

COMPARATIVE PERFORMANCE OF TELlichERRY GOATS UNDER EARLY WEANING AND CONVENTIONAL WEANING SYSTEM

S. Meenakshi Sundaram¹, T. Muthuramalingam^{2*}, P. Tensingh Gnanaraj³,
T. Sivakumar⁴, S. Vairamuthu⁵, S. Rangasamy⁶ and E. Rachel Jemimah⁷

Livestock Farm Complex

Tamil Nadu Veterinary and Animal Sciences University, Chennai – 600 051

ABSTRACT

The present work was formulated to evaluate the reproductive performance of Tellicherry does and the productive performance of their kids under the early weaning system. Second parity Tellicherry does aged between 2 – 2 ½ years were divided into two groups namely treatment 1 (weaning at 90 days) and treatment 2 (weaning at 60 days) comprising of 20 does each. Reproductive parameters such as days to first estrum post kidding, days to conception post kidding, number of services per conception, and kidding interval of does were also recorded. Productive parameters such as body weight at birth, weaning, 6 months and 9 months of age, pre-weaning, post-weaning, and overall average daily gain, total biomass produced per kidding, and economics of rearing kids were recorded. Statistical analysis revealed no significant difference between weaning at 90 days and weaning at 60 days in terms of days to first estrum post kidding, days to conception post kidding, number of services per conception, and kidding interval. Kids born under the early weaning system and the conventional system had similar birth weights. Kids weaned early by 60 days had significantly lower ($P < 0.01$) weaning weight, body weight at six months, body weight at nine months, total biomass produced / kidding, pre-weaning average daily gain, post-weaning average daily gain, and overall average daily gain compared to kids weaned at 90 days. Early weaning did not improve the reproductive performance of Tellicherry does and had a negative impact on the productive performance of kids.

Key Words: Tellicherry goat, productive performance, reproductive performance, early weaning, conventional weaning

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¹Professor and Head

²Assistant Professor, *Corresponding author Email: muthuvet001@gmail.com

³Registrar, TANUVAS

⁴Professor and Head, Department of Livestock Production Management, Madras Veterinary College, Chennai – 7

⁵Professor and Head, Centralised Clinical Laboratory, Madras Veterinary College, Chennai – 7

⁶Assistant Professor, Department of Veterinary Gynaecology and Obstetrics, Madras Veterinary College, Chennai - 7

⁷Assistant Professor, Post Graduate Research Institute in Animal Sciences, Kattupakkam – 603 203

INTRODUCTION

Goats play a significant role in providing livelihood and supplementary income to millions of resource-poor and landless farmers of rural India. Around 20 million small and marginal farmers and landless labourers' families depend on goats for their livelihood either partially or completely. India occupies the first position in goat milk production (5.75 million MT), the second position in terms of goat population (148.88 million), and goat meat production (1041.11 thousand tons) in the world (FAO, 2008; NAPG, 2018; BAHFS, 2017). The goat sector contributes Rs.14,453 crores to the agrarian economy of the country through meat, milk, skin, etc., which accounts for around 8 per cent of the Gross Domestic Product (GDP) from the livestock sector. In addition, the goat sector also generates about 4 per cent rural employment. In the present scenario of changing agro climatic conditions, this small ruminant has tremendous potential to be projected as the 'Future Animal' for rural and urban prosperity (NAPG, 2018).

Tellicherry goat is one of the recognized breeds of goats in India (Verma *et al.*, 2020). It is native to the Malabar region of Kerala. It has been also reared in different places of Tamil Nadu due to higher multiple birth percentage and milk yield. Reducing the amount of suckling by early weaning or by restricting suckling to two 30 min sessions per day can reduce the delay between parturition and the first ovulation in ewes (Ronquillo *et al.*, 2008). With this background, this work was formulated to evaluate the reproductive performance of Tellicherry does and the

productive performance of their kids under the early weaning system.

