The Journal of Animal & Plant Sciences, 25(5): 2015, Page: 1259-1263
ISSN: 1018-7081

PREVALENCE OF *SARCOPTIC* MANGE IN CAMELS IN PUNJAB, PAKISTAN

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ABSTRACT

Camels are raised in the desert, arid and other rain fed or hard climatic areas of Pakistan, where very little advisory and veterinary services exist due to which they remain exposed to a large number of diseases especially the parasitic infestations of which scabies has the special significance. A cross sectional study was conducted to determine the prevalence of scabies mange infestation in camels in Punjab, a province of Pakistan from September, 2013 to August, 2014. A total of 1489 animals from different camel populations of Punjab were examined for mange mite infestation. 168 animals were found positive for *Sarcoptic mange*, on the basis of microscopic examination of the skin scrapings. Statistically significant difference ($p<0.05$) regarding the prevalence of mange mite infestation between different months of the year and seasons prevailing in the country was observed. Furthermore a non-significant difference with reference to the sex and age of animals regarding the prevalence of disease was observed. Negative and significant effect of temperature and non-significant effects of rainfall and humidity were also observed as during the period when there was low temperature the disease increased. "The results of this study revealed that mange infestation is a potential health hazard of the camel population of Punjab in Pakistan, particularly during the winter season with young and females more prone to the disease, which further requires studies to measure its impact on camel production with economic losses and the ways to control it for the betterment of farmers of the area

Key words: Camel, Scabies, Arid, Punjab, *Sarcoptic* mange.

INTRODUCTION

Camel (Camelus dromedarius) is raised for milk, meat production, sports and riding purposes in Pakistan and are exposed to a wide range of external parasites (Anwar and Khan, 1998). Camel mange being an extremely pruritic and contagious disease is recognized as one of the most serious and damaging disease in camels caused by a small parasite "*Sarcoptes scabiei var cameli"*(Awol *et al*,2014). It mostly affects the head, neck, flanks, inner side of the thighs and inguinal region of the animal. Scabies due to mange infestation has been reported from various camel raising countries (Pence and Uechermann, 2002; Agab, 2006).Occurrence of the disease is mostly associated with poor camel management and a mingling of diseased camels with healthy one's (Richard, 1987; Abdel-Rehman *et al*, 2001). *Sarcoptes*, a burrowing mite, penetrates deep into skin and lead to pruritus, development of papules, hairless areas and scab formation (Al-Rawashdeh *et al*, 2000; Megersa *et al*, 2012). The diseased animals usually rub, bite or scratch the affected areas as a response to irritation. Rubbing or scratching leads to excoriation, formation of scabs on skin, hair loss and spreading of infestation to other body parts. *Sarcoptic* infestation causes serious disturbance and irritation leading to poor health status of animal and decreased production and efficiency (Gorakh *et al*, 2000; Abubakar *et al*, 2002). Disease is transmitted by direct animal to animal contact or via fomites such as blankets or baggage tack. *Sarcoptic* mites can also be transmitted to human beings during handling or riding leading to the development of pseudo scabies on different parts of the human body (Schillinger, 1987; Mitra, 1993).

There are many reports and studies regarding the prevalence of *Sarcoptic* mange, in camel from different parts of the world (Higgins *et al*, 1984; Parsani *et al* 2008; Dinka *et al*, 2010). Most of these studies revealed that prevalence of mange in the camel population of different countries ranges from 3.5% to 83% (Agab and Abbas, 1999; Megersa, 2010). In Pakistan very little work on mange prevalence has been carried out, but no-one is from the camel raising areas of Punjab province of Pakistan. **As** no authentic data has been compiled about the camel mange incidence at the farmer's level, therefore, present study was designed to determine the prevalence of mange infestation in camels in Punjab, Pakistan.

MATERIALS AND METHODS

Experimental Sites: The study was conducted in all three camel raising areas of Punjab, Pakistan, i.e. Pothohar (North Punjab), Thal (Western Punjab) and Cholistan (Southern Punjab). The diagnostic facilities of Livestock & Dairy Development Department (L&DD), Government of the Punjab at district level, Camel

Breeding &Research Center (CBRC), Rakh Mahni, district Bhakhar and of Barani Livestock Production Research Institute (BLPRI), Kheirimurat, district Attock were used for initial diagnosis on the basis of microscopic findings. Diagnostic facilities of Department of Parasitology, University of Veterinary & Animal Sciences (UVAS) Lahore were also randomly used for confirmation of initial diagnosis from skin scrapings carried out in the diagnostic laboratories of the field.

