INTERNATIONAL JOURNAL OF ADVANCED BIOLOGICAL RESEARCH

www.scienceandnature.org

Short Communication

INFLUENCE OF TEMPERATURE HUMIDITY INDEX AND DRY PERIOD ON INCIDENCE OF MASTITIS IN CATTLE AND BUFFALOES

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ABSTRACT
The data was collected for the twelve years period (2000 to 2011) to find out the effect of temperature humidity index and dry period on incidence of mastitis in cattle and buffaloes. The effect of temperature humidity index score on the incidence of clinical mastitis was significant in Karan Fries cows, (P <0.05), Murrah buffaloes (P <0.05), Karan Swiss and Sahiwal cows (P< 0.01), while THI did not influenced mastitis incidence in Tharparkar cows. The frequency of mastitis incidence in different duration of dry period varied from 36.76 to 39.55, 34.04 to 48.28, 27.94 to 37.50, 27.48 to 42.50 and 10.42 to 22.12 percent in Karan Fries, Karan Swiss, Sahiwal, Tharparkar cows and Murrah buffaloes.

KEYWORDS: Temperature humidity index, Dry period, Mastitis, Cow and Buffalo.

INTRODUCTION

Mastitis is a complex and costly disease among all the diseases in dairy herds (Beheshti *et al*., 2010). It stands second to foot and mouth disease (Varshney and Mukherjee, 2002) and at first position because of high prevalence (90%) in high yielder crossbred cows (Sharma, 2003). Mastitis is a global problem as it adversely affects animal health and economics of milk production of dairy herds in developing and developed countries (Radostits *et al.,* 2000; Sharma and Sindhu, 2007 and Sharma *et al*., 2012).The dynamic and abrupt changes in global weather have drawn the attention of dairy entrepreneur to alleviate the heat stress in order to minimize mastitis incidence. In addition to this the dry period duration also affects mastitis incidence in ensuing lactation (Chishty *et al.,* 2007). The present investigation was undertaken to find out effects of temperature humidity index and dry period on clinical mastitis in crossbred and indigenous cows *vis-a-vis* Murrah buffaloes.

MATERIALS & METHODS

The data on mastitis incidence was collected from history sheets, cum health record registers maintained in the institute for a period of twelve years (2000-2011). Lactation records (6251) comprising Karan Fries (2553), Karan Swiss (351) Sahiwal (1554), Tharparkar (323) cows and Murrah buffaloes (1470) were classified according to Temperature Humidity Index (THI) score and duration of dry period.THI was classified as< 72(No stress),73 to 78 (Mild stress) and 79 to 89 (Severe stress). The dry period (days) was classified as (i) up to60 days(ii) 61 to 120 days and (iii)121days & above. The data was analyzed by Chi-square method as under:

Chi-square = $\Sigma (O - E)^2 / E$

Where,

O = Observed frequencies; E = Expected frequencies,

Expected frequencies were calculated as: $E_{ij} = (R_{i.}) (C_{.j}) / GT$

Where,

Eij = Expected frequency belong to i^{th} row and j^{th} column

$R_{i.}$ = i^{th} row total; $C_{.j}$ = j^{th} column total; GT = Grand total

The association between two variables was studied using Chi-Square statistics

RESULTS & DISCUSSION

The effect of Temperature Humidity Index score on the incidence of clinical mastitis was significant in Karan Fries cows, (P <0.05), Murrah buffaloes (P <0.05), Karan Swiss and Sahiwal cows (P< 0.01), while THI did not influenced mastitis incidence in Tharparkar cows. The incidence of mastitis ranged from 33.98 to 40.80% in Karan Fries, 29.48 to 50.41% in Karan Swiss, 25.79 to 42.27% in Sahiwal, 26.92 to 35.43% in Tharparkar cows and 23.78 to 29.80% in Murrah buffaloes with different THI scores(Table). The incidence of mastitis increased with high THI score in KF, KS, and SW cows, however Tharparkar cows and Murrah buffaloes remain unaffected (Table).At low THI(<72) the incidence of mastitis in KF, KS, and SW cows was lower, though TP cows and Murrah buffaloes did not exhibited similar effect.

