

Ethological study of kankrej cows under different housing systems

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Received : 10 May, 2012

ABSTRACT

Feeding and resting behaviour of lactating Kankrej cows was noted under three housing systems, viz. First group was provided RCC shed (T_1), second group was kept under Thatched roof (T_2) and third group was provided Tree shelter (T_3). Fodder eating time was significantly ($P < 0.01$) higher under T_1 (292.15 ± 4.32 min.). Significantly higher feeding activity was observed in day time as compared to night in all treatments. In summer season standing idle time was significantly ($P < 0.05$) higher under T_1 (299.34 ± 3.15 min.). Sitting lying ruminating time was significantly higher in T_3 (278.93 ± 2.09 min.) in summer season as compared to T_1 (233.20 ± 2.13 min.) and T_2 (219.5 ± 2.14 min.), while in monsoon and winter season, it was significantly higher in T_1 (270.30 ± 2.11 and 259.10 ± 3.26 min. respectively). Sleeping pattern in all the seasons did not differ significantly between treatments. However, it was significantly ($P < 0.05$) higher in night as compared to day. Frequencies of defecation and urination did not differ due to treatments but was significantly higher in day. Feeding temperament score was not affected by seasons or treatments.

Key words : Kankrej cow, feeding, resting

Rapidly depressed feed consumption with increased environmental temperature has been observed (Razdan, 1965). An inadequate housing system, overcrowding and uncomfortable conditions are detrimental effects on animal's feeding and resting behaviour. The heat load on the animals can be reduced by providing comfortable housing and feeding proportion of concentrate in the daily ration (Johnson *et al.* 1963 and Yadav, 1981). Therefore the present study was undertaken to find out the effect of housing systems on feeding and resting behaviour of lactating Kankrej cows.

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MATERIALS AND METHODS

Eighteen lactating Kankrej cows of almost same stage of lactation, level of production and body weight were selected for present study. These cows were divided into three groups of six animals each. Each group was randomly allotted to one of the three treatments viz., RCC shed (T_1), Thatched roof (T_2) and Tree shelter (T_3). The experiment was conducted for one year covering all the three seasons. Individual feeding and resting activities were recorded for 24 hours once in a month for one year. The activities recorded were eating, standing ruminating, standing idle, sitting lying ruminating, sitting idle, sleeping, frequency of defecation, urination and feeding temperament score as given in

Table:1. The collected data were analyzed by standard statistical methods (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

In summer season time (minutes) spent for feeding was significantly higher for T_1 (292.15 ± 4.32) followed by T_2 (276.44 ± 2.90) and T_3 (261.51 ± 5.10). Animals took more eating time and standing idle time in T_1 (RCC shed). It was significantly higher over night as compared to day time (177.95 ± 3.14 Vs. 114.20 ± 1.18 ; 171.89 ± 1.70 Vs. 104.55 ± 1.20 and 150.46 ± 3.60 Vs. 111.05 ± 1.50 in T_1 , T_2 and T_3 , respectively). Time for standing ruminating was significantly ($P < 0.05$) higher in T_2 (274.63 ± 3.10) as compared to T_1 (182.23 ± 2.60) and T_3 (227.32 ± 2.92). Standing idle time was significantly higher in T_1 (299.34 ± 3.15). In thatched roof (T_2), idle standing was significantly ($P < 0.01$) less. Standing idle time was significantly affected by photoperiod being higher during day time. Sitting lying ruminating time was maximum in T_3 (278.93 ± 2.09) followed by T_1 (233.20 ± 2.13) and T_2 (219.50 ± 2.14). It was significantly ($P < 0.05$) higher in night as compared to day in all the treatments. Sleeping time was not significantly affected by treatments, but significantly ($P < 0.05$) higher in night as compared to day in all the treatments. Sitting lying idle time was significantly ($P < 0.05$) less in T_3 (238.50 ± 4.76) followed by T_1 (245.40 ± 4.06) and T_2 (248.83 ± 5.98). Values for day and night were similar and also statistically at par.