Collection of Skin Scrapings: Skin scrapings of total 1489 camels without any discrimination of age and sex, were taken from different camel populations of Punjab for whole one year. An average of twenty five percent of the camel population of each farmer and ten percent from each village visited for the purpose was included in the study. After selection of animals, each camel was restrained properly and the hairs were clipped from the margins of the lesions with the help of scissors and then the area was cleaned with a 10% solution of KOH. After cleaning and letting the area dry, the lesions were scraped from the margins with the help of a fresh razor blade in such a manner till the blood oozes out of the site. Samples were collected on a monthly basis (approximately 100 plus)in small plastic jars each duly labeled for the identity of the animal.

Diagnosis of mite infestation: Samples were shifted to the nearest field diagnostic laboratory of the Livestock & Dairy Development (L&DD) Department on the same day for microscopic examination. Each sample was shifted to clean petri dish and 10% KOH was used to release the mites from scabs & crusts before the examination. Petri dishes, containing the skin scraping samples, were warmed at 38ºC for about two minutes and examined microscopically for the presence of various stages of mites i.e. egg, larva, nymph and adult. Skin scrapings (negative) were shifted to separate test tubes containing 10 ml of 10% KOH, reheated for five minutes, centrifuged for 3 minutes at 2000 rpm and the supernatant was discarded. 5ml water added to the sediment and centrifuged again for 3 minutes at 2000 rpm. After discarding the supernatant the pellets were collected and examined microscopically for the presence of different stages of mites (Soulsby, 1982). The data regarding the presence of lesions was collected to assess the ratio of invement of different body parts in the disease. Collected data, regarding the prevalence of disease was statistically analyzed with different statistical techniques and using SPSS version 20. Chi square was applied to ascertain the prevalence of disease based on months, seasons and age, whereas Z-test for population proportion was used to have the details about the effect of sex on the prevalence of disease. Biserial correlation was applied to find out the relation between the disease and the environmental factors.

RESULTS

An epidemiological study was conducted for whole one year period (September, 2013 to August, 2014) in different camel raising areas of Punjab. From a total of 1489 suspected camels, 168 (11.28%) were found positive for *Sarcoptic* mange. Lesions of mange mite infestation were observed most commonly on the face followed by neck region, abdominal region, inner surface of the thighs and inguinal region respectively of the infected camels (Table-1). Clinically the disease was characterized by loss of hairs, scab formation, thickening/corrugation of skin and severe itching in most of the camels.

Table-1. Lesions of mange mite infestation on various body areas of infected camels (n=168).

Region	Lesions Present	%age of infestation
Face	122	72.61%
Neck	106	63.09%
Abdominal	70	41.66%
Inner surface of thighs	62	36.90%
Inguinal region	54	32.14%

Prevalence of *Sarcoptic* scabies in different months and seasons is presented table 2. Results revealed that the disease was more prevalent from November to March. The highest prevalence being significant ($p< 0.05$) was recorded during February followed by January. The lowest disease incidence was observed during the months of June and July. The season wise results reveal that the highest disease incidence was observed during winter season followed by spring and autumn, whereas the lowest prevalence of disease was observed in summer.

Table-2. Monthly and Season wise prevalence of Sarcoptic scabiei in camels.

Month	Positive %age	Season	Positive %age
September	4.9%	Autumn	6.34%
October	7.76%		
November	16.54%	Winter*	20.43%
December	17.02%		
January	22.30%		
February	25.89%		
March	18.43%	Spring	13.55%
April	7.27%		
May	3.57%		
June	0%	Summer	1.47%
July	0%		
August	1.98%		

*indicate statistically significant difference at $p<0.05$

Table-3.Age and Sex wise prevalence of Sarcoptic scabiei in camels.

