



E-ISSN: 2320-7078

P-ISSN: 2349-6800

JEZS 2019; 7(5): 734-736

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Received: 20-07-2019

Accepted: 22-08-2019

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## Mange infestation in sheep, goats and nomads of Jammu and Kashmir state

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**Abstract**

A cross-sectional study was carried out to determine the prevalence of mange among sheep, goats and associated nomadic rearers of Poonch and Rajouri Districts of Jammu & Kashmir State. The study was carried on 5050 sheep (4780 female and 270 male), 6590 goats (6247 female and 343 male) and 650 associated rearers (40 female and 610 male) from November 2016 to December 2018. Prevalence of mange in sheep was much higher (14.59%) than goats (0.50%). In sheep, the infestation was higher in females (14.91%) than males (8.88%) ( $p < 0.05$ ). Sheep of more than one year age had higher prevalence (15.73%) than sheep of age up to one year (12.14%) ( $p < 0.05$ ). The infestation in sheep was higher (15.6%) in winter followed by post rainy season (15.46%) ( $p < 0.05$ ). In goats, none of 343 male goats was infested with mange and in female goats, the prevalence was 0.52% (33/6247). The prevalence in female goats was higher in post rainy season (0.78%) followed by winter (0.49%) ( $p > 0.05$ ). In goats of age up to one year had higher prevalence (0.55%) than goats of more than one year age (0.46%) ( $p > 0.05$ ). The mites infesting sheep belonged to genera *Psoroptes* and *Sarcoptes* whereas goats were infested with *Sarcoptes* and *Demodex*. Out of 650 associated rearers interviewed, 2(0.48%) were infested with mange. The study indicated the necessity of intervention measures to control mange infestation in animals owing to their economic as well as zoonotic significance.

**Keywords:** *Psoroptes*, *Sarcoptes*, *Demodex*, goats, sheep

**Introduction**

Mange is a contagious skin disease caused by a variety of parasitic mites which is characterized by crusty pruritic dermatitis leading to hair loss [1]. The major parasitic mites involved in mange infestation are *Psoroptes*, *Sarcoptes* and *Demodex*. The mange infestation is also popularly known as itch, scab and scabies (scabies is a term used for infestation by *Sarcoptes scabiei*). In domestic animals, mange is a significant problem and transmission from animals to humans may occur due to close association with animals and also sharing common residential areas. In animals, other skin conditions such as dermatitis and fungal infections may confuse with mange and must be considered in differential diagnosis. The mange in animals is diagnosed by clinical manifestations and detection of mites in host skin scrapings. The clinical manifestations are mediated through inflammatory response to the mites leading to pruritis and hair loss [1].

Mites are endemic in tropical and subtropical areas of India and their infestation has been reported in animals as well as humans [2-5]. According to a World Health Organization report, sarcoptic mange is a concern and infestation by *Sarcoptes scabiei* may lead to an epidemic in an area. The transmission of mange occurs by direct contact with infected hosts such as hand shaking and sleeping or by indirect contact such as sharing clothes, towels etc. The transmission from animals to humans may occur on sharing living spaces, clothes and personal items with animals. Factors like low socio-economic status, poor personal and environmental hygiene and population density are the risk-factors involved in transmission of mites. The lack of knowledge about personal hygiene increases the incidence of mite infestation [4].

In Jammu and Kashmir, nomadic community of state rears sheep and goats. The flocks migrate from high altitude areas to low altitude areas in winter season. The interactions between animals and their handlers are extensive including sharing of living spaces. Under these conditions, the transmission of mites from animals to humans may easily occur if the animals are infested with mites. In this regard, this study was conducted to determine the prevalence of mange in sheep and goats of nomadic communities of the state. Also, the associated animal rearers were questioned about the mange infestation.

## Materials and Methods

### Study area

The samples were collected from Poonch and Rajouri districts of Jammu & Kashmir state where the nomads are involved in sheep (non-descript local) and goat (Bakerwali) farming. A random selection of 23 villages was done for study and 650 nomads (Bakarwals and Chopans) of these villages were included. The study was conducted over a period of three years from November 2015 to October 2018.

