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Research Paper

The Behaviour Pattern of Sirohi Goat Kids in Different Feeding Management Systems

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ABSTRACT

The present study was carried out at Livestock Research Station, Bojunda, Chittorgarh district of Rajasthan on twenty-one Sirohi goat kids of about 6 months of age with uniform body weight. The overall average time of different behavioural patterns as grazing, browsing, drinking urinating and sleeping behaviour of Sirohi goat kids in the extensive group (T_1) was found to be 53.68, 226.38, 6.92, 3.01 and 378.24 (min/day), respectively. The overall average time of different behavioural patterns as grazing, browsing, drinking urinating and sleeping behaviour of Sirohi goat kids in the semi-intensive group (T_2) group was recorded to be 48.31, 217.42, 6.89, 3.01 and 375.96 (min/day), respectively. The overall daily average time of different behavioural patterns like drinking, urination and sleeping behaviour of Sirohi goat kids in the intensive (T_3) group was found to be 5.94, 3.04 and 496.19 (min/day), respectively. Behavioural time (min/day) for grazing and browsing in extensive (T_1) group was significantly ($P<0.01$) higher than semi-intensive (T_2) group. Behavioural time (min/day) for drinking in extensive (T_1) group and semi-intensive (T_2) group was significantly ($P<0.01$) higher than intensive (T_3) group. The urination behaviour found non-significant difference among groups of three feeding management systems of Sirohi goat kids. Behavioural time (min/day) for sleeping in intensive (T_3) group was significantly ($P<0.01$) higher than extensive (T_1) group and semi-intensive (T_2) group.

Keywords: Behavioural pattern, Grazing, Browsing, intensive system, Sirohi goat

The livestock sector contributes significantly to the agricultural economy of developing countries, with multipurpose products and uses such as skin, feathers, fibre, manure for fertilizer and fuel, power and transportation, as well as serving as a barter product in societies where currency is not circulated (Mordia *et al*. 2018). Goat is considered to be as one of the strongest animal and thrive under zero inputs and have rightly been quoted as "Poor Man's cow". Goats have proved financially valuable species in Indian agriculture. The goats are reared by a large number of landless labourers in the rural areas. Present goat population of India is 148.88 million. Rajasthan with 56.8 million livestock population shares more than 11 per cent of India's total livestock population and ranks 2nd in the country according to 20th Livestock Census. The goat is the major meat producing animal in India needs rather low investment for equipment and housing. Under Indian village conditions, goats are usually kept in *kaccha* sheds with an open enclosure of thorny

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shrubs. Goat is a multi-functional animal that plays an important role in the economy and nutrition of the country's landless, tiny and marginal farmers. The pure version of this breed can be found in the villages of Rajasthan's Sirohi, Ajmer, Udaipur, Chittorgarh, Rajsamand and Bhilwara districts, as well as neighboring Gujarat districts like Palanpur and Patan. The coat is mostly brown with bright or dark patches and only occasionally white. The size of the brown patches determines the breed's purity. The purity increases as the size decreases. In extensive system animals are allowed for grazing in the entire pasture for the whole season and this practice is quite predominant in migratory, free range, pasture and grazing system. In this method the cost of feed is very low and goats play only a secondary role to crop or other livestock production (Sahoo *et al*. 2019). For proper livestock management, a thorough understanding of animal behaviour is a useful tool. It also aids in studying and analyzing the management system's applicability. Farm animal management that results in fighting, injury and extreme fear can lead to reproductive failure, a poor feed conversion ratio, lower carcass value and higher mortality (Fraser and Broom, 1990).

MATERIALS AND METHODS

The current study was conducted on twenty-one Sirohi goat kids of about 6 months' of age with uniform body weight. These goat kids were randomly divided into three groups of equal number (7 each). In group extensive (T1) kids were allowed to grazing for 8 hours in a day and housed in shed during night without any supplementary feed. Kids in semi-intensive (T2) group were allowed to grazing on "grasses" with concentrate supplementation. In intensive (T3) group animals were confined to the shed for entire period of study and reared on complete stall feeding with supplementation of commercial concentrate ration. All the experimental goat kids were identified by colour band and tag number. All the animals were dewormed 15 days before the start of the experimental trial. The kids were vaccinated again enterotoxaemia and pestes-des–petits as per the goat health calendar prescribed by LRS Bojunda.

