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Effect of stall fed system versus grazing system on parasitic infestation and cost economics in Sirohi goats reared in Kymore plateau and Satpura hills region of Madhya Pradesh

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Abstract

The proposed work was carried out at Livestock Farm Complex (LFC), College of Veterinary Science & Animal Husbandry, Rewa (M.P.) to evaluate the Disease incidence during the experimental period was recorded by fecal examination, for cleanliness scoring four region ano-genital, legs, hind underbelly and thigh were rated by visually for cleanliness in points scale (0- clean, 1- dirty and 2- very dirty) of Sirohi goats under stall feeding versus grazing system. The experiment was conducted on Twenty-four Sirohi kids of 3-4 months age of either sex with uniform body size and weight. They were randomly divided into two groups (Group 01 and Group 02) of 12 animals in each. Group 01 allowed to rear on complete stall feeding with supplementation of commercial concentrate feed while group 02 allowed was browsing around farm premises. Kids were allowed to feed 2% commercial readymade concentrate feed (20% protein and ME 2240 kcal/kg) on dry matter basis and 2% as greens (daily 6 hours grazing). The study was conducted for 1year. In present study higher parasitic infestation seen in rainy season of group 02 (Grazing group). The economics of Sirohi goats was compared between group 01 and 02. The result obtained in present findings show the net profit was higher in group 01 followed by group 02 and the benefit cost ratio was higher in group 01 (Stall fed group) as compared to group 02 *i.e.* (Grazing group). The study revealed that Sirohi goat reared under intensive system *i.e.* stall fed has less parasitic load and hence more profitable economically when reared in this system by the farmers.

Keywords: Stall fed, versus grazing system, parasitic infestation, cost economics

1. Introduction

The goat is a vital part of the dry land agricultural system. There are over 102 goat breeds worldwide, with 37 of those varieties being found in India. There are 148.88 million goats in India as per the 20th livestock census Yadav *et al.*, (2023) [13]. One of the primary meat-producing animals in India is the goat, whose chevon flesh is highly sought-after and in high demand domestically. Goats are incredibly adaptable animals, especially in dry regions, and can thrive in nearly any environment. It is hardy, prolific and can be cheaply reared (Banerjee, 2004) [1]. Because goats use a type of feed that other animals would starve to consume, many smallholder farmers and landless laborers in rural regions make raising goats their livelihood (Singh *et al.*, 2000 and FAO, 1991) [9, 3].

Goats are the ideal solution for marginal or undulating terrain that are inappropriate for other animal species like cows or buffaloes. About 40% of India's rural underprivileged population depends on goats for a stable source of income (Maske and Phule, 2011) [4]. For small and marginal landowners, goat farming may be an attractive business with relatively little initial investment. In the state, the extensive method of goat raising by grazing is widely practiced. Intensive goat husbandry has its own importance, though, because of deforestation and a lack of grazing area. The intended grazing area in Avikanagar is 1.3 hectare/ACU, whereas its availability is 0.77 hectare/ACU, according to the CSWRI. Thus, stall feeding with little input is one such promising option that shepherds will need to look for in the future in order to maintain productivity in the upbringing of goats or sheep. (Singh and Shalander Kumar, 2007) [10].

Thus, the current study compared the stall feeding system and the grazing system for goats with the goals of instructing and helping farmers in managing an intensive goat rearing system, providing vital nutrients to goats in the intensive farming system in order to achieve better animal growth than in the grazing system, conducting an economic analysis of the intensive farming system in comparison with the grazing system, and evaluating the prospects and economics of raising animals under an intensive method.

2. Material and Methods

The proposed work was carried out at "Goat Unit" of Livestock Farm Complex (LFC) Department of Livestock Production Management, College of Veterinary Science & Animal Husbandry, Rewa (M.P.) Use extra care to ensure that kids can be easily recognized by using tags for various

groups. The soil is mixed red and black soil with uniform topography. A total of twenty-four uniformly sized and weighed Sirohi goats kids, varying age from three to four months of age were chosen. They are divided into two equal-sized groups (01 and 02) at random (12 each). Each kid had a 15-day pre-adoption period before study began. The kids that were chosen for the study did not have either physiological, anatomical and infectious diseases. Group 01 allowed to rear on complete stall feeding with supplementation of commercial concentrate ration while Group 02 allowed to browsing around farm premises. Kids were allowed to feed 2% commercial readymade concentrate feed procured containing (20% protein and ME 2240 kcal/kg) on Dry matter basis and 2% as greens (daily 6 hours grazing).