MATERIALS AND METHODS

The study was carried out at Livestock Farm Complex, Madhavaram Milk Colony, Tamil Nadu Veterinary and Animal Sciences University, Chennai, Tamil Nadu, India, located between latitudes 12° 9' and 13° 9' N and longitudes 80° 12' and 80° 19' E with an altitude of 22 m above MSL. Second parity Tellicherry does aged between 2 – 2 ½ years were divided into two groups namely treatment 1 (weaning at 90 days) and treatment 2 (weaning at 60 days) comprising of 20 does each. All the does were maintained under intensive system of management with similar feeding, housing, and health care conditions. The data related with reproductive parameters (*viz.*, days to first estrum post kidding, days to conception post kidding, days to conception post kidding, number of services per conception, kidding interval) and productive parameters of kids born (*viz.*, birth weight, weaning weight, body weight at six months, body weight at nine months, total biomass produced / kidding, pre-weaning average daily gain (birth to weaning), post-weaning average daily gain (weaning to marketing), overall average daily gain (birth to marketing) were collected. The collected data were subjected to statistical analysis by independent t – test using SPSS software. Differences were considered significant at $P < 0.05$.

RESULTS AND DISCUSSION

The treatment had no effect on the days to estrum post kidding (days) in

Tellicherry does under the early weaning system (Table 1). Overall, days to estrum post kidding ranged from 139.88 ± 10.33 and 141.13 ± 13.49 days. Does in all the treatments had first estrum post kidding around the same time regardless of the weaning period and the reduction in days to estrum post kidding is only 2 days which is lower to that reported by Lawson *et al.* (1984) and Santhoshkumar *et al.* (2018). They reported a reduction of 6 days in the interval to estrus post kidding in the early weaning system in Spanish goats and Mecheri ewes. From the present study, it is noted that early weaning did not shorten the days to first estrus post kidding in Tellicherry does.

The treatment had no effect on the days to conception post kidding (days) in Tellicherry does under the early weaning system (Table 1). That is, all the treatment does conceived around the same time regardless of the weaning period. Thus, early weaning did not shorten the days to conception post kidding in Tellicherry does.

Days to conception post kidding observed in the conventional weaning system is similar to that reported by Venkatachalapathy *et al.* (2016) in Tellicherry does (129.20 ± 10.10 days). However, does in the early weaning system took more days to conception in the present study compared to that reported by Venkatachalapathy *et al.* (2016) in Tellicherry does (129.20 ± 10.10 days).

The treatment had no significant effect on the number of services per conception in Tellicherry does under the early weaning system (Table 1). All the treatment does required similar services per conception regardless of the weaning period. Further,

does in the early weaning group (2.06 ± 0.11) numerically required a higher number of services per conception compared to 90 days weaning group does (1.83 ± 0.09).

The number of services per conception is frequently used as an indicator of fertility and the optimum value is considered to range between 1.6 and 1.8 (Borkowska *et al.*, 2012). In the present study, does in the conventional weaning system had the number of services per conception within the range given by Borkowska *et al.* (2012). Does under early weaning system had the number of services per conception higher than those the range given by Borkowska *et al.* (2012). Thus, early weaning did not have an impact on the number of services per conception in Tellicherry does.

The treatment had no effect on the kidding interval (days) in Tellicherry does under the early weaning system (Table 1). All the treatment does had similar kidding interval regardless of the weaning period. Thus, early weaning did not shorten the kidding interval in Tellicherry does.

The kidding interval observed in the conventional and early weaning system (278.50 ± 10.84 ; 284.04 ± 8.70 days) was similar to that reported by Venkatachalapathy *et al.* (2016) (289 ± 7.51 days) in Tellicherry does.

Treatment did not influence the birth weight (kg) of kids under the early weaning system (Table 2). Statistical analysis revealed no significant difference between weaning at 90 days and weaning at 60 days in terms of the birth weight of kids. That is, kids born under the early weaning system and the conventional system had similar birth weight (2.04 ± 0.07

kg; 2.13 ± 0.05 kg) which is higher than that reported by Venkatachalapathy *et al.* (2016) (1.83 ± 0.05 kg) and similar to that reported by Thiruvankadan *et al.* (2008) (2.2 ± 0.1 kg).

Treatment had significantly influenced the weaning weight (kg) of kids under the early weaning system (Table 2). Kids weaned early by 60 days had significantly ($P < 0.01$) lower weaning weight (3.51 ± 0.12 kg) compared to kids weaned at 90 days (5.18 ± 0.14 kg). This is understandable because of the age difference. However, the weight of kids weaned at 60 days and 90 days observed in the present study is lower than that reported by Thiruvankadan *et al.* (2008) (5.8 ± 0.3 kg; 7.2 ± 0.3 kg) in Tellicherry kids.

