



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; SP-12(7): 381-384
© 2023 TPI
www.thepharmajournal.com
Received: 22-04-2023
Accepted: 26-05-2023

K Chinnamani
Associate Professor, Department
of Livestock Production
Management, Veterinary College
and Research Institute, Theni,
Tamil Nadu, India

J Muralidharan
Professor and Head, Mecheri
Sheep Research Station,
Pottaneri, Tamil Nadu, India

AK Thiruvankadan
Professor and Head, Department
of Animal Genetics and
Breeding, Veterinary College and
Research Institute, Namakkal,
Tamil Nadu, India

Corresponding Author:
K Chinnamani
Associate Professor, Department
of Livestock Production
Management, Veterinary College
and Research Institute, Theni,
Tamil Nadu, India

Reproductive performance of Tellicherry goats under intensive and semi-intensive systems of rearing in Tamil Nadu

K Chinnamani, J Muralidharan and AK Thiruvankadan

Abstract

Study was undertaken on reproductive performance of Tellicherry goats under the intensive and semi-intensive system of management using 40 kids. Under intensive system, the reproductive performance namely, weight at first mating, number of services per conception, weight at first kidding, litter size, gestational weight gain, lactational weight loss, service period, kidding percentage and kidding interval were 18.52 ± 0.86 kg, 1.25 ± 0.13 , 22.87 ± 0.75 kg, 1.08 ± 0.08 , 4.36 ± 0.33 kg, 3.28 ± 0.43 kg, 89.00 ± 1.85 days, 100.00 and 245.01 ± 3.84 days, respectively. The same values for semi-intensive system were 18.13 ± 0.87 kg, 1.50 ± 0.23 , 21.35 ± 0.98 kg, 1.25 ± 0.5 , 22 ± 0.50 kg, 2.92 ± 0.72 kg, 85.30 ± 2.12 days, 100.00, 243.39 ± 7.19 days. There was single twinning 8.33 noticed in intensive system and observed as 25.00 percentage in semi-intensive system.

Keywords: Tellicherry goat, reproductive performance, intensive, semi-intensive system

Introduction

In developing countries, goats make a very valuable contribution, especially to the poor people in the rural areas for generating employment, income, capital storage and improving household nutrition (Devendra, 1992) [3]. It has been anticipated that over the next decade, there will be a massive increase in the demand for food of animal origin (100 million tones of meat), as a result of global population growth, an extra 2.5 billion people to feed by 2020 (DFID, 2000) [4]. Goat is the best alternative for cows and buffaloes in places where undulating lands are unsuitable for large animal farming. In global scenario, India ranks second in goat population and meat production, and occupies top position in goat milk production. As such, demand for goat products is projected to rise considerably in coming decades. Presently, goat ensure livelihood for over five million households in India and this number would certainly increase with the ever growing human population. Tellicherry goat, originally distributed in Calicut, Cannanore and Malapuram districts of Kerala (Acharya, 1982) [1], also widely seen in western districts of Tami Nadu. In the home tract, the climate is hot-humid, whereas, in Tamil Nadu these animals are mostly reared in hot-dry regions. Tellicherry goats are medium sized and highly prolific. They are also capable of producing good quality meat and milk. There was no detailed study on reproductive performance of Tellicherry goats under intensive and semi-intensive management systems of management. Moreover, the wide spread distribution of this meat breed has wide scope for improvement in terms of its production performance. Hence, the present study was carried out to study the reproductive performance of Tellicherry goats under intensive and semi-intensive systems of management.

Materials and Methods

The reproductive performances of Tellicherry goats were studied with 40 Tellicherry kids from the age of three to four months under two systems of rearing at Instructional Livestock Farm Complex, Veterinary College and Research Institute, Namakkal. The group (T₁) was kept under intensive system of rearing and other group under semi-intensive system of rearing (T₂). The kids were given an adaptation period of 15 days before the start of the experiment. The group T₂ was sent for grazing. The T₁ group was kept under stall feeding. Stall-fed animals were offered concentrate feed, Co-4 grass (Bajra X Napier hybrid variety), subabul (*Leucaena leucocephala*), sorghum (*Sorghum bicolor*) stover and ground nut haulms (*Arachis hypogaea*) at different times of the day to meet the nutrient requirement as per the nutrient requirements recommended by ICAR (2013) [9].