Table 1: Feeding management of experimental animals

S. No.	Groups	Number of animals	Feeding pattern	Period
01.	01	12	Stall Feeding @ 4% of Body Weight (Greens -2%) + Concentrate -2% (Dry Matter Basis)	1 year
02.	02	12	Browsing	1 year

Disease incidence during the experimental period was recorded by fecal examination, For cleanliness scoring four region ano-genital, legs, hind under-belly and thigh were

rated by visually for cleanliness in points scale (0- clean, 1- dirty and 2- very dirty).

Table 2: Cleanliness scoring in experimental goats

S. No.	Region	Cleanliness score (0- clean, 1- dirty and 2- very dirty)
1.	Ano-genital	A
2.	Legs	B
3.	Hind under-belly	C
4.	Thigh	D
Total score for a animal		(A+B+C+D)

The observed values were subsequently added to obtain a single value for each animal. Cleanliness scoring was done at monthly interval. Calculation of cost economics at the end of the experiment was done.

The data obtained during the experiment were analysed for two way ANOVA using SPSS statistics software version 20 package as described by Snedecor and Cochran (1994) [12].

3. Results and Discussion

3.1 Health Indicator

3.2 Fecal Examination

The fresh fecal sample from experimental Sirohi goat kid were collected every month from individual animals for screening of parasitic eggs. For this sedimentation technique was used for qualitative fecal examination at monthly interval. The occurrence of parasitic infestation in goats of different system of management has been presented in table 03. It was observed from the study that higher rate of parasitic infection seen in kids of grazing group in rainy season followed by summer, winter and autumn season. The results obtained in the present study are in agreement with Debbarma *et al.* (2022) [2], Rahman *et al.* (2012) [8] and Ntonifor *et al.* (2013) [5] who reported the higher rate of parasitic infestation in goats of extensive system in the month of rainy season which could possibly be due to animals being exposed constantly to the larval stage of parasites available in the grazing areas.

Table 3: Incidence of parasitic infestation in Sirohi goat kids

Month (Season)	Parasites	Group 01	Group 02
March - May (Summer)	Strongyles eggs	Present	Present
	Strongyloides eggs	Absent	Present
	Trichuris eggs	Absent	Present
	Moniezia	Absent	Absent
	Coccidial oocyst	Absent	Present
June-Sept (Rainy)	Strongyles eggs	Present	Present
	Strongyloides eggs	Absent	Present
	Trichuris eggs	Absent	Present
	Moniezia	Absent	Present
	Coccidial oocyst	Present	Present
Dec-Feb (Winter)	Strongyles eggs	Absent	Absent
	Strongyloides eggs	Absent	Absent
	Trichuris eggs	Absent	Present
	Moniezia	Absent	Present
	Coccidial oocyst	Absent	Present
Oct- Nov (Autumn)	Strongyles eggs	Present	Absent
	Strongyloides eggs	Absent	Absent
	Trichuris eggs	Absent	Present
	Moniezia	Absent	Present
	Coccidial oocyst	Present	Present

3.3 Cleanliness of kids

The mean for monthly cleanliness score in two groups are presented in table 04. The cleanliness score of kids after one month of experiment in group 01 was 1.56±0.28 and in group 02 was 1.10±0.11 cm and the differences in the cleanliness of kids was non-significant between group 01

and group 02. The average cleanliness score of goats in 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 month of experiment in group 01 was 1.48±0.19, 1.48±0.12, 1.41±0.12, 1.44±0.12, 1.44±0.13, 1.45±0.11, 1.46±0.12, 1.39±0.11, 1.42±0.10, 1.46±0.11 and 1.45±0.03, respectively and in group 02 was 1.85±0.09, 1.83±0.64, 1.79±0.12, 1.75±0.13, 1.85±0.99, 1.93±0.13, 1.68±0.09, 1.67±0.88, 1.70±0.10, 1.45±0.11 and 1.62±0.27, respectively present results indicated that cleanliness score was higher in stall fed group as compared to grazing group but the differences in the cleanliness of goats was non-significant between the groups.