Age Group (Years)	Positive %age	Sex	Positive %age
Sucklers (up to 2 Years)	13.08%		
Young (2-5 Years)	12.25%	Male	10.19%
Adults (above 5 years)	10.05%	Female	13.05%

The prevalence of *Sarcoptic* mange infestation was also studied with reference to age and sex of animals. Of the total 1489 animals under study, 567 were females and 922 males. It was observed that females (74/567) attracted more mange infestation as compared to (94/922) males (table-3), however, there was no significant difference ($p < 0.05$) between the sexes as far as disease incidence was concerned. All the animals under study were divided into three age groups, i.e. Sucklers, Young and Adults. The age wise disease prevalence results are presented in (table-3). The results reveal that sucklers were more prone to the disease followed by younger and adults respectively. No statistically significant difference ($p < 0.05$) amongst different age groups was observed.

The meteorological data regarding rainfall, temperature and humidity for the last four years of the entire camel population areas from where samples were collected was officially obtained from the meteorological department of Pakistan. The monthly mean average of all these three parameters for the last four years was arithmetically calculated. The monthly prevalence of the disease was then compared with the meteorological data and statistically analyzed using the biserial correlation between prevalence and rainfall, temperature and humidity. On the basis of data obtained from the meteorological department, statistical analysis showed that the rainfall had negative and non-significant effect ($p < 0.05$) on the prevalence of the disease which means that with the decrease of rainfall, the rate of disease prevalence increases. On the other hand humidity had positive, non-significant effect ($p < 0.05$) on the prevalence of disease as it increases with the increase of humidity. However, biserial correlation between temperature and the prevalence of disease was noticed as negative and significant ($p < 0.05$), as with the decrease of temperature the disease increased.

DISCUSSION

The occurrence of *Sarcoptic* mange is influenced by multifactorial system, i.e. composed of poor condition, temperature, humidity, overcrowding, unhygienic conditions, lack of acaricidal treatment and poor veterinary services. Once a herd is infected with Sarcoptic mite, it usually suffers from continuous re-infections (Singh and Veer, 2005; Premalatha *et al*, 2010). *Sarcoptic* mange is usually considered to be a seasonal and is often reported during the winter months (Banaja and Ghandour, 1994;). Poor animal health and body condition, malnutrition, harsh climatic conditions, and other parasitic or infectious diseases are predisposing factors for mange infestation (Tefera and Gebreah, 2001; Megresa *et al*, 2012). Young camels (< 5 years of age) are generally more prone to mange infestation (Hussain *et al*, 2012), however the animals of all age groups and both sexes are seen equally affected with the disease (Dinka *et al*, 2010).In the present study, epidemiological data on *Sarcoptic* mange due to *Sarcoptes scabiei var cameli* was collected from various rain fed and arid areas of Punjab province of Pakistan. In this study *Sarcoptes scabiei var cameli* was identified as the only mite species from all collected samples of skin scrapings. This observation is in a general agreement with various research workers (Delafosse and Doultoum, 2004, Higgins, 1985, Anwar and Khan, 1998, Dinka *et al*, 2010). Even though both the *Sarcoptic* and *Chorioptic* mange mites the scabies due to *Sarcoptes scabiei var cameli* is the most common, extremely contagious and serious problem seen in the camels (Parsani *et al*, 2008, Nayel and Abu-Samra, 1986).

Camel mange mite infestation usually starts from head region and then extends to the neck and other areas of the body with thin skin such as penile sheath and the udder. The scabies may spread to the whole body within a period of one month (Mukassa–Mugerwa, 1981).Lesions of mange mite infestation were observed most commonly on the head, neck, and abdomen, inner surface of the thighs and the inguinal region with different ratios. Richard, (1987) also indicated that camel mange infestation commences at areas of thin skin, the head, and base of the neck, udder, prepuce and flank. The head becomes affected rapidly in every case because the animal uses its teeth to scratch the affected areas.