Subabul fodder was cut into small branches of minimum stem portion and fed to goat afresh. Sorghum stover was also chopped and fed as dry fodder. Groundnut haulms were fed as such. The Co-4 and sorghum stover were fed two times a day, whereas, subabul was fed once a day. *Ad libitum* drinking water was made available. Kids were allowed for grazing from 9.00 a.m. to 4.30 p.m. T₂ group of goats were grazed together and separated in their pens in the evening. The males were grazed separately and maintained in separate pens. The grazing land of the institution was having *Cenchrus* pasture, naturally growing grasses (*Heteropogon contortus*, *Cynodon dactylon*, *Deschampsia cespitosa*, *Echinochola colona*), shrubs (*Agerotum houstonianum*, *Bambusa vulgaris*, *Colotropis gigantean* and *Canna indica*) and tree fodders (*Azadirachta indica*, *Albizia lebbeck*, *Acacia leucophloea*, *Leucaena leucocephala*, *Gliricidia sepium* and *Ficus religiosa*).

At the end of the growth study (150 days), the females maintained under different systems of rearing were utilized to study the reproductive performance. All the kids were allowed to remain separately according to sex and age group in a fenced open run in front of the shed from 06.00 to 07.00 A.M for heat detection and health care. Heat detection was made from the physical signs of heat (bleating, swelling and mucus discharge of vulva, tail wagging, jumping on other animals and male seeking behavior). At the time of mating, the female was weighed and the weight at first mating was recorded. Gestation length was calculated as days between date of mating and date of kidding. The occurrence of heat is confirmed with the use of apronised teaser buck. After that, the animals confirmed of estrus were allowed for hand mating with selected bucks. These animals were observed for re-occurrence of heat signs in subsequent cycles and those animals came to estrus again were recorded and re-mated. The other animals which did not come to heat again were tested for pregnancy with the use of an ultra sound scanner by trained personnel. The animals which were negative for

pregnancy were again observed for the occurrence of heat.

The pregnant does in the grazing groups were retained in the shed and the signs of kidding were observed. At the time of kidding, the type of birth and birth weight of kid(s) were recorded within 24 hours of birth. The dams were weighed after expulsion of placenta to record the body weight at kidding. The dams and kids were allowed together for the first three days after birth in the shed itself. After that, the kids were retained in the shed and dams of the grazing group were sent for grazing. The kids of dams reared in intensive system were also separated after three days and kept in kid enclosure except at the time of suckling. After the return of grazing animals, the dams and kids were again allowed together. The kids were weaned at 90 days in both the systems to facilitate the dams to come to heat again. The date of coming to oestrus after kidding was recorded and subsequent mating was allowed.

Result and Discussion

Weight at first mating

The effect of rearing system on weight at first mating is shown in (Table 1). There was no significant difference in intensive system and semi-intensive system. The present study observed the weight at first mating in intensive and semi-intensive system was 18.51±0.86 kg and 18.13±0.87 kg, respectively. The present findings for weight at first mating agreed with report of Faruque *et al.* (2010) [6] reported no significant difference in weight at first mating between different systems of rearing in Black Bengal goats. On the contrary, Patel *et al.* (2005) [14] reported significant difference between systems of management in Marwari, Parbatsari and local non-discript goats of Rajasthan. The weight at first mating observed in Tellicherry and Salem Black goats was comparable with the earlier report of Kutchi, Jamunapari and Mehsana goats of India (Kumar *et al.*, 2006; Hassan *et al.*, 2010; Patel and Pandey, 2013) [12, 8, 15].