A total of 11640 animals including 5050 sheep (4780 female and 270 male) and 6590 goats belonging to nomads were physically examined through hand assessment, palpation, parting their hair and roughness of skin for the clinical signs of mange. The associated animal rearers were also questioned about the clinical manifestations of mange. From mange infested animals and rearers, one hundred twenty two samples (75 sheep, 45 goats and 2 rearers) of skin scrapings in 10% potassium hydroxide were collected and processed for identification of mites [5]. Prevalence of mange was statistically analysed for season, age and sex.

### Results and Discussion

A random selection of flocks of sheep and goats belonging to 650 nomads of 23 villages of Poonch and Rajouri districts of Jammu and Kashmir state was carried out. A total of 11640 animals (sheep=5050 and goat=6590) were physically examined for clinical signs of mites infestation. Prevalence of mange in sheep was much higher (14.59%) than goats (0.50%). In sheep, the infestation was higher in females (14.91%) than males (8.88%) ( $p<0.05$ ). Sheep of more than one year age had higher prevalence (15.73%) than sheep of age up to one year (12.14%) ( $p<0.05$ ). The infestation in sheep was higher (15.6%) in winter followed by post rainy season (15.46%) ( $p<0.05$ ). In goats, none of 343 male goats was infested with mange and in female goats, the prevalence was 0.52% (33/6247). The prevalence in female goats was higher in post rainy season (0.78%) followed by winter (0.49%) ( $p>0.05$ ). In goats of age up to one year had higher prevalence (0.55%) than goats of more than one year age (0.46%) ( $p>0.05$ ). Village-wise prevalence of mange infestation in animals is shown in Table 1. The species-wise

results have been tabulated in Table 2 and 3.

In skin scrapping analysis, out of 75 sheep samples, 17 were positive with 8 samples for *Psoroptes* mite and 9 samples for *Sarcoptes*. None of sheep samples was positive for *Demodex*. Among 45 goat samples, 6 samples were positive with 5 samples for *Sarcoptes* and 1 sample for *Demodex*. The two samples collected from male animal rearers during winter season were positive for *Sarcoptes* (Table 4).

Mange is a contagious skin disease, usually spreads by close contact. The present study was conducted from Nov.2016-Dec. 2018 and a total of 11640 animals, sheep (5050) and goats (6590) were examined. The prevalence in sheep (14.59%) was much higher than goats (0.47%). The mange infestation has been reported from various parts of country including Jammu and Kashmir. Shabir et al. has reported the mange infestation in Pashmina goats of Ladakh region [2] while Murthy et al. has reported the mange infestation in sheep of Karnataka region [7]. The species differences have been reported by many other workers. Seid et al. reported the prevalence to be higher in goats than sheep [8] while Seyoum identified mites infestation in sheep but not in goats [5]. The risk factors such as age, sex and season play an important role in occurrence of ectoparasitic diseases [5]. In both sheep and goat, mange infestation was higher in winter and post-rainy season. It could be due to living in close contacts with overcrowding in cold weather. Further, high relative humidity of environment in post-rainy season may propagate infestation of ectoparasites especially in sheep because of presence of wool. The infestations are further increased under stress and malnutrition as has been reported by many workers [8]. In winter season, the insufficiency of green fodder during winter season may lead to weak and debilitated animals making them prone to ectoparasite infestation. The humans associated with animals were infested with mange infestation during winter season and could be attributed to living in close contact with animals during severe winter months.

The mange infestation may have severe economic as well as public health implications as the infestation leads to poor quality of fleece and hide in animals and may also transmit infection to human beings [4], thus requiring interventions for effective control and prevention in animals.