The trial was carried out over a three-month period. Before beginning research, all three groups were given a 15-day pre-adoption period. Experimental goat kids were weighed separately. The mean live body weight of each goat kid from the T1, T2 and T3 treatment groups were recorded using an electronic digital balance at weekly intervals on 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84 and 90 days during 90-days experimental period. All three groups' behaviour were monitored weekly for 24 hours during the trial. Behavioural patterns (grazing, browsing, drinking, urinating and sleeping) were observed directly from outside the field and at the shelter's corner, so that the animal was not disturbed when grazing. The data obtained during this experiment were statistically analysed in one way ANOVA according to Snedecor and Cochran (1994) and significance of mean differences were compared by Duncan's new multiple range tests (DNMRT) as modified by Kramer (1957).

RESULTS AND DISCUSSION

1. Behavioural Observation

1.1 Grazing behaviour

The observations regarding to the grazing behaviour were (min/day) recorded once in a week under different feeding management systems are presented in Table-1.

Table 1: Average grazing time (min/day) of Sirohi goat kids under different feeding management systems

Weeks	Group T_1	Group T_2	SEM
1	55.00 ^{b}	47.57 ^{a}	1.70**
2	51.28 ^{b}	44.47 ^{a}	1.35**
3	56.28 ^{b}	50.14 ^{a}	1.32**
4	52.86	49.86	1.35 ^{NS}
5	55.14 ^{b}	50.28 ^{a}	1.18**
6	58.42 ^{b}	52.71 ^{a}	1.53**
7	57.00 ^{b}	51.43 ^{a}	1.50**
8	51.86 ^{b}	46.43 ^{a}	1.39**
9	47.28 ^{b}	43.71 ^{a}	0.90**
10	47.71 ^{b}	41.86 ^{a}	1.09**
11	50.00 ^{b}	46.57 ^{a}	1.05**
12	56.71 ^{b}	50.71 ^{a}	1.01**
13	58.28 ^{b}	52.28 ^{a}	0.99**
Pooled mean	53.68 ^{b}	48.31 ^{a}	1.26**

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The overall average grazing time (min/day) of Sirohi goat kids under extensive feeding system for entire period of trial was found to be 53.68 mins. The overall average grazing time (min/day) of Sirohi goat kids under semi-intensive feeding system for entire period of trial was found to be 48.31 mins. The highly significant difference (P<0.01) was detected for grazing time of Sirohi goat kids between different feeding management systems. T_1 group have significantly (P<0.05) higher grazing time than T_2 group during entire trial. The result of grazing behaviour according to the findings of Chen *et al.*,(2013), Pathan *et al.*,(2017) as they observed that extensive system showed significantly (P<0.01) higher grazing activity than semi-intensive system. The semi-intensive system group had less grazing time, which could be due to concentrate ration only met part of the animal's dry matter demand.

1.2 Browsing behavior

The observations regarding to the browsing behaviour (min/day) were recorded once in a week under different feeding management systems are presented in Table 2.

Table 2: Average browsing time (min/day) of Sirohi goat kids under different feeding management systems

Weeks	Group T_1	Group T_2	SEM
1	223.28	213.43	3.17 ^{NS}
2	219.00 ^{b}	201.57 ^{a}	2.88*
3	228.28 ^{b}	216.42 ^{a}	3.72*
4	222.71	216.42	3.15 ^{NS}
5	217.14	212.42	3.33 ^{NS}
6	224.71 ^{b}	218.57 ^{a}	2.84**
7	221.85	210.42	2.92 ^{NS}
8	219.14 ^{b}	216.85 ^{a}	3.29*
9	230.71 ^{b}	224.42 ^{a}	1.67*
10	232.42 ^{b}	222.85 ^{a}	2.18*
11	236.00	222.14	2.74 ^{NS}
12	242.00	232.71	2.15 ^{NS}
13	225.71 ^{b}	220.28 ^{a}	2.12*
Pooled mean	226.38^{b}	217.42^{a}	3.61**