In monsoon season, eating fodder time was significantly ($P < 0.01$) higher in T_2 (259.63 ± 3.92 min.). In day, it was significantly ($P < 0.01$) higher over night in all the treatments. Standing ruminating time was significantly ($P < 0.05$) higher in T_3 (229.20 ± 2.12). It was also significantly ($P < 0.05$) higher in day compared to night. Standing idle time of T_2 (296.40 ± 2.78) was significantly ($P < 0.05$) higher compared to T_1 (278.40 ± 2.31) and T_3 (284.30 ± 2.28). Photoperiod did not affect it significantly, though it was higher in night. Sitting lying ruminating time under T_1 (270.30 ± 2.11) was significantly ($P <$

0.05) higher compared to T_2 (258.40 ± 2.13) and T_3 (248.70 ± 2.09). It was significantly ($P < 0.05$) higher in night as compared to day in all the treatments. Sleeping pattern was not influenced by the treatments but, it was significantly higher in night over day. Sitting lying idle time in T_1 , T_2 and T_3 was 241.60 ± 3.28 , 256.40 ± 3.45 and 230.20 ± 3.41 , respectively. The difference due to treatments was non-significant. Photo period also did not affect it.

In winter season, cows spent higher time (Min.) in eating fodder in T_1 (262.46 ± 4.42). However, the difference due to treatment was non-significant. It was significantly ($P < 0.05$) higher in day as compared to night (169.44 ± 2.93 , 166.78 ± 3.18 and 156.40 ± 3.37 Vs. 93.02 ± 1.49 , 88.92 ± 1.61 and 90.19 ± 1.54 in T_1 , T_2 and T_3 , respectively). Standing ruminating time did not differ significantly between treatments. However, it was significantly ($P < 0.05$) higher in day over night in all the treatments. Standing idle time was significantly ($P < 0.05$) higher in T_2 (276.50 ± 2.58) and T_3 (275.40 ± 2.33) than T_1 (241.10 ± 2.46). However, photoperiod did not affect it. Sitting lying ruminating time did not showed significant variation between treatments but was significantly ($P < 0.05$) higher in night than day. Sleeping time did not show difference due to treatments but significantly ($P < 0.05$) higher in night over day in all the treatments. Sitting lying idle time for T_1 , T_2 and T_3 was 239.81 ± 2.88 , 247.25 ± 2.61 and 252.83 ± 2.56 , respectively. The difference due to treatments and photo period was non-significant.

The detail analysis revealed that eating activity in all the groups was mainly in day time. Sitting lying ruminating, sitting idle and sleeping activities were more in night time. Standing idle time was more in night except in summer season. Higher feeding activity in day was also observed by Schake and Riggs (1969), Regina and Pant (1980), Varlyakov *et al.*, (1988) and Sharma (1999). Kotvas and Vavak (1979), Sharma (1999) and Kataktalware (2004) also observed almost same activity pattern. Frequencies of defeacation and urination were not affected by the treatments. Feeding temperament score was not affected by treatment or photoperiod.

Table 1 Feeding and resting behaviour (Time in different activities in minutes)

