3 ^B	11.0 \pm 0.4 ^A
PCV (%)	19.0 \pm 0.8 ^B	34.0 \pm 1.3 ^A
ESR (mm h^{-1})	10.0 \pm 0.5 ^A	2.0 \pm 0.3 ^B
TP (g dL^{-1})	10.0 \pm 0.6 ^A	7.0 \pm 0.3 ^B
DLC (%)	L	55.0 \pm 0.9 ^B
	N	23.3 \pm 0.4 ^B
	M	2.0 \pm 0.3
DLC (%)	E	7.3 \pm 0.8 ^A
	B	0.67 \pm 0.4
		30.0 \pm 1 ^A
	4.0 \pm 0.4 ^B	
	0.33 \pm 0.2	

Means having different superscript in a row differ significantly ($P < 0.05$)

Fig. 1. Photomicrograph of *Sarcoptes scabiei* var. *ovis*



N.B. Dorsal view, 20X

healthy sheep compared with infested animals. In DLC, a significant difference in the numbers of lymphocytes, neutrophils and eosinophils was observed between the healthy and infested sheep, but the values of monocytes and basophils were almost the same (Table III).

DISCUSSION

Mange is a highly contagious and debilitating skin disease of sheep, which badly affects the health and productive capacity of these animals in our country. The species of three main genera i.e., *Psoroptes*, *Sarcoptes* and *Chorioptes* are of particular clinical importance in our part of the globe (Afzal *et al.*, 1995). During the present study only *S. ovis* was identified infesting sheep population in and around Tehsil Taunsa Shareef, Distt. D.G. Khan. In sheep, *Sarcoptes scabiei* var. *ovis* is a fairly frequent parasite affecting only the non-woolly areas of the body. The infection usually starts near the mouth (lips, nostrils) and spreads to other parts of the face and then to the carpal and tarsal joints. Their activity produces a marked irritation, which causes intense itching and scratching (Soulsby, 1982). During present study lesions were found only on head, neck, eyelashes and ears. Previously, Abu-samra *et al.* (1984) also reported that non-woolly areas are preferred sites for *S. ovis*. Initially *S. ovis* only infest the non-woolly parts of the body and only spread to the body if un-treated so economic losses in terms of loss in wool production are less with *S. ovis* infestation. But it may lead to a decrease of 1.2 lambs ewe⁻¹, 1.5 kg lambing weight (Kettle & Pearce, 1974; Fthenakis *et al.*, 2001) and 22.4% decrease in milk production (Fthenakis *et al.*, 2000).

Overall prevalence of *S. ovis* was recorded 6% (24/400) in and around Taunsa Shareef. Alvi and Khan (1963) also recorded the prevalence of *Psoroptes*- and *Sarcoptes*-mange in sheep as 6.5% and 10.2%, respectively in different provinces of Pakistan, indicating that *S. ovis* is a major problem of Pakistan. Maximum positive cases (8.9%; 4/45) for mite infestation were recorded from UC Vehoa and Nari. The high prevalence of mange in these two UCs might be due to the poor management of flock by the owner as animals in poor condition appear to be more susceptible as reported by Abu-Samra *et al.* (1981). Similarly the higher prevalence of mange (6.9%) in young animals as compared to older animals (5.8%) may be due to keeping young and adult animals together thus getting infection through direct contact. Additionally, in Pakistan the farmers are not well acquainted with modern livestock management practices.