Table 1: Mean (±SE) of reproductive performance of Tellicherry goats under intensive and semi- intensive systems of rearing

Parameters	Intensive system (T ₁)	Semi-intensive system (T ₂)	T-value	P-value
Weight at first mating (kg)	18.51±0.86 (12)	18.13±0.87 (12)	0.306 ^{NS}	0.380
Number of services per conception	1.25±0.13 (12)	1.50±0.23 (12)	0.944 ^{NS}	0.179
Weight at first kidding (kg)	22.87±0.75 (12)	23.35±0.98(12)	0.390 ^{NS}	0.349
Litter size	1.08±0.08(12)	1.25±0.13(12)	1.076 ^{NS}	0.147
Birth weight (kg)				
Male	2.43±0.18 ^b (7)	2.05±0.05 ^a (7)	2.003 [*]	0.042
Female	2.23±0.06 ^b (7)	1.86±0.09 ^a (7)	3.330 ^{**}	0.003
Overall	2.33±0.10 ^b (14)	1.96±0.05 ^a (14)	3.247 ^{**}	0.002
Weaning weight (kg)				
Male	9.86±0.48 ^b (7)	7.83±0.17 ^a (7)	4.022 ^{**}	0.001
Female	9.17±0.43 ^b (7)	7.46±0.14 ^a (7)	5.370 ^{**}	0.003
Overall	9.51±0.33 ^b (14)	7.65±0.11 ^a (14)	5.370 ^{**}	0.000
Gestational weight gain (kg)	4.36±0.33 (12)	5.22±0.50 (12)	1.406 ^{NS}	0.088
Dam weight at the time of weaning	19.59±0.31 (12)	20.43±0.40 (12)	1.664 ^{NS}	0.064
Lactational weight loss (kg)	3.28±0.43 (12)	2.92±0.72 (12)	0.858 ^{NS}	0.126
Service period (days)	89.00±1.85 (12)	85.30±2.12 (12)	1.315 ^{NS}	0.103
Kidding percentage	100.00 (12)	100.00 (12)	-	-
Twinning percentage	8.33 (1)	25.00 (3)	-	-
Kidding interval (days)	245.01±3.84 (12)	243.39±7.19 (12)	0.198 ^{NS}	0.422

Means bearing the different superscript within a row differ significantly, *Significant $p < 0.05$,

** Highly significant ($p < 0.01$), ^{NS} Non significant

Number of services per conception

The overall mean of the number of services per conception in intensive and semi-intensive system was shown in (Table 1).

The present study revealed that the number of service per conception of the intensive and semi-intensive system was 1.25±0.13 and 1.50±0.23, respectively. System of rearing did

not significantly influence the services per conception. The present study was closely agreed with Chodhury *et al.* (2002)^[2] in Black Bengal goat who reported semi-intensively reared goat was 1.45 and Sultana *et al.* (2011)^[21] studied the effect of intensive and semi-intensive feeding system on reproductive performance of native sheep of Bangladesh and observed that the number of services per conception in intensive and semi-intensive systems of rearing was 1.6 and 1.4 numbers, respectively.

Weight at first kidding

The overall means for weight at first kidding were shown in (Table 1). In the present study, the values were found to be 22.87±0.75 and 23.35±.98 kg in intensive and semi-intensive system, respectively. The systems of rearing had no significant effect on weight at first kidding in Tellicherry goats. The non-significant effect of systems of management was in accordance with the reports on Jamunapari and Mehsana goats (Hassan *et al.*, 2010; Patel and Pandey, 2013)^[8, 15]. However, Patel *et al.* (2005)^[14] and Faruque *et al.* (2010)^[6] reported significantly higher weight at first kidding in intensively reared goats compared to semi-intensively reared goats.

Litter size

The litter size observed in the present study was 1.08±0.08 and 1.25±0.13 under the intensive and semi-intensive system. It is close agreement with the reports of Kanni Adu (1.70±0.60), Black Bengal (2.33±0.33) and Salem Black (1.48±0.13) goats (Thiruvankadan *et al.*, 2000a; Islam *et al.*, 2009; Gopu *et al.*, 2013)^[22, 10, 7].