Treatment	Photoperiod	Eating fodder	Standing ruminating	Standing idle	Sitting lying ruminating	Sleeping
Summer season						
T ₁	Day	177.95 ± 3.14 ^a	91.40 ± 1.41 ^a	170.70 ± 2.48 ^a	92.21 ± 1.04 ^a	7.3 ± 0.24 ^a
	Night	114.20 ± 1.18 ^b	90.83 ± 1.91 ^a	128.64 ± 0.67 ^b	140.99 ± 1.09 ^b	10.8 ± 0.74 ^b
	Total	292.15 ± 4.32 ^c	182.23 ± 2.60 ^b	299.34 ± 3.15 ^c	233.20 ± 2.13 ^c	18.1 ± 0.98
T ₂	Day	171.89 ± 1.70 ^d	105.87 ± 2.34 ^c	171.38 ± 1.91 ^a	91.16 ± 1.02 ^a	8.9 ± 0.17 ^a
	Night	104.55 ± 1.20 ^e	168.76 ± 0.76 ^d	110.02 ± 1.07 ^b	128.34 ± 1.12 ^b	10.3 ± 0.93 ^b
	Total	276.44 ± 2.90 ^f	274.63 ± 3.10 ^e	281.40 ± 2.98 ^d	219.50 ± 2.14 ^c	19.2 ± 1.10
T ₃	Day	276.44 ± 2.90 ^f	102.78 ± 1.89 ^f	175.55 ± 2.03 ^e	123.48 ± 0.81 ^d	9.3 ± 0.52 ^a
	Night	150.46 ± 3.60 ^e	124.54 ± 1.03 ^f	118.79 ± 1.18 ^b	155.45 ± 1.28 ^a	10.1 ± 0.72 ^b
	Total	111.05 ± 1.50 ^b	227.32 ± 2.92 ^a	294.34 ± 3.21 ^c	278.93 ± 2.09 ^f	19.4 ± 1.24
Monsoon season						
T ₁	Day	160.40 ± 3.16 ^a	105.70 ± 1.02 ^a	128.10 ± 1.02	110.70 ± 0.95 ^a	7.9 ± 0.86 ^a
	Night	99.43 ± 1.02 ^b	76.90 ± 0.96 ^b	150.30 ± 1.29	159.60 ± 1.16 ^b	9.6 ± 0.32 ^b
	Total	259.83 ± 4.18 ^c	182.60 ± 1.98 ^c	278.40 ± 2.31 ^c	270.30 ± 2.11 ^c	17.5 ± 1.18
T ₂	Day	173.30 ± 2.23 ^d	125.64 ± 1.19 ^a	126.07 ± 1.02	115.40 ± 1.32 ^a	6.3 ± 0.22 ^a
	Night	86.33 ± 1.69	83.66 ± 0.99 ^b	170.33 ± 1.76	143.00 ± 0.81 ^b	9.9 ± 0.69 ^b
	Total	259.63 ± 3.92 ^c	209.30 ± 2.18 ^d	296.40 ± 2.78 ^b	258.40 ± 2.13 ^c	16.2 ± 0.91
T ₃	Day	151.84 ± 2.79 ^a	140.82 ± 1.21 ^a	118.80 ± 0.46	109.45 ± 1.43 ^a	6.4 ± 0.42 ^a
	Night	96.32 ± 1.04 ^b	88.38 ± 0.91 ^b	175.50 ± 1.82	139.25 ± 0.66 ^b	9.7 ± 0.78 ^b
	Total	248.16 ± 3.83 ^a	229.20 ± 2.12 ^d	284.30 ± 2.28 ^a	248.70 ± 2.09 ^d	16.1 ± 1.20
Winter season						
T ₁	Day	169.44 ± 2.93 ^a	128.26 ± 1.89	124.58 ± 1.41	198.24 ± 1.45 ^a	6.8 ± 0.94 ^a
	Night	93.02 ± 1.49 ^b	127.54 ± 1.29	116.52 ± 1.05	150.86 ± 1.81 ^b	9.4 ± 1.07 ^b
	Total	262.46 ± 4.42	255.80 ± 3.18	241.10 ± 2.46 ^a	259.10 ± 3.26	16.2 ± 2.01
T ₂	Day	166.78 ± 3.18 ^a	129.24 ± 2.88 ^a	140.43 ± 1.33	99.48 ± 1.45 ^a	7.2 ± 0.17 ^a
	Night	88.92 ± 1.61 ^b	120.96 ± 0.53 ^b	136.07 ± 1.25	140.22 ± 1.53 ^b	9.7 ± 0.91 ^b
	Total	255.70 ± 4.79	250.20 ± 3.41	276.50 ± 2.58 ^b	239.70 ± 2.98	16.9 ± 1.08
T ₃	Day	156.40 ± 3.37 ^a	132.42 ± 2.81 ^a	138.68 ± 1.19	94.33 ± 1.43 ^a	6.9 ± 1.01 ^a
	Night	90.19 ± 1.54 ^b	119.98 ± 0.57 ^b	136.72 ± 1.14	140.47 ± 1.66 ^b	8.9 ± 1.19 ^b
	Total	246.59 ± 4.91	252.40 ± 3.38	275.40 ± 2.33 ^b	234.80 ± 3.09	15.8 ± 2.20