**Table 1:** Prevalence of mange in sheep and goats (n=11640)

Name of village	Sheep		Goats	
	Examined	Positive (%)	Examined	Positive (%)
Fazalabad	260	52 (20)	150	1 (0.66)
Muchakki Draba	520	94 (18.07)	200	2 (1.0)
Pathian Draba	450	85 (18.88)	150	1 (0.66)
Daddanar Surankote	200	39 (19.5)	080	1 (1.25)
Chingus Rajouri	100	19 (19)	400	2 (0.5)
Kura Kalakote	190	35 (18.42)	350	1 (0.28)
Barmandal Kalakote	600	120 (20)	500	3 (0.6)
Kharakpanjah Kalakote	380	55 (14.47)	900	4 (0.44)
Kurlian Kalakote	200	33 (16.5)	600	1 (0.16)
Kattari Kalakote	180	24 (13.33)	250	1 (0.4)
Hadayatpur Narian	200	32 (16)	300	3 (1.0)
Rajalmore Nowshara	300	47 (16.66)	200	1 (0.5)
Chattaryari Nowshara	100	16 (16)	200	2 (1.0)
Dogiani Nowshara	200	29 (14.5)	300	2 (0.66)
Sangpur Nowshara	170	23 (13.52)	350	3 (0.85)
Katwari Kalakote	200	7 (3.5)	700	1 (0.14)
Tanddi Surankote	400	18 (4.5)	100	1 (1)
Rajalkote Nowshara	100	3 (3)	200	1 (0.5)
Kura Gujran Kalakote	50	2 (4.0)	150	2 (0.013)
Chainpur Dalhote Kalakote	0	0	150	0

Lathung Surankote	50	0	60	0
Keri Barmandal Kalakote	140	3 (2.14)	163	0
Broh Barmandal Kalakote	60	1 (1.66)	137	0
Total	5050	737 (14.59)	6590	33 (0.50)

**Table 2:** Prevalence of mange in sheep (n=5050)

	No. Examined	No. Infested	%	p-value
<b>Season</b>				
Winter	2500	390	15.6	0.041
Summer	500	58	11.6	
Rainy	550	67	12.8	
Post rainy	1500	222	15.46	
<b>Sex</b>				
Male	270	24	8.88	0.006
Female	4780	713	14.91	
<b>Age</b>				
Up to 1 year	1605	195	12.14	0.001
Above 1 year	3445	542	15.73	

**Table 3:** Prevalence of mange in goats (n=6590)

	No. Examined	No. Infested	%	p-value
<b>Season</b>				
Winter	4050	20	0.49	0.134
Summer	532	2	0.37	
Rainy	613	0	0	
Post rainy	1395	11	0.78	
<b>Sex</b>				
Male	343	0	0	0.595
Female	6247	33	0.52	
<b>Age</b>				
Up to 1 year	2539	14	0.55	0.645
Above 1 year	4051	19	0.46	

**Table 4:** Prevalence of mange among animal rearers (n=650)

	No. Examined	No. Infested	%	p-value
<b>Season</b>				
Winter	450	2	0.44	0.827
Summer	80	0	0.0	
Rainy	70	0	0.0	
Post rainy	50	0	0.0	
<b>Sex</b>				
Male	610	2	0.48	0.717
Female	40	0	0	

## Conclusions

The findings reveal the endemicity of mites infestation in animals of Poonch and Rajouri districts of Jammu and Kashmir state and also indicated the risk of transmission of infestation to humans. Therefore, people should be made aware about the zoonotic potential of mites to prevent transmission, early detection and treatment in humans.

## Acknowledgements

The authors are highly thankful to NRDMS/DST Division, Ministry of Science and Technology, Govt of India New Delhi for providing the financial help under the research project, "Diagnosis and interventional strategies for prevention and control of common parasitic zoonoses of livestock and their rearers belonging to schedule caste and schedule tribe population for socio-economic upliftment". We are highly thankful to Director Research for his constant efforts and time to time guidance. We are also thankful to

Dean FVSc & AH, R.S. Pura for his constant help on technical and administrative aspects.

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