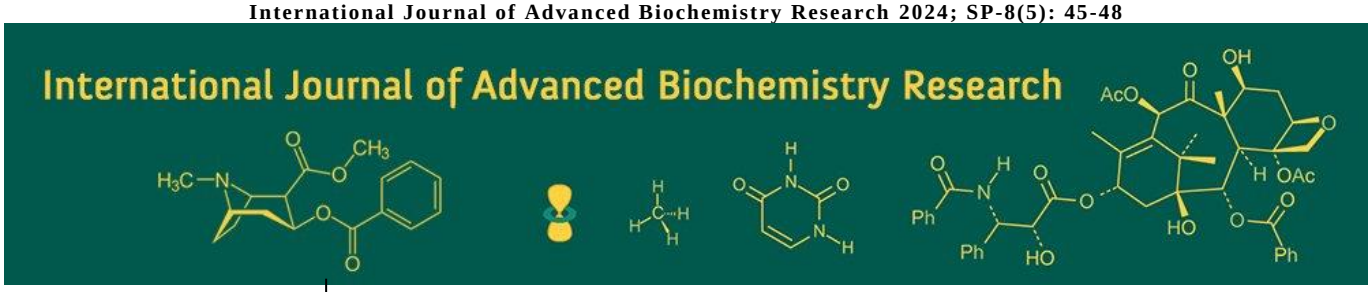

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Breeding management practices adopted by Sojat goat rearers in Rajasthan

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Abstract
This survey experiment was conducted in Pali and Jalore districts selected purposely keeping in view the fact that the district has highest goat population in Rajasthan. The results pertaining to the breeding practices revealed that the goat owners were detected heat by symptoms of both bleating and vibrating the tail free (95.62%)followed by frequent urination (73.75%), mounting on other goats (70.62%), mucous discharge (65.00%) and reduction in milk yield (55.00%); Commonly used the natural method of breeding (100%); Community bucks were the main source for breeding buck (70.63%) remaining 29.37 percent goat rearers use own reared buck; Mid heat was the main time for natural service (50%) followed by 45.00 and 5.00 percent of the respondents followed the practice in early heat and late heat, respectively.

Keywords: Breeding practices, Sojat goat, bearers, Pali and Jalore

Introduction
The goat is versatile animal. It is known as poor man's cow. Goats can be kept with little expense in the marginal and undulating lands. Goat rearing is an enterprise that has been practice by a large section of population in rural areas. Goats have served the humankind in earning its livelihood by selling live animals or its products and byproducts. They contribute to livestock industry in terms of milk, meat, skin, hair offal, and dung. In difficult situations, goats may thrive on accessible shrubs and trees.

In India, the total numbers of goat breeds that have been recognized till date is 34 and most other still remain unexplored (ICARNBAGR). According to 20th livestock census, the goat population has increased by 10.14 percent from the previous census (2012). But in Rajasthan state a decline in goat population 3.81 percent- suggesting the need of sustainable management for preserving goat breeds and population. Livestock in developing countries like India have a considerable role in its rural area population as it provides labour for land cultivation and employment to huge number of people. India is contributing 11.6 percent of total livestock in world and 27.8 percent of which is contributed by goats. The maximum goat milk producing state in India is Uttar Pradesh followed by Rajasthan, (Basic Animal Husbandry and Fisheries Statistics, 2014). Good quality milk is produced by Indian goat breeds such as Jamunapari, Barbari, Beetle, Surti and Jakhrana. As per 20th Livestock census, and BAHS (2014) India's livestock sector is one of the largest in the world having huge livestock population of 535.78 million. According to recent census by Govt. of India in 2012 the Goat population is 148.88 million in India.

In Rajasthan the total population is 20.84 million. Total meat production including goat meat was 5.9 million Tone in 2012-13 as compared to 1.9 million tons in 2001-02 [1]. In Rajasthan state goat farming has become an income generating activity for every class of society whether they are landless or land holder, resource poor or progressive farmer and irrespective of their occupation. Hence, with this background the present study was conducted to know the Economic Characteristic of Sojat Goat Rearers in Rajasthan.

