

Incidence of mastitis in Sahiwal cattle and Murrah buffaloes of a closed organized herd

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ABSTRACT

The incidence of mastitis was investigated in Sahiwal and Murrah breeds maintained as a closed pedigreed herd in a research institute. The overall occurrence of mastitis in Sahiwal and Murrah was 26.43 and 18.91%, respectively. Least squares analysis revealed that breed, season of calving and milk yield had significant effect on the incidence of mastitis. The incidence was the highest among cows calved in summer, whereas it was the lowest in winter calvers in Sahiwal and autumn calvers in Murrah. High milk producers had significantly higher incidence than their low yielding counterparts. There was a nonsignificant trend of increase in incidence with the increase of parity order.

Key words: Buffalo, Mastitis, Sahiwal

Mastitis is a multifactorial threshold trait resulting from interaction between genetic components of the host, infectious agents and environmental factors. The disease causes economic losses due to lower milk yield and its degraded quality, early culling and loss of genetic potential, higher veterinary expenses and increased labour cost for a farmer. The genetic correlation between milk yield and mastitis has been reported to be antagonistic. The present investigation was undertaken to estimate the incidence of clinical mastitis in relation to various non-genetic factors in Sahiwal and Murrah breeds maintained in Cattle Yard, at the National Dairy Research Institute, Karnal.

MATERIALS AND METHODS

The information for estimation of mastitis incidence was collected from history sheets, stock registers and health record registers maintained in different sections of the institute. Lactation records (861) comprising 401 Sahiwal and 460 Murrah were utilized. The data were classified according to breed, parity, season of calving and milk yield, to assess the per cent incidence and to analyze the effect of these factors on mastitis using least squares technique (Harvey 1966). Information was recorded parity-wise up to 6 lactations and above it was pooled, as number of animals was less for analysis. Each calendar year was classified into seasons: winter (December-February), summer (March-

June), rainy (July–August) and autumn (September–November), on the basis of prevailing regional climatic conditions. The animals were classified into 3 production groups considering the lactation milk yield (LMY) of all the completed lactations. Animals that had LMY greater than the herd average +1 standard deviation (SD) were defined as high yielders, animals with LMY within the herd average ± 1 SD considered as medium yielders and those with LMY lesser than herd average -1 SD were treated as low yielders. A binary response variable was created for the disease. If a cow got infected with the disease at least once in a lactation, a response of “1” was attributed to the record. A healthy record with a response of “0” was created for a cow that was never recorded for the disease.

RESULTS AND DISCUSSION

The overall incidence of clinical mastitis in Sahiwal and Murrah was 26.43% and 18.91%, respectively (Table 1). The occurrence of mastitis has been studied and reported in literature by several investigators; however, figures are quite different. In comparison to the present study, lower incidence of mastitis in buffaloes has been reported by several workers (Shinde *et al.* 2001, Taraphder 2002, Satyapal 2003). Though, almost similar incidence of clinical mastitis was reported in buffaloes (Bilal *et al.* 2004). On the other hand, Dhakal and Thapa (2002) reported a higher incidence of mastitis in buffaloes in Nepal. In cattle, higher incidence of mastitis was also reported (Ahmad 2006). Conversely, lower incidence of mastitis was reported in cattle (Hagnestam *et al.* 2007, Bar *et al.* 2008, Petzer *et al.* 2009).

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Table 1. Incidence of clinical mastitis in Sahiwal and Murrah

	Sahiwal		Murrah	
	N	Mastitis (%)	N	Mastitis (%)
Overall	401	26.43 (106)	460	18.91 (87)
<i>Parity</i>				
First	148	20.94 (31)	165	14.54 (24)
Second	103	24.27 (25)	125	21.60 (27)
Third	68	27.94 (19)	68	23.52 (16)
Fourth	33	33.33 (11)	40	25.00 (10)
Fifth	25	40.00 (10)	27	25.92 (07)
Sixth and above	24	41.66 (10)	35	8.57 (03)
<i>Season</i>				
Winter	193	17.09 (33)	123	15.44 (19)
Summer	109	43.11 (47)	83	33.73 (28)
Rainy	58	27.58 (16)	159	16.35 (26)
Autumn	41	24.39 (10)	95	14.73 (14)
<i>Milk yield</i>				
High	59	33.89 (20)	69	30.43 (21)
Medium	276	26.08 (72)	332	17.46 (58)
Low	66	21.21 (14)	59	13.55 (08)

Figures in parentheses indicate the number of affected animals.