The prevalence of infestation rate observed in the present study is comparable to the 10.68% infected camels found by Dinka *et al*, (2007) in Ethiopia, 13.40% by Anwar & Khan, (1998) in Pakistan and 12.1% by Gebrehiwet, (1998) in Eritarea. The present study appears to be nearly close to the above mentioned workers who reported about the infestation rate in different countries of the world. However Awol *et al*, (2014); Zelalem (1994); Agab and Abbas, (1999); Muhammad *et al*, (2006) respectively observed 16.7, 27.8, 32.2, 31.6 and 35 percent prevalence in different countries of the world. These findings are in partial agreement with the results of the present study. The difference in the prevalence of camel mange mite might be attributed to the different management systems and the environmental conditions that exist among those areas. However, the results showing the prevalence of disease are not in agreement with the findings of Al-Ani *et al*, (1998) who recorded 83 % prevalence. This prevalence of disease variation in this

study may be attributed to some external factors of environmental conditions, management practices and use of insecticides.

It has also been observed in the present study that the prevalence of mange mite was the highest during winter season, followed by spring, then autumn and the lowest during summer. Awol *et al*, (2014) reported that the prevalence of the camel mange mite may be attributed to environmental conditions that exist in those areas. They also emphasized that low temperature and overcrowding during winter months are favorable for the rapid propagation of the mite life cycle as was also reported by Richard, (1987).

In the present study the prevalence of mange mite was slightly higher in females than the males, however, no significant difference was observed ($p < 0.05\%$). This may be associated with some hormonal influences. The higher level of Prolactin and Progesterone hormones could make the females more susceptible to any infection (Lioyd, 1983). Additionally, pregnancy and lactation stress could also aggravate the susceptibility of the female camels to infections. Furthermore the breeding behavior of mange infected males could also be attributed to the transfer of disease to a number of females.

In the present study prevalence of mange mite infestation was more in the age group of sucklers than the rest of the age groups. This could be due to the undeveloped acquired immunity of young animals, Dinka *et al*, (2010), Awol *et al*, (2014). Furthermore, close interaction of the sucklers group with the lactating females could also be another factor leading to a higher prevalence in this age group.

REFERENCES

Abdel Rehman, M. B., A. Y. Osman, and A. G. Hunter (2001). Parasites of the one-humped camel (*Camelus dromedarius*) in the Sudan: A review.The Sudan J. Vet. Res. 17:1-13.

Abubakar, M. B., Y. Adamu and F. .Bello (2002). Incidence of Mange (*Sarcoptes scabiei var cameli*) among camels with skin diseases in Sokoto State Sokota. J. Vet. Sci 4(2):39-40.

Agab, H. and B. Abbas (1999). Epidemiological studies on camel diseases in the eastern Sudan. World Anim. Rev. 92(1): 42-51

Agab, H. (2006). Diseases and causes of mortality in a camel (*Camelus dromdarius*) dairy farm in Saudi Arabia. J. Camel Prac. Res., 13(2): 165-169.

Al-Ani F K, L. A. Sharrif , O. F. Al-Rawashdeh, K. M. Al- Qudah and Y. Al- Hammi (1998). Camel diseases in Jordon. Proceedings of the third annual meeting for animal production under arid conditions, Al-Ain UAE University, (2): 77-92.

Al-Rawashdeh O. F, F. K. Al-Ani, L. A. Sharrif, K. M. Al-Qudah, Y. AL-Hammi and N. Frank (2000). A survey of camel (*Camelus dromedarius*) diseases in Jordan. J. Zoo wildl. Med. 31(3): 335-338.

Anwar A H and M. N. Khan (1998). Parasitic Fauna of Camel in Pakistan: Proceedings of 3rd annual meeting of production under arid conditions. UAE University, (2): 69-76

Awol N, S. Kiros, Y. Tsegaye, M. Ali and B. Hadush (2014). Study on mange mite of camel in Raya-Azebo district, northern Ethiopia. Vet. Res. Forum, 5(1): 61-64.

Banaja A A and A. M. Ghandour (1994). A review of parasites of camels (*Camelus dromedarius*) in Saudi Arabia. JKAU Sci. (6): 75- 86.

Bornstein S, U. Werney, J. Kinne, K. Naslund, M. Younan and R. Feinstein (2002). Experimental studies of *Sarcoptes Scabiei* infections of Arabian camels (*Camelus dromedarius*). Mange and myiasis of livestock; COST Action 833: 38-48.