Materials and Methods
The present study was conducted in Pali and Jalore districts selected purposely keeping in view the fact that the district has highest goat population in Rajasthan.

Selection of Tehsil: Two tehsils from each identified district were selected for present study on the basis of maximum number of Sojat goats. Thus, in all four tehsils were taken for the study. The name of selected tehsils from identified districts has been given in Table.1

Selection of Villages: A complete list of all the villages from the selected tehsils where the Sojat goat is reared by the farmers will be prepared with the help of personnel of department of Animal Husbandry. From the list so prepared, four villages were selected from each selected tehsilon the basis of maximum number of Sojat goats reared by the farmers. Thus, total sixteen villages were identified for the present investigation.

Selection of respondents: For selection of respondents a list of Sojat goat owners were collected from the agriculture supervisor, gram sevak of respective village. From the obtained list, 10 farmers were selected randomly from each identified village. Thus, the total sample were of 160 Sojat goat farmers.

Construction of Schedule for Data Collection: To gather the required information from the respondents, the interview schedule was developed keeping in view the objectives of the study. The interview schedule was pre-tested in the field before actually conducting survey.

Results and Discussion

The results obtained on different breeding aspects of goats in study area from 160 respondents are summarized in the following sub heads and detail information are presented in Table No 1.

Sign for heat detection: The perusal of data revealed that the most common symptom of heat detection practiced by goat farmers on overall basis was bleating (95.62%) followed by tail vibration free (95.62%), frequent urination (73.75%), mounting on other goats (70.62%), mucous discharge (65.00%) and reduction in milk yield (55.00%). In both the districts most common symptom of heat detection practiced by goat farmers was bleating. These findings are in line with the findings of Dar *et al*. (2016) [2] and Sandhu (2017) [3].

Method of breeding: Natural service was practiced for breeding in goats by all the goat rearers of both Pali and Jalore district and artificial insemination was not practiced in the study area may be lack of trained person and non-availability of buck semen in areas. The findings are in accordance with the observation of Vijaya *et al.* (2017) [4] and Kumar *et al.* (2021) [5].

Source of breeding buck: Majority of goat rearers (70.63%) did not possess their own buck for breeding whereas, 29.37 percent goat rearers used own breeding buck for matting. The association between district and source of breeding buck was non-significant (χ^2=2.440). These findings are in accordance with the findings of Kumawat (2016) [6] and Mordia (2017) [7].

Time of natural service: As regards to the time of natural service at which goats were allowed for natural service, majority 50.00 percent of the respondents followed the practice in mid heat (12-24 hours), 45.00 and 5.00 percent of the respondents followed the practice in early heat (< 12 hours) and late heat (> 24 hours), respectively. It was noted that all the respondents observed their goats for heat symptoms regularly. A non-significant association was found between district and time of natural service (χ^2=2.638). The findings are in conformity with the findings of Fogya (2017) [8] and Khadda (2017) [9].

Care of pregnant Doe: The information relevant to management of pregnant doe are presented in following sub-heads: -

Housing: Result shows that maximum goat rearers (91.88%) in the study area practiced to house their pregnant doe with their other goats in group while, only 8.12 percent goat rearers were aware to house pregnant doe in a separate house. The calculated chi-square value was more than tabulated value at 5 percent level of significance. Hence the difference is significant agreement between the districts with regards to housing. The findings support the views expressed by Gameti (2018) [10].

Grazing: Only few farmers at 3.75 percent of survey population have not allowed pregnant doe to go for grazing while, maximum proportion of goat rearers at 96.25 percent allowed doe for grazing during pregnancy period. The association between districts and grazing was non-significant (χ^2=2.770). The results are in line with the results obtained by Gameti (2018) [10].

Prepartum ration: Survey results indicate that maximum (84.37%) number of goats rearers of experiment area do not provide any special ration for their pregnant doe. While, only few goat rearers at 15.63 percent provide prepartum ration to their pregnant doe. The effect of district on prepartum ration was highly significant (χ^2=8.011**). The results are in line with the results obtained by Gameti (2018) [10].