The overall average browsing time (min/day) Sirohi goat kids under extensive feeding system for entire period of trial was recorded to be 226.38 mins. The overall average browsing time (min/day) of Sirohi goat kids under semi-intensive feeding system for entire period of trial was recorded to be 217.42 mins. The average browsing time was significantly (P<0.01) lower in semi-intensive compared to extensive group which, could be due to the semi-intensive group's partial fulfilment of the dry matter need. The result of browsing behaviour are in line with Setianah *et al*. (2004), Annichiarico *et al*. (2007) and Sharma *et al*. (1997) who found that throughout the summer.

1.3 Drinking behaviour

The observations regarding to the drinking behaviour (min/day) were recorded once in a week under different feeding management systems are presented in Table 3.

Table 3: Average drinking time (min/day) of Sirohi goat kids under different feeding management systems

Weeks	Group T_1	Group T_2	Group T_3	SEM
1	6.26 ^{b}	6.21 ^{b}	5.25^{a}	0.074**
2	6.42 ^{b}	6.73 ^{c}	5.56 ^{a}	0.082**
3	7.16 ^{b}	7.15 ^{b}	6.12 ^{a}	0.073**
4	7.08 ^{b}	6.94 ^{b}	6.04 ^{a}	0.081**
5	6.89 ^{b}	6.80 ^{b}	6.14 ^{a}	0.111**
6	7.15 ^{b}	6.94 ^{b}	6.22 ^{a}	0.103**
7	6.89 ^{b}	6.96 ^{b}	6.08 ^{a}	0.079**
8	7.27 ^{b}	7.08 ^{b}	6.05 ^{a}	0.088**
9	7.15 ^{b}	7.02 ^{b}	6.08 ^{a}	0.081**
10	7.54 ^{b}	7.37 ^{b}	6.59 ^{a}	0.073**
11	6.43 ^{b}	6.57 ^{c}	5.27 ^{a}	0.036**
12	6.67 ^{b}	6.83 ^{c}	5.72 ^{a}	0.046**
13	7.09 ^{c}	6.90 ^{b}	6.05 ^{a}	0.046**
Pooled mean	6.92^{b}	6.89 ^{b}	5.94 ^{a}	0.033**

The overall average daily drinking time of Sirohi goat kids under grazing feeding system for entire period of trial was recorded to be 6.92 mins. The overall average drinking time (min/day) of Sirohi goat kids under semi-intensive feeding system for entire period of trial was recorded to be 6.89 min. The overall average drinking time (min/day) of Sirohi goat kids under intensive feeding system was 5.94 mins. The overall average drinking duration of Sirohi goat kids under T_1 and T_2 groups were significantly (P<0.01) higher as compared to intensive group (T_3). Goat kids of group T_3 were kept in the house for 24 hours and fed greens, which

may have resulted less water use. The results of drinking behaviour are in close agreement with the findings of Yurtman *et al.* (2005) and Khound *et al.* (1996) reported that more drinking time in extensive group than intensive group. These findings are contraindicated with the findings of Keskin *et al.* (2005).

1.4 Urinating behavior

The observations regarding to the urinating behaviour (min/day) were recorded once in a week under different rearing systems are presented in Table 4.

