

## OBSERVATIONS ON BUFFALO SARCOPTIC MANGE IN JAMMU, INDIA

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## ABSTRACT

Observations on sarcoptic mite infestation in 1440 buffaloes belonging to 72 unorganised dairy farms of Jammu revealed a 3.33% prevalence rate. Prevalence was significantly ( $p \leq 0.05-0.01$ ) higher during the winter (5.55%) as compared with the summer (2.91%) and the rainy (1.33%) seasons. The disease was recorded in 3.75% and 2.5% of buffaloes up to 1 year and above 1 year of age, respectively. Females showed a significantly ( $p < 0.05$ ) higher prevalence rate (4.07%) than males (1.96%). A strong negative correlation ( $r = -0.725$ ) was observed between the prevalence rate and temperature whereas relative humidity had little or no association ( $r = 0.2$ ). The initial lesions were observed on the face and the upper part of neck as papules and exudative crusts, and then the infestation spread quickly causing generalized mange. In severe cases, animal had emaciated body with no sign of fat deposits and loss of normal skin colour and texture. Infested buffaloes showed a significant ( $p < 0.05$ ) association with inappetence.

**Keywords:** buffaloes, *Sarcoptes scabiei*, prevalence, Jammu

## INTRODUCTION

Mite infestation, particularly with the obligate, burrowing mite *Sarcoptes scabiei*, is an extremely pruritic, contagious and debilitating disease of buffaloes (Naresh *et al.*, 2005; Chhabra and Pathak, 2011). It is recognized as one of the most serious diseases of dairy animals in the Indian subcontinent (Gill *et al.*, 1989). The disease spreads rapidly in dairy and breeding herds due to overcrowding, malnutrition and poor managerial conditions. Though economic losses must be of a very high magnitude due to hide damage, decreased milk and meat production, morbidity and mortality, no accurate figures are available. The morbidity rate varies from 1.5 to 82%, and reaching up to 100% in severely affected herds, with heavy losses of young animals (Gill *et al.*, 1989; Patel *et al.*, 2002a). Despite this, no epidemiological study vis-à-vis the incidence of sarcoptic mange in buffaloes was undertaken previously in the state of Jammu and Kashmir of India. The present work was therefore conducted to determine the prevalence and clinical signs associated with sarcoptic mite infestation in buffaloes (*Bubalus bubalis*) and the effect of climatic factors on the prevalence of sarcoptic

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## MATERIALS AND METHODS

### Study area, animals and techniques

The study was carried out in 1440 buffaloes belonging to 72 unorganised dairy farms of Jammu of Jammu and Kashmir state, located in north-western region of India, between 74° 50' east longitude and 30° 40' north latitude. The area lies about 332 m above sea level and experiences a subtropical humid climate. The area experiences four seasons; summer (March to June), rainy (July to September), post-rainy (October-November) and winter (December to February).

Skin scrapings of buffaloes with visible dermatitic lesions were collected using the method given by Tikaram and Ruprah (1986). These samples were brought to the laboratory and examined under stereomicroscope using standard techniques described elsewhere (Soulsby, 1982). The data were recorded according to the age (up to 1 year and above 1 year) and sex (male/ female).

### Statistical analysis

Differences in the prevalence of mite between seasons, age groups and sexes were tested for significance by the chi-square test. The relationship between the monthly variation of the infection index and the one of the climatic parameters: temperature and relative humidity were determined by Pearson correlation analysis using SPSS 16.0. A p-value of  $\leq 0.05$  was considered significant.