Care during parturition: Out of total 160 respondents, 86.25 percent took extra care of goat at the time of kidding for better health and less chance of contamination. While, 13.75 percent goat rearers of experiment area do not provide care during parturition. The care during parturition was significantly affected by district (χ^2= 5.27*). The results are in line with the results obtained by Gameti (2018) [10].

Colostrum feeding: All goat rearers (100 percent) adopted the practice of feeding colostrum to newly born kids in both the districts. It was observed that 100 percent of the respondents of both the districts were aware about the importance of colostrum feeding to newly born kids. The association between district and colostrum feeding to the newly born kid was observed to be non-significant. The results of the present study are in conformity with those of Sandhu (2017) [3] and Singh *et al*. (2018) [11].

Duration of kid suckling: The information indicated that the 69.37 percent goat rearers of surveyed population allowed suckling up to 3 months, 30.63 percent goat rearers allowed suckling for more than 3 months. There was a significant association between duration of kid suckling and

districts (χ^2=4.97*). More or less similar results have been reported by Khadda (2017) [9] and Gameti (2018) [10].

Breeding season: Results obtained indicates that majority of respondents (58.12%) observed their goat in heat during rainy season (July-October) or with the onset of monsoon while, only 14.38 percent respondents observed their goats in heat during winter season (November-February) and only 27.50 percent respondents observed their goat in heat during summer season (March-June). The calculated chi-square value (χ^2=0.228) was less than tabulated value at 5 percent level of significance. Hence the difference is non-significant between the districts with regards to breeding season. The findings are in accordance the observation of Khadda (2017) [10].

Castration: Observed results indicate that majority (60.00%) of surveyed goat owners did not castrate the male kids whereas, 40.00 percent respondents castrated the male kids. Castration of male kids was done by 40.00 percent of the goat owners to avoid unnecessary mating and to improve fattening, remaining 60.00 percent goat owners were not aware about importance of castration. The association between districts and castration was non-significant (χ^2=3.75). The findings support the views expressed by Sandhu (2017) [3] and Gameti (2018) [10].

Selection criteria of breeding buck: The physical appearance or breed characteristics as a criterion to select breeding buck was practiced by maximum goat farmers at 75.62 percent, while only 8.75 percent goat rearers used milk yield and 15.63 percent used body weight as criteria for selection of breeding buck. The association among district and selection criteria of breeding buck (χ^2= 2.915) was non-significant. The findings are in conformity with the findings of Khadda (2017) [9] and Mordia (2017) [7].

Treatment of anoestrus: Only 18.75 percent goat rearers of surveyed population provided treatment for anoestrus. Maximum 81.25 percent goat rearers did not provide treatment to their goats for anoestrus. The calculated chi-square value (χ^2=2.625) was less than tabulated value at 5 percent level of significance. Hence the difference is non-significant between the districts with regards to treatment of anoestrus. The results of the present study are in conformity with those of Kumar (2011) [11] and Fogya (2017) [8].

Treatment of repeat breeders: Only 20.62 percent goat rearers of surveyed population were well aware to provide treatment to their repeater doe. Who did not take any treatment for the goat not conceived and proportion of such goat rearers were observed at 79.38 percent of total surveyed population. The effect of districts on treatment of repeaters was non-significant (χ^2= 1.870). These findings are in accordance with the findings of Kumar (2011) [11] and Sandhu (2017) [3].

Table 1: Breeding practices adopted by Sojat goat farmers.

