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Performance of Lactating Crossbred Cows under Different Housing Systems During Summer in Konkan Agro-ecological Conditions"

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ABSTRACT

An investigation was carried out on nine lactating crossbred cows (J×L) cows which were allotted randomly into three comparable shelters in switch over design. Three different type of shelters were, 1- Asbestos roofing; 2- Paddy straw thatched roof house; 3 - White painted asbestos roof. Temperature humidity index was higher in macro -environment followed by thatched roof shed, white painted asbestos roof and asbestos roofing. Thatched roof shed had significant ($P<0.05$) incremental effect on the milk production and milk composition of cows than the cows in white painted roof shed and asbestos roof shed during summer. Overall paddy straw thatched roof shed effectively ameliorates environmental temperature, humidity and THI during summer season in the Konkan region.

Keywords: Cross bred cows, Shelter management, Microenvironment, Milk Composition

In tropical and subtropical climates, the productivity and adaptability of crossbred cows is adversely influenced by climatic variables, particularly due to thermal stress. High environmental temperature, humidity and solar radiation are associated with low dairy cattle performance. Lactating dairy animals are particularly sensitive to adverse thermal stress due to their specialized productive function and to their high efficiency of feed utilization. High temperature caused increase in respiration rate and body temperatures and decrease in feed intake and milk production in cows. (Vagtapilly *et. al.,* 1990).

Housing plays a key role in dairy cattle management. An ideal housing enable in moderating the range of microclimate to which the animals are exposed and the degree of comfort depends upon types of housing. It also improves the dairy cattle

productivity by protecting them from extreme climate. (Dhiman *et. al.*, 1990, Sharma and Singh, 2002).

Therefore, the present investigation on "Performance of lactating crossbred (JxL) cows under different sets of housing management during summer, in agro ecological region of the Konkan" was carried out to study the performance of lactating crossbred (JxL) cows under different types of housing condition and the suitable housing condition for maintaining temperature inside the shed.

MATERIALS AND METHODS

The trail was conducted on nine lactating crossbred (JxL) cows. Each group of three cows was allotted randomly into three comparable shelters in switch over design for fixed period of 18 days. There was five days time interval kept between successive treatment periods, as an adjustment period. The experiment was conducted from 1st April, 2008 to 3rd June, 2008.

The fundamental construction of each shed was almost same having covered and open area. The changes were done in three sheds in respect to roofing. Shed-I was having and no other modification was carried out in this shed. Shed – II was thatched roof house; a modified barn with six inch layer of paddy straw bedding with bamboo structure over the asbestos roof. Shed-III was having white painted asbestos sheets.

Micro-environmental data within these sheds was recorded during period of experiment. The maximum, minimum, wet bulb, dry bulb thermometers were fixed at 2m height in the centre of shed and the temperatures were recorded of 7.30 a.m. and 2.30 p.m. in each shed daily.

According to requirement, the animals in each group were fed with dry grass, green maize and jowar kadbi. The concentrate mixture was fed at the time of milking. Daily morning and evening milk yields were recorded in respect of individual cow during the entire trail period. To evaluate the treatment effects on the milk composition, milk samples were collected once in fortnight and were analyzed for fat, solid not fat, proteins and total solid content.

RESULTS AND DISCUSSION

Macro and micro environment

The mean ±SE of climatic components in different micro and macro environment are presented in (Table.1). The maximum temperature remained on higher side in macro environment as compared to other three shelters in all the periods. The average maximum temperature of macro environment and micro-environment like asbestos roofed shed, thatched roof shed and white painted roof shed were 37.20 ± 0.17, 34.27 ± 0.17, 31.90 ± 0.16 and 32.98 ± 0.18, respectively (Table.1). The present investigations were in agreement with the findings of Singh *et. al.*(1989). The minimum temperature was the lower under asbestos roofed shed and was followed by the white painted roof shed and thatched roof shed over all the period. The

average minimum temperature of asbestos roofed shed, thatched roof shed, white painted roof shed and macro-environment were 23.10 ± 0.33, 23.60 ± 0.32, 23.30 ± 0.32 and 22.07 ± 0.27^{0}c respectively (Table.1).