Gestational weight gain

The gestational weight gain of the intensive and semi-intensive system was 4.36±0.33 and 5.22±0.50 kg, respectively are shown in Table 1. It is similar to the reports of Thiruvankadan *et al.* (2008)^[23] in Mecheri sheep maintained under organized farm conditions.

Lactational weight loss

The lactational weight loss of intensive and semi-intensive system was 3.28±0.43 and 2.92±0.72 kg, respectively. The present values was comparable with Islam *et al.* (2009)^[10] in Black Bengal goat and the values are lower than the reports of Thiruvankadan *et al.* (2008)^[23] in Mecheri sheep of Tamil Nadu under farm conditions.

Service period

The overall mean service period recorded under intensive and semi-intensive systems of management in Tellicherry goats was 89.00±1.85 and 85.30±2.12 days respectively are shown in Table 1. The observed service period was comparable with Sangamneri goat (Deokar *et al.*, 2007)^[5] and Berari goat (Kranti Khar *et al.*, 2014)^[11] and shorter than other Indian goat breeds like Jamunapari (Singh and Roy, 2003)^[18], Sirohi (Pathodiya *et al.*, 2008)^[16], Mehsana (Patel and Pandey, 2013)^[15] and Ganjam (Rao *et al.*, 2009)^[17] goats,

Kidding percentage

The kidding percentage of Tellicherry goats under intensive and semi-intensive system was 100 percent and 100 percent, respectively. All the goats were given birth reared under intensive and semi-intensive system of rearing. However, the reports of Kumar *et al.* (2006)^[12] reported kidding percentage

of 70 percent in semi-intensively reared Kutchi goat in Rajasthan. Singh *et al.* (2009a)^[19] studied the reproductive performance of Gohilwadi goats in range condition of Uttar Pradesh and reported a kidding percentage of 82 percent. Singh *et al.* (2009b)^[20] studied the productive and reproductive performances of Zalawadi goats under range condition of Uttar Pradesh and observed a kidding percentage of 84 percent.

Twining percentage

Twining percentage of Tellicherry goats under intensive and semi-intensive system was 8.33 and 25.00 percent, respectively. The present values were higher than the previous reports Verma *et al.* (2009)^[24] and Muthuramalingam *et al.* (2014)^[13] on the same breed.

Kidding interval

Kidding interval in Tellicherry goat under intensive and semi-intensive system was 245.01±3.84 and 243.39±7.19 days, respectively. Acharya (1982)^[1] and Verma *et al.* (2009)^[24] reported similar values in Tellicherry goats reared in its native tract of Kerala.

Conclusion

The reproductive parameters viz., weight at first mating, number of services per conception, gestational weight gain, lactation weight loss, service period, kidding percentage, kidding interval and twinning percentage of Tellicherry goats had no significant ($p>0.05$) difference between the rearing systems. It is possible to provide better grazing land in semi-intensive system will be more twinning percentage.

Acknowledgements

The authors are thankful to Tamil Nadu Veterinary and Animal Sciences University, Chennai for providing necessary facilities, funds and support to carry out the research work.

References

1. Acharya RM. Sheep and Goat Breeds of India. FAO Animal Production and Health Paper 30, FAO, United Nations, Rome, Italy; c1982.
2. Chowdhury SA, Bhuiyan MSA, Faruk S. Rearing Black Bengal goat under semi-intensive management 1. Physiological and reproductive performances. Asian - Aust. J Anim. Sci. 2002;15(4):477-484.
3. Devendra C. Goats and rural Prosperity. Pre-Conference Proceeding, Vth International Conference on Goats. New Delhi, India; c1992, p. 6-25.
4. DFID. Sustainable Livelihoods Guidance Sheets. Department for International Development, 2000. www.livelihoods.org.
5. Deokar DK, Lawar VS, Pawar BK, Andhale RR. Breed characteristics of Sangamneri goat. Indian J Small Rumin. 2007;13(2):213-215.
6. Faruque S, Chowdhury SA, Siddiquee NU, Afroz MA. Performance and genetic parameters of economically important traits of Black Bengal goat. J Bangladesh Agril. Univ. 2010;8(1):67-78.
7. Gopu P, Raman KS, Thangaraju P, Saravanan R, Panneerselvam S. Breed characteristics of Salem Black goat in Tamil Nadu. Shanlax Interna. J Vete. Sci. 2013;1(1):15-19.
8. Hassan MR, Talukder MAI, Sultana S. Evaluation of the production characteristics of the Jamunapari goat and its