The effect of preceding dry period on incidence of mastitis was non-significant in cows and buffaloes, except Sahiwal in which effect of dry period was significant (P< 0.01).The frequency of mastitis incidence in different duration of dry period varied from 36.76 to 39.55, 34.04 to 48.28, 27.94 to 37.50, 27.48 to 42.50 and 10.42 to 22.12 % in Karan Fries, Karan Swiss, Sahiwal, Tharparkar and Murrah buffaloes. The higher incidence of mastitis in Murrah buffaloes during the winter season when THI was < 72 was be due to the severe cold stress condition as buffaloes are managed in a loose housing system. However,

significantly low incidence of mastitis in summer season than the winter season and a non- significant effect between hot –humid and hot- dry season clearly indicated more adoptability of buffaloes to summer season in comparison to winter season. The crossbred and Sahiwal cows were more affected by high humidity and ambient temperature (THI- 79 to 89) due to less adaptability to hot-humid conditions, growth of pathogen and exposure udder to unhygienic conditions (Shinde *et al*., 2001; Singh *et al.*, 2001). High humidity in the cow's shed and a draught on the udder increases susceptibility to mastitis. Wetness of the udder due to moist stalls floor or due to frequent washing of the udder increases the deleterious effect of draughts by increasing heat loss from its skin (Wani and Bhatt, 2003; Barkema *et al.*, 1999 and De and Mukharjee, 2009). However, THI < 72 was found to have least effect on incidence of mastitis in crossbred and indigenous cows. Tharparkar cows were found to be more resistant to high ambient temperature of hot-humid season and corroborate earlier reports in Karan Fries cows and Hariana cattle (Pal, 2003 and Kaushik ; Khanna, 2004). There was no clear cut effect of duration of dry period on mastitis incidence, except buffaloes in which the incidence increased with the duration of dry period as reported earlier (Peeler *et al*., 2000 and Chishty *et al*., 2007). It has been found that dry period length of seven weeks is associated with the lowest risk of clinical mastitis as found in Karan Fries cows and Murrah buffaloes in this study (Enevoldsea and Sorensen,1992).

CONCLUSION

The data on incidence of mastitis was collected from the institute herd and was classified as per the duration of dry period and THI score. The effect of dry period on mastitis incidence was non-significant in ensuing lactation in crossbred (Karan Fries, Karan Swiss) and indigenous cows (Sahiwal, Tharparkar), but increase in dry period influence mastitis incidence in buffaloes. Increase in THI score significantly increased mastitis incidence in all breeds of cows but Murrah buffaloes remain unaffected. However, decrease in THI (<72) increased mastitis incidence in Murrah buffaloes and Tharparkar cows.

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ISSN 2250 – 3579

TABLE 1. Incidence of clinical mastitis (%) in various breeds of cattle and buffaloes in different THI score, and duration of dry period:

	Breed									
	Karan Fries		Karan Swiss		Sahiwal		Tharparkar		Murrah Buffaloes	
Effect	NO.	Mastitis	NO.	Mastitis	NO.	Mastitis	NO.	Mastitis	NO.	Mastitis
THI Score										
< 72	1104	33.98(375)	173	29.48(51)	760	25.79(196)	127	35.43(45)	557	29.80(166)
73 to 78	427	35.13(150)	57	40.35(23)	238	40.76(97)	52	26.92(14)	236	25.00(59)
79 to 89	1022	40.80(417)	121	50.41(61)	556	42.27(235)	144	34.03(49)	677	23.78(161)
Duration of dry period										
Up to 60 days	710	36.76(261)	55	41.82(23)	74	36.48 (27)	23	39.13(9)	48	10.42(5)
61 to 120days	584	39.55(231)	94	34.04(32)	312	37.50(117)	40	42.50(17)	357	21.29(76)
121 days & above	312	38.78(121)	58	48.28(28)	662	27.94(185)	131	27.48(36)	547	22.12(121)

NO.=Number of observation; THI= Temperature Humidity Index Figures in parentheses indicate the number of observation of mastitic animals