Relative humidity (morning) of thatched roof shed, white painted roof shed, asbestos roofed shed and microenvironment were 83.94 ± 0.66, 85.70 ± 0.60, 86.90 ± 0.57 and 82.27 ± 0.49 per cent respectively (Table.1). Similar trend was found in case of RH (evening). The average relative humidity (evening) of thatched roof shed, white painted roof shed, asbestos roofed shed and macro environment were 55.59 ± 0.75, 59.09 ± 0.74, 60.94 ± 0.79 and 50.87 ± 0.72 per cent respectively (Table.1). The THI was commonly used method to know the degree of heat stress in animal (Fuquay, 1981). Over the whole period, temperature humidity index (morning) was higher in macro environment and followed by asbestos roofed shed, white painted roof shed and thatched roof shed. (Table1).

Table 1: Climatic components in different micro and macro environment.

Sr. No.	Treatments	Parameters	Period-I	Period-II	Period-III	Mean
1.	Asbestos roofed shed (T_1)	MAX (^{0}C)	33.44±0.44	34.35±0.10	35.02±0.13	34.27±0.17
		MIN (^{0}C)	20.36±0.37	23.42±0.20	25.52±0.28	23.10±0.33
		RH morn. (%)	88.27±1.04	87.94±0.63	84.50±1.04	86.90±0.57
		RH even. (%)	56.72±1.04	62.44±0.78	63.66±1.24	60.94±0.79
		THI morn.	70.70±0.55	75.69±0.31	78.89±0.26	75.09±0.51
		THI even.	80.42±0.41	83.09±0.24	83.75±0.20	82.42±0.26
2.	Thatched roof shed (T_2)	MAX (^{0}C)	31.17±0.39	31.87±0.07	32.65±0.15	31.9±0.16
		MIN (^{0}C)	20.86±0.38	24.00±0.20	25.95±0.18	23.6±0.32
		RH morn. (%)	86.00±1.05	83.94±0.75	81.88±1.41	83.94±0.66
		RH even. (%)	53.72±1.49	54.72±0.99	58.33±1.20	55.59±0.75
		THI morn.	70.10±0.52	75.28±0.32	78.32±0.23	74.56±0.51
		THI even.	77.19±0.41	79.58±0.15	80.30±0.18	79.02±0.24
3.	White painted roof shed (T_3)	MAX (^{0}C)	32.26±0.45	32.94±0.10	33.75±0.16	32.98±0.18
		MIN (^{0}C)	20.57±0.39	23.73±0.22	25.61±0.18	23.30±0.32
		RH morn. (%)	86.61±1.24	86.11±0.67	84.38±1.12	85.70±0.60
		RH even. (%)	55.88±1.42	59.55±0.64	61.83±1.29	59.09±0.74
		THI morn.	70.30±0.55	75.57±0.32	78.50±0.24	74.77±0.51
		THI even.	78.89±0.40	81.12±0.21	81.86±0.20	80.63±0.23
4.	Macro environment	MAX (^{0}C)	36.21±0.37	37.85±0.13	37.56±0.16	37.20±0.17
		MIN (^{0}C)	19.89±0.36	22.47±0.25	23.84±0.17	22.07±0.27
		RH morn. (%)	84.22±0.82	81.72±0.47	80.88±1.01	82.27±0.49
		RH even. (%)	50.27±1.28	49.16±0.81	53.16±1.42	50.87±0.72
		THI morn.	72.28±0.54	77.09±0.31	80.36±0.26	76.58±0.50
		THI even.	82.13±0.37	84.98±0.23	86.12±0.18	84.41±0.27

Milk Production and Milk Composition

The average milk yield of 8.17 ± 0.084 kg/day/cow was found significantly higher ($P<0.05$) in thatched roof shed (T_2) in comparison with 7.91 ± 0.084 kg in the white painted roof shed (T_3) and 7.52 ± 0.084 kg in asbestos roofed shed (T_1) (Table 2). As compared to asbestos roofed shed (T_1), there was increase in milk production by