## RESULTS

### Observations on the prevalence of sarcoptic mange

During the year a total of 1440 buffaloes belonging to 72 unorganised dairy farms of Jammu were examined. Out of that total, 3.33% of buffaloes were found to be infested with *S. scabiei* var. *bubalis* (Table 1). The highest prevalence was found in the month of February (7.5%), followed by March (6.66%) and December (5.0%). The lowest prevalence (0.83%) was found in the month of May (Figure 1). None of the animals examined were found positive during the months of June and July. Significant association ( $p \leq 0.05-0.01$ ) was found between the prevalence rate and the seasons and the highest prevalence rate (5.55%) was found in the winter season (Table 1). There was a strong negative correlation ( $r = -0.725$ ,  $r^2 = 0.525$ ) between the prevalence rate and the mean monthly temperature (Figure 2) and a weak positive correlation ( $r = 0.2$ ,  $r^2 = 0.04$ ) was found between the prevalence rate and mean monthly relative humidity (Figure 3). Sarcoptic mange infestation was observed in 3.75% and 2.5% buffaloes up to 1 year and above 1 year of age, respectively (Table 1). However, the infestation was not significant. The females had a significantly ( $p < 0.05$ ) higher prevalence rate (4.07%) than the males (1.96%) (Table 1).

### Clinical observations

The initial lesions were often localized accompanied by alopecia and were found on the body parts which had thin hair and were prone to scratches/ injuries such as the face and the upper part of the neck. Small papules with intense itching were evidenced as a result of early inflammatory reactions to the mites' invasion and injury to the

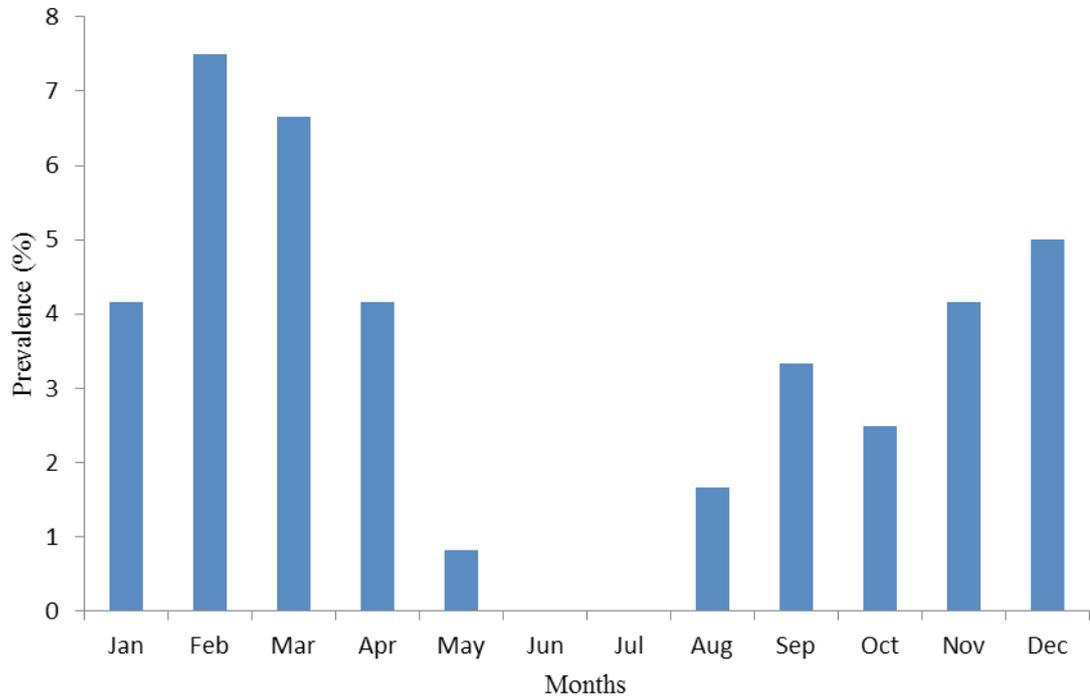


Figure 1. The prevalence (%) of sarcoptic mange in buffaloes from January 2010 to December 2010.