S. No.	Breeding Practices	Pali	Jalore	Overall	χ^2value
1.	**Sign for heat detection**				
a	Bleating	78(97.50)	75(93.75)	153 (95.62)	
b	Mounting	59(73.75)	54(67.50)	113 (70.62)	
c	Frequent urination	63(78.75)	55(68.75)	118 (73.75)	0.00
d	Mucus discharge	55(68.75)	49(61.25)	104 (65.00)	
e	Reduction in milk yield	56(70.00)	32(40.00)	88 (55.00)	
f	Vibrate the tail free	77(96.25)	76(95.00)	153 (95.62)	
2.	**Method of breeding**				
a	By natural service	80 (100.0)	80 (100.0)	160 (100.0)	0.00
b	By artificial insemination	0(0.00)	0(0.00)	0 (0.00)	
3.	**Source of breeding buck**				
a	Own buck	28(35.00)	19(23.75)	47(29.37)	2.440
b	Community buck	52(65.00)	61(76.25)	113(70.63)	
4	**Time of natural service**				
a	Early Heat	40(50.00)	32(40.00)	72(45.00)	2.638
b	Mid Heat	35(43.75)	45(56.25)	80(50.00)	
c	Late Heat	5(6.25)	3(3.75)	8(5.00)	
5	**Care of pregnant Doe**				
A	**Housing**				4.102*
a	Separate	3(3.75)	10 (12.50)	13(8.12)	
b	Group	77(96.25)	70(87.50)	147(91.88)	
B	**Grazing**				
a	Not allowed	1(1.25)	5(6.25)	6(3.75)	2.770
b	Allowed	79(98.75)	75(93.75)	154(96.25)	
C	**Prepartum ration**				
a	Yes	19(23.75)	6(7.50)	25(15.63)	8.011**
b	No	61(76.25)	74(92.50)	135(84.37)	
6	**Care during parturition**				
a	Yes	64(80.00)	74(92.50)	138(86.25)	5.27*
b	No	16(20.00)	6(7.50)	22(13.75)	
7	**Colostrum feeding**				
a	Yes	80(100.0)	80(100.0)	160(100.0)	0.00
b	No	0(0.00)	0(0.00)	0(0.00)	
8	**Duration of kid suckling**				4.97*
a	Up to3 Months	62(77.50)	49(61.25)	111(69.37)	

b	More than 3 Months	18(22.50)	31(38.75)	49(30.63)	
9	**Breeding season**				0.228
a	Summer	23(28.75)	21(26.25)	44(27.50)	
b	Rainy	45(56.25)	48(60.00)	93(58.12)	
c	Winter	12(15.00)	11(13.75)	23(14.38)	
10	**Castration**				3.75
a	Yes	38(47.50)	26(32.50)	64(40.00)	
b	No	42(52.50)	54(67.50)	96(60.00)	
11	**Selection criteria of breeding buck**				2.915
a	Body weight	9(11.25)	16(20.00)	25(15.63)	
b	Milk yield of doe	6(7.50)	8(10.00)	14(8.75)	
c	Physical appearance/breed characteristics	65(81.25)	56(70.00)	121(75.62)	
12	**Treatment of anoestrus**				2.625
a	Yes	11(13.75)	19(23.75)	30(18.75)	
b	No	69(86.25)	61(76.25)	130(81.25)	
13	**Treatment of repeat breeders**				1.870
a	Yes	13(16.25)	20(25.00)	33(20.62)	
b	No	67(83.75)	60(75.00)	127(79.38)	

*Significant (p<0.05), **Significant (p<0.01) (Figure in parenthesis indicate percentage)

Conclusion

In conclusion, the study sheds light on various breeding aspects of goats in the study area, offering valuable insights into the practices of goat rearers. From heat detection methods to breeding practices and care during pregnancy and parturition, the findings underscore the prevalent techniques and highlight areas for improvement. It is evident that natural service remains the predominant method of breeding, with challenges such as the lack of access to artificial insemination services. The care of pregnant does, including housing, grazing, and prepartum ration, varies among rearers, indicating the need for education and awareness programs. Additionally, the study emphasizes the significance of colostrum feeding and duration of kid suckling for the health and well-being of newborns. Breeding season observations and practices related to castration and selection criteria of breeding bucks further contribute to the understanding of goat management strategies. While some practices align with existing literature, others reveal areas where further research and intervention may be warranted. Overall, this study provides a comprehensive overview of goat breeding practices in the study area, offering valuable insights for stakeholders involved in goat husbandry and management.

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Conflict of Interests

Authors show no conflict of interest.

Author Contributions

1. **D. K. Bagri:** Field visits, data collection, statistical analysis and manuscript preparation.
2. **Lokesh Gupta:** Research planning and supervision.
3. **D. L. Bagdi:** Helps in manuscript preparation and reviewed it.

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