Table 4: Average urination time (min/day) of Sirohi goat kids under different feeding management systems

Weeks	Group T_1	Group T_2	Group T_3	SEM
1	2.26[b]	2.22 [a]	2.26[b]	0.011*
2	2.71	2.64	2.70	0.025 [NS]
3	3.17[a]	3.16 [a]	3.28 [b]	0.014 [**]
4	3.07	3.04	3.06	0.032 [NS]
5	3.00[b]	2.96 [a]	3.06 [b]	0.021*
6	3.09	3.16	3.13	0.025 [NS]
7	3.07	3.05	3.14	0.035 [NS]
8	3.29	3.21	3.29	0.026 [NS]
9	3.16	3.16	3.13	0.027 [NS]
10	3.60	3.62	3.65	0.013 [NS]
11	2.46	2.44	2.45	0.017 [NS]
12	2.64[a]	2.76[b]	2.77 [b]	0.014**
13	3.52 [a]	3.64[b]	3.61 [b]	0.020**
Pooled mean	3.01	3.01	3.04	0.021 [NS]

The overall average urination time (min/day) of Sirohi goat kids under extensive feeding system for entire period of trial was observed to be 3.01mins. The overall average urination time (min/day) of Sirohi goat kids under semi-intensive feeding system for entire period of trial was observed to be 3.01 min. The overall average urination time (min/day) of Sirohi goat kids under intensive feeding system for entire period of trial was observed to be 3.04 mins. The average frequency of urination was observed 6-8 day/animal in all the groups. The result of this study are according to the findings of Yurtman *et al*. (2005) who reported that allowing concentrate feed had no influence on urinating behaviour.

1.5 Sleeping behaviour

The observations regarding to the sleeping behaviour (min/day) were recorded once in a week under different feeding management systems are presented in Table 5.

Table 5: Average sleeping time (min/day) of Sirohi goat kids under different feeding management systems

Weeks	Group T_1	Group T_2	Group T_3	SEM
1	364.43[a]	360.15[a]	492.43[b]	3.19**
2	372.58[a]	369.43[a]	491.86[b]	3.22**
3	378.43 [a]	376.00[a]	498.29[b]	3.05**
4	384.86 [a]	382.15[a]	492.00[b]	3.47**
5	384.43[a]	381.58[a]	495.43[b]	3.65**
6	381.86[a]	378.72[a]	499.72[b]	5.36**
7	364.86[a]	360.58[a]	492.86[b]	3.88**
8	373.15[a]	370.29[a]	492.00[b]	3.92**
9	376.86[a]	376.43[a]	501.00[b]	3.36**
10	385.58[a]	384.86[a]	490.15[b]	3.76**
11	384.15[a]	383.58[a]	494.72[b]	3.70**
12	382.15[a]	380.58[a]	502.43[b]	3.86**
13	383.72[a]	383.15[a]	507.58[b]	4.30**
Pooled mean	378.24[a]	375.96[a]	496.19[b]	2.53**

The overall average sleeping time of Sirohi goat kids under extensive feeding system for entire period of trial was found to be 378.24 mins. The overall average sleeping time (min/day) of Sirohi goat kids under semi-intensive feeding system for entire period of trial was found to be 375.96 mins. The overall average sleeping time (min/day) of Sirohi goat kids under intensive feeding system for entire period of trial was found to be 496.19 mins. The overall average sleeping duration of Sirohi goat kids under intensive group (T_3) was significantly (P<0.01) higher compared to T_1 and T_2 groups. Pathan *et al.,* (2017) found that stall fed goats spend more time sleeping than other rearing systems groups.

CONCLUSION

Average behavioural parameters like browsing and grazing time of goat kids were significantly (P<0.01) higher in extensive system (T_1) group than semi-intensive system (T_2) group. The average drinking time of goat kids were significantly higher under extensive (T_1) and semi-intensive (T_2) group than

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intensive (T_3) group. It may be due to more physical activities of kids during grazing time. The daily average urinating behaviour of Sirohi goat kids is unaffected by the feeding management systems. The sleeping time of goat kids were significantly ($P<0.01$) higher in intensive system than extensive systems. This suggests that animals under intensive system were more relaxed than other systems. Therefore, based on the overall findings of the research, intensive and semi-intensive systems are the superior options for raising Sirohi goat breed.

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