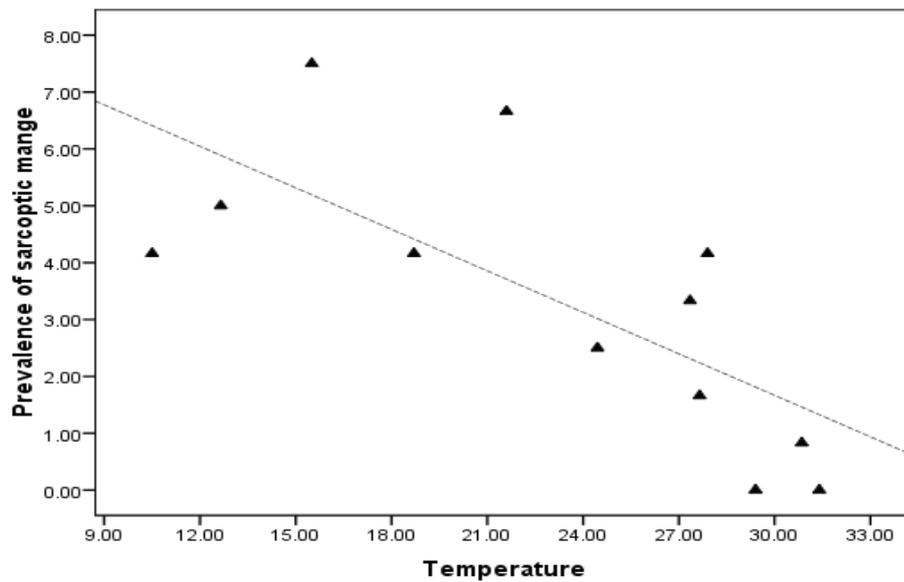


Figure 2. Scatter graph showing a strong negative correlation ( $r=-0.725$ ,  $r^2=0.525$ ) between the prevalence rate (%) of sarcoptic mange and mean monthly temperature (°C).

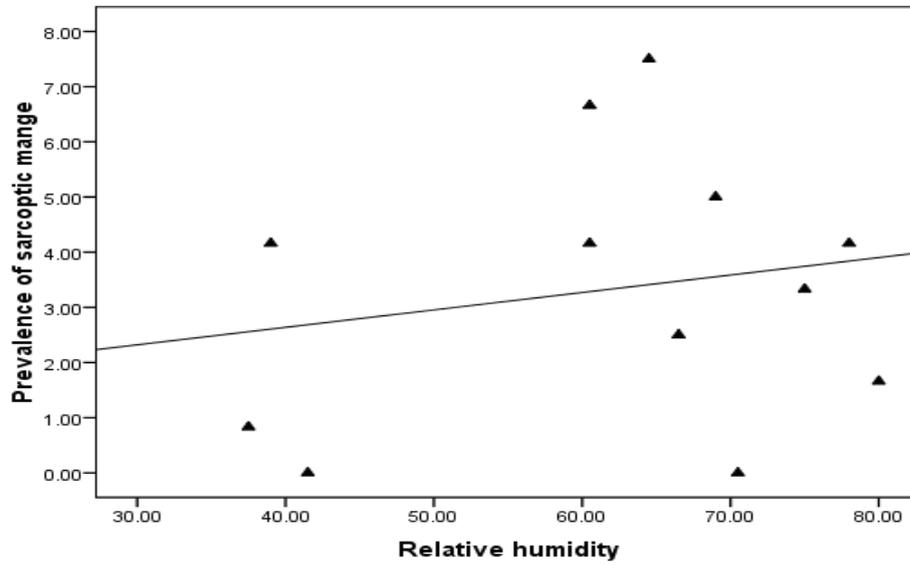


Figure 3. Scatter graph showing a weak positive correlation ( $r=0.2$ ,  $r^2=0.04$ ) between the prevalence rate (%) of sarcoptic mange and mean monthly relative humidity (%).