5.19 per cent in white painted roof shed (T_3) and 8.64 per cent in paddy straw thatched roof shed (T_2). High environmental temperature decreased milk production mainly due to lower feed intake (Singh and Mishra, 2007). The results were also in agreement with findings of the Singh *et. al.* (2008) who noted that use of paddy straw bedding over the asbestos sheet significantly ($P< 0.05$) improved the milk yield of crossbred cows in comparison to the cows in the asbestos roofed shed. The average total solids in milk of crossbred course was found significantly higher ($P<0.05$) in thatched roof shed followed by white painted roof shed (T_3) and asbestos roofed shed (T_1) (Table 2). These results agree with Fumaiki Itoh *et.al.* (1998), who found that, per cent total solid decreased in hot environment. The cows in thatched roof shed (T_2) average fat, SNF and protein present in milk followed by white painted roof shed (T_3) (Table 2). There is increase in water intake which results in reduced milk fat percentage (Aggarwal and Singh, 2006). Comparable results were reported by Moody *et. al.* (1967) who found that marked decrease in percent of SNF, fat and protein in milk of lactating cows due to high temperature in the shed.

Table 2: Milk yield and Milk composition of cows under different housing conditions during experimental periods.

Sr. No.	Constituents	T_1	T_2	T_3
1.	Milk yield (kg)	7.52	8.17	7.91
2.	Milk total solid (%)	13.04	13.71	13.31
3.	Milk fat (%)	4.45	4.87	4.64
4.	Milk Protein (%)	3.28	3.48	3.40
5.	Milk SNF (%)	8.41	8.89	8.62

Result showed that thatched roof shed had significant ($P< 0.05$) incremental effect on the milk production and milk composition of cows than the cows in white painted roof shed and asbestos roofed shed during summer season.

CONCLUSION

The results the study concluded that paddy straw thatching over the asbestos sheet effectively ameliorates heat stress during the summer season in the Konkan region.

REFERENCES

Anjali Aggarwal and Singh, M. 2006. Impact of macroclimatic modification on production of dairy avenals durery summer. *Indian Dairyman*, **58(3)** : 49-59.

Dhiman, P.C., Singh, N. and Yadav, B.L. 1990. A study of dairy cattle and buffalo managemnt practices in adopted and non adopted villages of Hiss are district. *Indian Journal of Animal Production and Management*, **6(2)**: 84-89.

Fumiaki ITOH; Yoshiaki Drand; Michad T, Rose Hireshi fuse and Harro Harimato 1998. Insulin and decagon sevation in lactating cows during heat exposure. *Journal of Dairy Science.* **76**:2182-2189.

Fruguay, J.W; Zook, A.B., Daniel, J.W., Brown, W.H. and Poe, W.E. 1979. Modifications in freestall housing for dairy cows during the summer. *Journal of Dairy Science*, **62(**4**):** 577-583.

Moody, E.G; Vansoest, P.G., Mcdowell R.E. and forel G.L. 1967. Effect of high temperature and dietary fat on performance of lactating cows. *Journal of Dairy Science*, **50 (**12**):**1909-1916.

Sharma , P. and Singh, K. 2002. Effect of shelters system on environmental variable. *Indian Journal of Animal Science*, **72**(9): 806-809.

Singh, K; Kumar, P., Saini, A.L. and Bhattacharyya, N.K. 1989. Influence of commonly used roofing materials on microclimate in animal houses in hot semiarid zone. *Indian Journal Dairy Science*,**. 42(**3): 505-510.

Singh, S.P. and Mishra, A. 2007. Import of climatic variation on animal health and productivity. *Indian Dairyman*, **59**(3): 47-54.

Vazhapilly, P. Frazzi, E., Lombardelli, R., Maiuti M.G. and Cappa V. 1990. Effect of microclimate on the physiological and metabrdical response of dairy cows and on milk quality. *Fide Dairy Science. Abstract*, **55:**48.