Total erythrocyte counts were significantly lower in infested animals as compared to healthy sheep. It has been reported that *S. ovis* consumes erythrocytes and leads to marked reduction in erythrocyte counting (Hogg, 1979). Earlier, Hassan (1989) and Sharma *et al.* (1990) have also reported decreased erythrocyte count in scab mite in sheep. The Hb level was also significantly lower in infested animals, which because of significantly low erythrocyte counts, hematocrit and erythrocyte fragility (Jain, 1986) or

due to toxemia caused by mites (Pas'Ko & Chotchaev, 1974). Mehrotra and Singh (1982) also reported decreased Hb level in sheep infested with ectoparasites. There was a decrease in packed cell volume in infested animals, which may be contributed by the decreased cellular contents in blood after infestation of mange mites (Tung *et al.*, 1975). Infested animals exhibited eosinophilia, which could be due to allergic reactions caused by mites or their products of inflammatory reactions or due to the activation of immune system (Jain, 1986; Yousaf *et al.*, 1989).

In contrary to the findings of present study, Chineme *et al.* (1979) observed no change in the blood of sheep suffering from sarcoptic mange. The reason of disagreement may be attributed to the fact that those sheep, which were examined by them might be have given balanced diet during the course of disease, due to which disease could not produce any ill effect on the blood picture.

Significantly lower values of ESR and TP were observed in healthy group as compared to the infested group. According to Anwar (1966) anemia in mange mites is related to the degree of infestation, because the number of mites increases, the size of erythrocytes also decreases. Moreover, as a consequence of hemorrhages, the number of TEC decrease, due to this the ESR also increases. He also observed that the size of TEC decreased as the infestation increased and resulted in increased ESR. Fisher *et al.* (1986) and Mourad *et al.* (1987) indicated an increase in the serum protein in the blood of sheep suffering from mange mites. Tung *et al.* (1975) suggested that this increase was mainly due to increase in albumin rather than globulin fraction. Increase in albumin could be attributed to change in protein and free amino acids and synthesis in liver.

Significantly less numbers of neutrophil, lymphocyte and monocyte in infested sheep compared to healthy sheep is in close agreement with the findings of Hassan (1989). Likewise, the results of Hassan (1989) support our findings, which show increased eosinophil and basophil numbers in the blood of sheep suffering from mange mite. The findings of this study indicated that infestation of mange mites is a quite common problem of sheep populations in D.G. Khan. Such infested sheep are more susceptible to various viral and bacterial diseases, which may make sheep production un-economical and put extra burden on sheep growers. A mange eradication program should be launched for better and more profitable sheep farming.

REFERENCES

- Abu-Samra, M.T., K.E. Ibrahim and M.A. Aziz, 1984. Experimental infection of goats with *Sarcoptes scabiei* var. *ovis*. *Annl. Trop. Med. Parasitol.*, 78: 55-61
- Abu-Samra, M.T., S.E. Imbabi and E.O. Mahgoub, 1981. Mange in domestic animals in Sudan. *Annl. Trop. Med. Parasitol.*, 75: 627-37
- Afzal, M., A. Hussain, M.S. Mian, A. Muneer and A.R. Rizwi, 1995. Incidence of ectoparasites and its chemotherapy. *J. Anim. Health Prod.*, 5: 146-9
- Alvi, M.H. and Z.U. Khan, 1963. Incidence of ectoparasites in West Pakistan. *Proc. 15th All Pakistan Science Conference, Lahore*