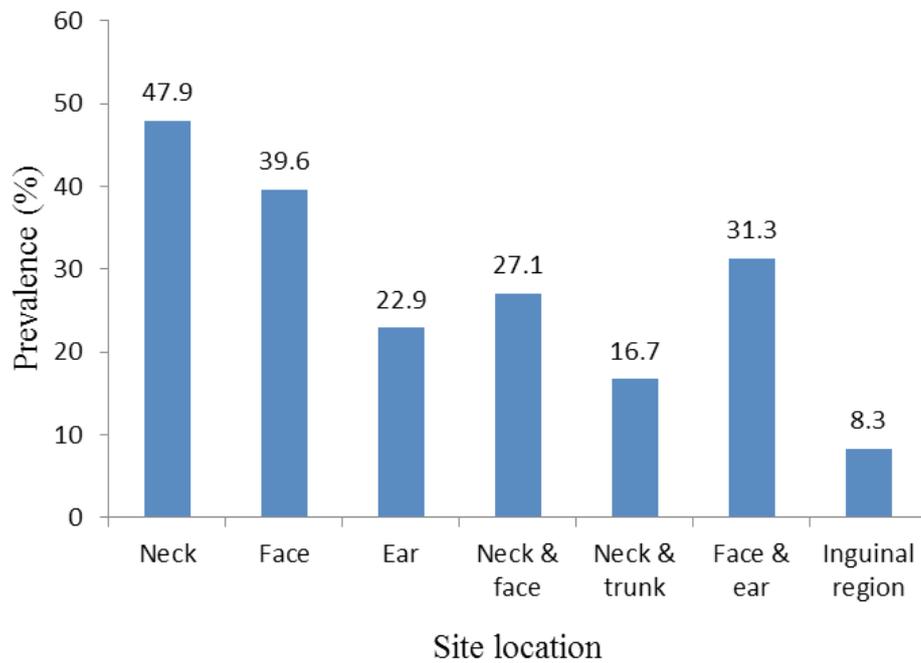


Figure 4. The prevalence (%) of sarcoptic mange on buffaloes in respect of site locations.

Table 1. The prevalence of *Sarcoptes scabiei* on buffaloes in respect of season, sex and age.

Season	No. examined	No. infested	Percent	Male			Female			Up to 1 year			Above 1 year		
				examined	infested	percent	examined	infested	percent	examined	infested	percent	examined	infested	percent
Winter	360	20	5.55 <sup>a</sup>	144	5	3.47	216	15	6.94	240	14	5.83	120	6	5
Summer	480	14	2.91 <sup>b</sup>	159	3	1.88	321	11	3.42	320	10	3.12	160	4	2.5
Rainy	360	6	1.66 <sup>b</sup>	117	0	0	243	6	2.46	240	6	2.5	120	0	0
Post-rainy	240	8	3.33 <sup>ab</sup>	88	2	2.27	152	6	3.94	160	6	3.75	80	2	2.5
Total	1440	48	3.33	508	10	1.96 <sup>p</sup>	932	38	4.07 <sup>q</sup>	960	36	3.75	480	12	2.5

Figures with different superscripts differ significantly ( $p \leq 0.05-0.01$ ).

skin, which leads to rubbing of the affected parts with manger or the walls. The infestation spread quickly from these localized lesions causing generalized mange. Although the skin lesions were found all over the body, the neck (47.5%) and the face (39.6%) were the most affected parts (Figure 4). However, some animals had the lesions on two sites together (Figure 4). The lesions appeared as exudative crusts, scales, haemorrhagic and non-haemorrhagic fissures. A decrease in feed intake and a rapid fall in milk yield in lactating buffaloes were prominent features of the infestation. In severe cases, excess keratinization and thickening of skin were observed, which resulted in corrugations or folds often spread over with a fine, chalk-like covering of scurf. Severely infested buffaloes had emaciated bodies with no sign of fat deposits. The characteristic signs of the infestation were loss of normal skin colour and texture.

The infested buffaloes showed a significant ( $p < 0.05$ ) association with inappetance. Out of 48 infested buffaloes, 29 (60.41%) showed inappetance while 19 (39.58%) had normal appetite.