Delafusse A and A. A. Doutoum (2004). Prevalence of T. evansi infection and associated risk factors in camels in eastern Chad. Vet. Parasitol. 119 (2-3): 155-164.

Dinka A, B. Eyerusalem and H. T. Yacob (2010). A study on major ectoparasites of camel in and around Dire Dawa, Eastern Ethiopia. Rev. Med. Vet. 161 (11): 498-501.

Gebrehiwet T. (1998). The camel in Eritrea: an all-purpose animal, World Anim. Rev. 91-1998/2

GorakhMal, D. S. Sena, K. Rajender and M. S. Sahani (2000). A study on the clinical, haemato-biochemical and histopathological aspects of mange in camels. J. Vet.Parasitol 14(1):27-30.

Hussain M. H., F. G. Habasha and M. K. Faraj (2012). *Demodectic* mange in Iraqi camels. Al-Qadisiya. J. Vet. Med. Sci. 11(1): 1-5.

Higgins A J. (1984). *Sarcoptic* mange in Arabian camel: diagnosis and treatment. WAR (FAO), 49: 2-5.

Higgins A. J. (1985). Common ectoparasites of the camels and their control. Brit. Vet. J. 141(2): 197 -216.

Lioyd S. (1983). Effect of pregnancy and lactation upon infection. Vet. Immunol. Immunopathol. 4(1-2): 153-176.

Megersa B. (2010). An epidemiological study on major camel diseases in the Borana lowland, Southern Ethiopia. Oslo, Norway: DCG Report No. 58: 67-98.

Megersa B., A. Damena, J. Bekele, B. Adane and D. Sheferaw (2012).Ticks and mange mites infesting camels of Boran, Pastoral areas and the associated risk factors, Southern Ethiopia. J. Vet. Med. and anim. Health, 4 (5): 71-77.

Mange and Myiasis of livestock: (2001). Proceedings of the workshop held at the Ecole Nationole Veterinaire de Toulouse, France (3-6 October, 2001). Directorate-General for Research, European Commission, COST Action 833, EUR 20364.

Mitra M., S. K. Mahanta, S. Sen, C. Ghosh and A. K. Hati (1993). *Sarcoptes scabiei* in animals spreading to man. Trop. Geogr. Med. 45(3): 142-143.

Muhammad G., A. Jabbar, Z. Iqbal, M. Athar and M. Saqib (2006). A preliminary passive surveillance of clinical diseases of cart pulling camels in Faisalabad metropolis (Pakistan). Prev. Vet. Med. 76 (3-4): 273-279.

Mukassa-Mugerwa E. (1981). The camel (*Camelus dromedarius*): A bibliographical review. ILCA Publications, Addis Ababa, Ethiopia; 52-54.

Nayel N. M. and M. T. Abu-Samra (1986). Experimental infection of the one humped camel (*Camelus dromedarius*) and goats with *Sarcoptes scabiei var cameli* & *S. scabiei var caprae*. Br. Vet. J. 142(3): 264-269.

Parsani H. R., V. Singh and R. R. Momin (2008). Common Parasitic Diseases of Camel. Vet. World, 1(10): 317-318

Pence D. B. and E. Ueckermann (2002). *Sarcoptic* mange in wildlife. Rev. Sci. Tech. Off. Int. Epiz. 21(2): 385-398.

Premalatha N., M. G. Jayathangaraj, K. Senthilkumar, K. Senthilvel, N. Vengadabady and B. Muralimanhar (2010). Strategic treatment of scabies in captive camels (*Camelus dromedarius*) Tamilnadu. J. Vet & Anim. Sci. 6 (4): 188-190.

Rickard D. (1987). Camel mange, Rev. Sci. Tech off Int. Epiz 6(2):475- 477.

Schillinger D. (1987). Mange in camels-an important zoonosis. Rec. Sci. Tech. Off. Int. Epiz., 6(2): 479 - 480.

Soulsby E. (1982). Helminths, Arthropods & Protozoa of Domesticated animals 7th Ed. Bailliere Tindale London PP 492-552.

Tefera M. and F. Gebreah (2001). A study on the productivity and diseases of camels in eastern Ethiopia. Trop. Anim. Health Prod. 33(2): 265-274.