- Anwar, A.K., 1966. A study on the blood parameters of cattle suffering from mange mites infestation. *M. Sc. (Hons.) Thesis*, University of Agriculture, Faisalabad
- Benjamin, R.L., 1978. Techniques for the study of different blood parameters. *J. Vet. American Med. Ass.*, 111: 240–7
- Blood, D.C., G.M. Radostits, J.A. Hendersson, J.H. Arundel and C.C. Gay, 1983. *Veterinary Medicine, A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats and Horses. ELBS and Bailliere Tindall*, 6th edition, pp: 965–7
- Chineme, G.N., S.A. Bida and S. Nauru, 1979. Sarcoptic mange of sheep in Kaduna State, Nigeria. *Bull. Anim. Health Prod.*, 27: 41–5
- Dominguez, O.J., R.R. Maldonada and S.L. Tamayo, 1977. Experimental transmission of scabies due to *Sarcoptes scabiei* var. *camos* from man to dog. *Vet. Mexico*, 8: 37–41
- Fisher, W.F., F.C. Guillot and N.A. Cole, 1986. Development and decline of serum antibody activity to *Psoroptes ovis* in area of Taxos. *Exp. Appl. Acarol.*, 2: 239–48
- Fthenakis, G.C., A. Karagiannidis, C. Alexopoulos, C. Brozos and E. Papadopoulos, 2001. Effects of sarcoptic mange on the reproductive performance of ewes and transmission of *Sarcoptes scabiei* to newborn lambs. *Vet. Parasitol.*, 95: 63–71
- Fthenakis, G.C., E. Papadopoulos, C. Himonas, L. Leontides, S. Kritas and J. Papatsas, 2000. Efficacy of moxidectin against sarcoptic mange and effects on milk yield of ewes and growth of lambs. *Vet. Parasitol.*, 87: 207–16
- Hassan, Z., 1989. A brief note on parasitic diseases of livestock in East Pakistan. *20th Pakistan Science Conference, H-20*
- Higgins, A.J., 1984. Diagnosis and treatment of sarcoptic mange in domestic animals. *World Ani. Rev.*, 49: 2–5
- Hogg, A., 1979. Mange problems are sobbing feed efficiency. *Hog Farm Mange. Australian Vet. J.*, 16: 29–30
- Hungerford, T.G., 1975. *Diseases of Livestock*, 8th edition, pp: 945–52. McGraw Hill, Australia
- Jain, N.C., 1986. *Schalm's Veterinary Hematology*, 4th edition. Lea and Febiger, Philadelphia
- Kettle, P.R. and D.M. Pearce, 1974. Effect of sheep bloody louse (*Damalinia ovis*) on host weight gain and fleece value. *N.Z. J. Exp. Agric.*, 2: 219–21
- Mehrotra, P. and T. Singh, 1982. Some studies on the blood constituents of sheep infested with biting louse *Damalinia ovis*. *Indian Vet. J.*, 59: 75–6
- Mourad, I.M., M.H. Karam, T.S. Abdul-Ali and A. Salam, 1987. A clinical and some blood constituent studies in healthy and manged camel. *Assuit. Vet. Med. J.*, 19: 154–9
- Neog, R., M.R. Borkakoty and B.C. Lahkar, 1992. Mange mite infestation in sheep in Assam. *Ind. Vet. J.*, 69: 891–3
- Pas'Ko, G.G. and A.D. Chotchaev, 1974. Clinical and morphological features of sarcoptic mange in goats. *Veterinariya Moscow*, 12: 58–9
- Radostits, O.M., D.C. Blood and C.C. Gay, 1994. *Veterinary Medicine, A Text Book of the Diseases of Cattle, Sheep, Pigs, Goats and Horses*, 8th edition, p: 1308. Bailliere Tindall, London
- SAS, 1998. *Statistical Analysis System: User's Guide*. Statistical Institute: North Carolina
- Schmidt, H.W., 1994. Dogs as transmitter of sarcoptic mange to other domestic animals and man. *Vet. Bull.*, 22: 643
- Sharma, R.L., F.U. Peer and T.K. Bhat, 1990. Antiparasitic activity of ivermectin against natural *Psorptes communis* var. *ovis* infestation in Kashmir Merino Sheep. *Indian Vet. J.*, 67: 264–6
- Soulsby, E.J.L., 1982. *Helminths, Arthropods and Protozoa of Domestic Animals*, pp: 162–3. Bailliere Tindall, London
- Tung, H.T., F.W. Cook and R.D. Wyatt, 1975. Anaemia caused by ectoparasitic infestation. *Poultry Sci.*, 54: 1962–9
- Yousaf, Y.A., N.W. Alkhalidi and M.M. Zend, 1989. A treatment of scabies with ivermectin. *Indian J. Vet. Med.*, 9: 22–3

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