## DISCUSSION

Sarcoptic mange is one of the few diseases that seriously threaten the well-being of the water buffalo (*Bubalus bubalis*). A higher incidence rate of 27.6% of sarcoptic mange in buffaloes has been reported from organised dairy farms of Haryana state of India (Tikaram and Ruprah, 1986). El-Khodery *et al.* (2010) observed *Psoroptes* and *Chorioptes* spp. infestation in 16.66% buffaloes of smallholder farms in the Nile Delta region of Egypt. As against the above observations, there is an incidence rate of 3.33% currently recorded in Jammu.

The occurrence of sarcoptic mange is usually considered to be seasonal and is often restricted to a few months of the year (during winter and early summer months) (Tikaram and Ruprah, 1986; El-Khodery *et al.*, 2010). Probably, with increase in the mean temperature during summer months, the mite numbers decrease rapidly due to less active feeding and decreased oviposition by the mites (Soulsby, 1982). Further the maximum survival of both sarcoptic and psoroptic mites has been recorded at 20-27°C rather than at 31-39°C (Maske and Ruprah, 1981). During the hot summer months, the disease is recognized as subacute (dormant or quiescent) or chronic with focal lesions mainly in the groin and submaxillary regions. During this quiescent phase a spontaneous cure has occurred. Since the more severe lesions may subside, itching and pruritus are relieved and new hair growth starts. These quiescent lesions are potential sources of clinical infection and the risk of a sudden outbreak of mange within a herd with the change of season poses a serious threat.

The young animals showed a higher infestation rate of *S. scabiei* than the adults. This could be attributed to soft and tender skin, dense hair coat, huddling tendency and relatively low level of immunity in young animals (Patel *et al.*, 2003a). However, Cernea and Cernea (2006) concluded that the mange-mite infestation develops in adult animals irrespective of sex with higher prevalence of psoroptic mange at 5-13 years of age. Although male and female animals are kept under similar managerial conditions, a significantly ( $p < 0.05$ ) higher infestation rate in females than the males suggests that differences in susceptibility between sexes may exist.

In mite infestation, host reactions such as cutaneous inflammation and intense pruritus are associated with response to the mites' burrowing

and feeding activities, which usually occur three weeks after the initial infestation (Colebrook and Wall, 2004; Rahbari *et al.*, 2009). The reaction time is longer accompanied by severe itching during early stages of infestation when the mite numbers are low. Subsequently, the reaction time becoming much shorter after repeated exposures (Gary and Durden, 2009). The induction of cutaneous hypersensitivity in response to mite faecal antigens may cause proliferation of mast cells and resultant increase in chymase and tryptase activities (Noviana *et al.*, 2004) as well as decrease in anti-oxidant enzyme activities and trace minerals suggesting its association with compromise in anti-oxidant defense and resulting in oxidative stress (Dimri *et al.*, 2008); these phenomena are supposed to play an important role in development of pathogenicity. Itching may develop as a result of histamine that is released from the destroyed cells and that is a potent pruritogen (Greaves and Wall, 1996). The rubbing and scratching of the affected areas in an attempt to alleviate the itchiness, result in the shedding of mites in the surroundings for subsequent transmission to other animals. Excessive rubbing and scratching leads to excoriation and haemorrhage on the skin surface and even death, particularly in animals below one year of age when the lesions are large (Patel *et al.*, 2002a).

The mite infestation is often accompanied by inappetance, and as a result, loss of weight gain may occur (Rahbari *et al.*, 2009). El-Khodery *et al.* (2010) reported a significant ( $p < 0.01$ ) inappetance in buffaloes infested with *Psoroptes* spp. mites. Inappetance in mite infestation may develop as a result of alteration in hepatic function and structure and decrease in digestibility of nutrients (Dimri and Sharma, 2004b). Damage of hepatic tissues in cattle calves infested with *Psoroptes ovis* has also been reported (Fisher and Crookshank, 1982).

On the basis of the results of the study, it may be concluded that the season and sex are important and significant predisposing factors for sarcoptic mange in buffaloes. The application of suitable acaricides would help to reduce the infestation and to sustain the optimal growth and productivity of buffaloes and minimise the perpetuating financial losses to resource-poor communities in the region.

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