Table 4: Cleanliness Score in Sirohi Goat kids

Month	Cleanliness Score	
	Group 01	Group 02
1	1.70±0.11	1.56±0.28
2	1.85±0.09	1.48±0.19
3	1.83±0.64	1.48±0.12
4	1.79±0.12	1.41±0.12
5	1.75±0.13	1.44±0.12
6	1.85±0.99	1.44±0.13
7	1.93±0.13	1.45±0.11
8	1.68±0.09	1.46±0.12
9	1.67±0.88	1.39±0.11
10	1.70±0.10	1.42±0.10
11	1.45±0.11	1.46±0.11
12	1.62±0.27	1.45±0.03

During the trial period, the kids in each group were monitored for body cleanliness. In present experiment goat kids of both the groups get soiled with their droppings and urine during night or resting hours thus our findings are in agreement with Singh *et al.* (2008) ^[11].

3.4 Cost Economics

In present study, the economics of Sirohi goat kids was compared between group 01 and 02 using the data recorded during the experiment. The details of economics have been presented in Table 05.

Table 5: Economics of Sirohi kids in group 01 and 02.

Particulars		Group 01	Group 02
(a)	Cost of 12 kids @ 1200/- per kid (₹)	14,400.00	14,400.00
(b)	Annual labour cost @ 72/day (₹)	26,280.00	26,280.00
(c)	Cost of medicine	1,200.00	2,400.00
(d)	Miscellaneous cost (₹)	2,000.00	1,000.00
(e)	Total concentrate fed(kg)	61.52.00	-
(f)	Cost of concentrate feeding @ 21.50 per kg (₹)	1,322.70	-
(g)	Cost of green @ 2.00 per kg (₹)	180.46	-
(h)	Cost of straw feeding @ 5.00 per kg (₹)	150.38	-
(i)	Total expenditure (₹)	45,533.54	44,080.00
(j)	Body weight of kid after one year (kg)	23.51	18.85
(k)	Rate of kid sale per kg (₹)	400.00	400.00
(l)	Gross Income through sell of 12 kids ($j \times k \times 12$) (₹)	112,848.00	90,480.00
(m)	Net profit ($l - i$) (₹)	67,314.46	46,400.00
(n)	BC ratio ($l \div i$)	2.48	2.05

In this study the cost economics was calculated by finding the net profit and B:C ratio by considering recurring and nonrecurring expenditure like purchasing of kids, labour cost, medicine cost, feed cost, feeding and miscellaneous cost. Thus the total expenditure was calculated in each

group, the total expenditure was calculated by addition of cost of kids purchase, annual labour cost, cost of medicine, miscellaneous cost (electricity, water charges etc.) cost of concentrate, cost of green and cost of straw feeding and total expenditure was ₹ 45,533.54 in group 01 (stall fed group) and ₹ 44,080.00 in group 02 (grazing group).

The total income was generated by selling of kids at price @ ₹ 400.00 per kg in each group so the income was received by selling of 12 goats in stall fed group (average body weight 23.51 kg) was ₹ 1,12,848.00 and ₹ 90,480.00 in group 02 (Average body weight 18.85 kg). The net profit was higher in group 01 followed by group 02 and the values were ₹ 67,314.00 and ₹ 46,400.00 respectively. The benefit cost ratio was higher in stall fed group as comparison to grazing group.

The result obtained in the present findings are in agreement with Patil *et al.* (2014) ^[6], who reported that the profit earn by rearing Osmanabadi goats for three months was found to be higher in groups that are stall fed in comparison to the grazing groups. Similarly, Pralhad *et al.* (2014) ^[7] concluded after three months of work for 15 Kenguri rams the profit was calculated to be ₹ 50,250.00 (based on market price) in stall fed group as compared to ₹ 40,848.00 in grazing group. Hence, stall fed system is more beneficial than grazing system of goats. However, Debbarma *et al.* (2022) ^[2] reported that goat reared under extensive system gave a maximum return in comparison to stall fed group.

4. Conclusion

In present study higher parasitic infestation seen in rainy season of group 02 (Grazing group). The economics of Sirohi goats was compared between group 01 and 02. The result obtained in present findings show the net profit was higher in group 01 followed by group 02 and the benefit cost ratio was higher in group 01 (Stall fed group) as compared to group 02 *i.e.* (Grazing group). The study revealed that Sirohi goat reared under intensive system *i.e.* stall fed has less parasitic load and hence more profitable economically when reared in this system by the farmers.

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