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Treatment	Photoperiod	Sitting lying idle	Frequency of defecation	Frequency of urination	Feeding temperament score
Summer season					
T ₁	Day	120.50 ± 2.88	3.03 ± 0.18	3.28 ± 0.13 ^a	1.10 ± 0.05
	Night	124.90 ± 1.18	2.72 ± 0.02	2.07 ± 0.05 ^b	1.20 ± 0.05
	Total	245.40 ± 4.06 ^a	5.75 ± 0.20	5.35 ± 0.18	1.15 ± 0.05 (Av.)
T ₂	Day	110.80 ± 2.94	2.90 ± 0.06	3.58 ± 0.11 ^a	1.10 ± 0.04
	Night	138.03 ± 3.04	2.33 ± 0.12	2.02 ± 0.10 ^b	1.15 ± 0.09
	Total	248.83 ± 5.98 ^a	5.23 ± 0.18	5.60 ± 0.21	1.13 ± 0.06 (Av.)
T ₃	Day	98.43 ± 2.41	2.10 ± 0.10	3.30 ± 0.09 ^a	1.12 ± 0.03
	Night	140.07 ± 2.35	2.82 ± 0.11	2.45 ± 0.05 ^b	1.00 ± 0.04
	Total	238.50 ± 4.76 ^b	4.92 ± 0.21	5.75 ± 0.14	1.06 ± 0.05 (Av.)
Monsoon season					
T ₁	Day	130.40 ± 2.73	3.10 ± 0.20	2.91 ± 0.42 ^a	1.08 ± 0.03
	Night	111.20 ± 0.55	2.79 ± 0.12	1.94 ± 0.29 ^b	1.15 ± 0.07
	Total	241.60 ± 3.28	5.89 ± 0.32	4.85 ± 0.71	1.12 ± 0.05 (Av.)
T ₂	Day	133.30 ± 2.69	2.80 ± 0.11	3.38 ± 0.11 ^a	1.13 ± 0.04
	Night	123.10 ± 0.76	2.18 ± 0.23	1.72 ± 0.05 ^b	1.12 ± 0.05
	Total	256.40 ± 3.45	4.98 ± 0.34	5.10 ± 0.16	1.13 ± 0.05 (Av.)
T ₃	Day	134.30 ± 2.83	3.10 ± 0.19	3.83 ± 0.09 ^a	1.18 ± 0.06
	Night	95.90 ± 0.58	2.85 ± 0.09	1.07 ± 0.07 ^b	1.21 ± 0.07
	Total	230.20 ± 3.41	5.95 ± 0.28	4.90 ± 0.16	1.20 ± 0.07 (Av.)
Winter season					
T ₁	Day	133.78 ± 1.96	3.30 ± 0.54	2.90 ± 0.18	1.30 ± 0.04
	Night	106.03 ± 0.92	2.39 ± 0.25	2.98 ± 0.10	1.20 ± 0.02
	Total	239.81 ± 2.88	5.69 ± 0.79	5.88 ± 0.28	1.25 ± 0.06 (Av.)
T ₂	Day	130.30 ± 1.76	3.02 ± 0.45	3.08 ± 0.19	1.18 ± 0.09
	Night	116.95 ± 0.85	2.16 ± 0.23	3.12 ± 0.13	1.12 ± 0.06
	Total	247.25 ± 2.61	5.18 ± 0.68	6.20 ± 0.32	1.15 ± 0.08 (Av.)
T ₃	Day	134.81 ± 1.91	3.06 ± 0.35	3.34 ± 0.19	1.19 ± 0.01
	Night	118.02 ± 0.65	2.92 ± 0.26	3.36 ± 0.05	1.13 ± 0.05
	Total	252.83 ± 2.56	5.98 ± 0.61	6.70 ± 0.24	1.16 ± 0.03 (Av.)

CONCLUSION

In summer season, sitting lying ruminating time was significantly higher in T₃, while in monsoon and winter season, it was higher in T₁. Thus, it can be concluded that cows were better placed under T₃ in summer while, under T₁ in winter and monsoon.. Frequencies of defecation and urination were mostly higher in day time. Feeding temperament score was not influenced by the housing system.

ACKNOWLEDGEMENT

Authors sincerely thank the Research Scientist, Livestock Research Station, S. D. Agricultural University, Sardarkrushinagar, for providing necessary facilities for the research.

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