- adaptability to farm conditions in Bangladesh. *Bangl. Vet.* 2010;27(1):26-35.
9. ICAR. Nutrient Requirements of Sheep, Goat and Rabbit. Indian Council of Agriculture Research, Krishi Anusandhan Bhawan, Pusa, New Delhi; c2013.
 10. Islam MR, MR. Amin, Kabir AKMA, Ahmed MU. Comparative study between semi-intensive and scavenging production system on the performance of Black Bengal goat. *J Bangladesh Agril. Univ.* 2009;7(1):9-86.
 11. Kranti Kharkar, Kuralkar SV, Prajakta Kuralka. Growth, production and reproduction performance of Berari goats in their native tract. *Indian J Small Rumin.* 2014;20(1):12-15.
 12. Kumar A, Sushilkumar, Mishra AK, Singh VK. Characteristics of Kutchi goats of Gujarat. *Indian J Small Rumin.* 2006;12(2):162-168.
 13. Muthuramalingam T, Pothiappan P, Tensingh Gnanaraj P, Devi T, Rangasamy S. Effect of flushing on reproductive performance and synchronization of estrus in Tellicherry does. *Indian J Anim. Rep.* 2014;35(2):34-35.
 14. Patel AK, Mathur BK, Kaushish SK. Kidding performance of arid goat breeds under different management systems. *Indian J Small Rumin.* 2005;11(2):140-144.
 15. Patel AC, Pandey DP. Growth, production and reproduction performance of Mehsana goat. *J Livestock Sci.* 2013;4:17-21.
 16. Pathodiya OP, Gurjar ML, Singh SK. Reproductive performance of Sirohi goats in field conditions. *Indian J Small Rumin.* 2008;14(1):124-126.
 17. Rao PK, Dash SK, Singh MK, Rai B, Singh NP. Ganjam goat of Orissa and its management practices. *Indian J Small Rumin.* 2009;15(1):44-50.
 18. Singh MK, Roy R. Effect of non-genetic factors on reproduction traits in Jamunapari goats under semi-intensive management. *Indian J Small Rumin.* 2003;9(2):112-115.
 19. Singh MK, Rai B, Ashok Kumar, Sisodiya HS, Singh NP. Production performance of Gohilwadi goats under range conditions. *Indian J Anim. Sci.* 2009a;79(6):587-593.
 20. Singh MK, Rai B, Ashok Kumar, Simaria MB, Singh NP. Performance of Zalawadi goats under range conditions *Indian J Anim. Sci.* 2009b;79(1):68-72.
 21. Sultana N, Hasan MN, Iqbal A, Ershaduzzoman M, Talukdar MAL, Dey S. Effect of intensive and semi-intensive feeding system on productive and reproductive performance of native sheep. *J Sci. Res.* 2011;3(3):693-698.
 22. Thiruvankadan AK, Panneerselvam S, Kandasamy N. Reproductive performance of Kanni Adu goats under field conditions. *Indian J Anim. Sci.* 2000;70(7):691-693.
 23. Thiruvankadan AK, Muralidharan J, Karunanithi K. Body weight changes during different physiological stages of Mecheri ewes. *Indian J Anim. Sci.* 2008;78(12):1389-1392.
 24. Verma NK, Dixit SP, Dangi PS, Aggarwal RAK, Subodhi Kumar, Joshi BK. Malabari goats: Characterization, management, performance and genetic variability. *Indian J Anim. Sci.* 2009;79(8):813-818.