Values in the same column with different superscript significantly differ ($P < 0.05$).

The incidence of mastitis varies among herds as well as within herds at different period of times due to dissimilarity in diagnosis, treatment and reporting of disease events. Besides, there is possibility of changes in managerial practices over the years owing to changes of farm managers. Furthermore, installation of milking machine to involve more number of animals and ensure complete milking could facilitate occurrence of mastitis, as removal of milk by milking machines can cause trauma of teat end tissues, which facilitates colonization of mastitis-causing organisms. These factors could be responsible for differences in the incidence of mastitis between and within herds as observed from comparison of the results of present investigation with similar studies conducted in other herds.

Analysis of variance revealed that frequency of mastitis incidence was significantly higher ($P < 0.01$) in Sahiwal as compared to Murrah cows. This finding is in agreement with earlier report of Satyapal (2003) on cattle (Sahiwal and Karan Fries) and buffalo (Murrah) breeds.

Genes influence anatomical pattern and thus the shape, structure and size of teat, and the manner of attachment of udder could have effect on resistance or susceptibility to mastitis. Large size of udder and increased rate of milk flow influence the occurrence of mastitis. The significant variation of mastitis between Sahiwal and Murrah might, therefore, primarily be of genetic origin. The pendulous udder and loose teat sphincters in Sahiwal could be an important factor in this aspect.

The incidence of mastitis showed a nonsignificant increasing trend with the increase in parity order. This finding

is in accordance with the report of Shinde *et al.* (2001) and Satyapal (2003). Contrary to the present finding, significant effect of parity on mastitis incidence was reported by Taraphder (2002).

The incidence was the highest in sixth and above parity (41.66%), and lowest in the first parity (20.94%) in Sahiwal cows, whereas in Murrah buffaloes, the highest and the lowest incidence was in fifth (25.92%) and sixth and above parity (8.57%), respectively. Results revealed that the incidence across parity in Sahiwal was higher than that in exotic cattle breeds (Bar *et al.* 2008). On the other hand, parity-wise incidence in Sahiwal was almost similar when compared with other report on cattle breeds in India (Satyapal 2003). In Murrah, the incidence in different parities was higher than the previous reports (Taraphder 2002, Satyapal 2003) on the same breed and herd.

The higher incidence of mastitis in later parity might be due to long time exposure of cows to the risk during which the effectiveness of streak canal as barrier to infection decreased with the increase of parity numbers. Another reason might be due to increase of milk yield with the increase in parity order.

Season of calving had significant ($P < 0.01$) effect on the incidence of mastitis. The frequency of mastitis incidence in different seasons ranged from 17.09 to 43.11% in Sahiwal and 14.73 to 33.73% in Murrah. In Sahiwal, this was highest in cows that calved in summer followed by rainy season, autumn and winter, whereas in Murrah, the highest and lowest incidence was observed in summer and autumn, respectively. Similar findings on the effect of season of calving on the incidence of mastitis were reported by Shinde *et al.* (2001), Taraphder (2002) and Satyapal (2003).

High incidence of clinical mastitis in summer could be due to heat stress, which might be making an animal prone to infection. Besides, the non-availability of adequate quantity of green fodder during summer might also contribute to the high incidence during the season. As green grasses are rich in selenium and vitamin E, which are anti-inflammatory against mastitic pathogens through enhancement of intracellular killing by neutrophils; they bolster the immune system and decrease mammary infections. On the other hand, the humid and filthy environment during rainy season could be very conducive for proliferation and easy access of pathogenic organisms into the mammary gland for precipitating the disease. These findings indicate that cows initiating lactation in summer and rainy seasons need better care and management during these months.

Milk yield had significant effect ($P < 0.05$) on the incidence of clinical mastitis in both Sahiwal cattle and Murrah buffaloes. The incidence varied from 33.89 to 21.21% in Sahiwal and 30.43 to 13.55% in Murrah buffaloes, respectively. This finding is in agreement with the well established facts of positive and significant correlation between mastitis and milk yield (Carlen *et al.* 2004). The

higher incidence of mastitis in high milk producing cows could be of genetic origin. The other possible reasons could be the high producing animals being given treatment and retained in the herd while their low yielding counterparts might have been culled. The outcome of the present study suggests that better care and management should be given to cows depending upon parity, production groups and initiation of lactation in different seasons.

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