Treatment had significantly influenced the six months body weight (kg) of kids under the early weaning system (Table 2). Kids weaned at 60 days had significantly lower ($P < 0.01$) body weight at six months (6.30 ± 0.23 kg) compared to kids weaned at 90 days (8.98 ± 0.28 kg); however, both the body weights were lower than that reported by Thiruvankadan *et al.* (2008) (10.5 ± 0.4 kg) in Tellicherry kids.

Treatment had significantly influenced the nine months body weight (kg) of kids under the early weaning system (Table 2). Kids weaned at 60 days had significantly lower ($P < 0.01$) body weight at nine months (7.67 ± 0.17 kg) compared to kids weaned at 90 days (12.93 ± 0.33 kg) both of which in turn is lower than that reported by Thiruvankadan *et al.* (2008) (13.8 ± 0.5 kg) in Tellicherry kids.

Early weaning system produced significantly less ($P < 0.01$) total biomass of

kids/kidding (82.48 ± 6.60 kg) compared to conventional weaning system (129.34 ± 9.92 kg). Treatment had significantly influenced the total biomass of kids produced/kidding (kg) under the early weaning system (Table 2).

Treatment had significantly influenced the pre-weaning average daily gain (g) of kids under the early weaning system (Table 3). Kids weaned at 60 days had significantly lower ($P < 0.01$) pre-weaning average daily gain (24.51 ± 1.88 g) compared to kids weaned at 90 days (33.98 ± 1.54 g), however, both of which were lower than the report of Thiruvankadan *et al.* (2008) (51.00 ± 4.73 g/day).

According to Thiruvankadan *et al.* (2009) pre-weaning, average daily weight gain in Tellicherry kids was highly affected by season, type of birth, sex and parity. The low pre-weaning ADG observed in the present study might be due to any of the above factors.

Kids weaned at 60 days had significantly ($P < 0.01$) lower post-weaning average daily gain (19.79 ± 0.87 g) compared to kids weaned at 90 days (43.12 ± 1.75 g). The post-weaning average daily gain observed in the conventional weaning kids is higher than that reported by Thiruvankadan *et al.* (2008) (38.78 ± 2.98 g/day). Treatment had significantly influenced the post-weaning average daily gain (g) of kids under the early weaning system (Table 3). Early weaned kids had very low post-weaning average daily gain than that reported by Thiruvankadan *et al.* (2008).

Treatment had significantly influenced the overall average daily gain (g) of kids under the early weaning system

Table 1. Reproductive performance of Tellicherry does under early weaning and conventional weaning system

Treatment	Mean $\pm$ S.E. (n=20)			
	Days to first estrum post kidding (days)	Days to conception (days)	Number of services per conception	Kidding interval (days)
Treatment 1 (T1) Weaning @ 90 days	141.13 $\pm$ 13.49	127.58 $\pm$ 8.68	1.83 $\pm$ 0.09	284.04 $\pm$ 8.70
Treatment 2 (T2) Weaning @ 60 days	139.88 $\pm$ 10.33	134.13 $\pm$ 10.79	2.06 $\pm$ 0.11	278.50 $\pm$ 10.84
t value	0.07 ^{NS}	-0.47 ^{NS}	-1.66 ^{NS}	-0.51 ^{NS}

^{NS} – Non significant**Table 2. Body weight of Tellicherry kids at birth, weaning, 6 months, 9 months of age and total biomass produced/kidding under early weaning and conventional weaning system**

Treatment	Mean $\pm$ S.E. (n=20)				
	Birth weight (kg)	Weaning weight (kg)	Bodyweight at six months (kg)	Bodyweight at nine months (kg)	Total biomass produced / kidding (kg)
Treatment 1 (T1) Weaning @ 90 days	2.13 $\pm$ 0.05	5.18 $\pm$ 0.14	8.98 $\pm$ 0.28	12.93 $\pm$ 0.33	129.34 $\pm$ 9.92
Treatment 2 (T2) Weaning @ 60 days	2.04 $\pm$ 0.07	3.51 $\pm$ 0.12	6.30 $\pm$ 0.23	7.67 $\pm$ 0.17	82.48 $\pm$ 6.60
t value	1.09 ^{NS}	8.41 ^{**}	6.92 ^{**}	12.77 ^{**}	3.48 ^{**}

^{NS} – Non significant; ^{**} - Significant at P<0.01

Table 3. Average daily gain of Tellicherry kids under early weaning and conventional weaning system

Treatment	Mean $\pm$ S.E. (n=20)		
	Pre-weaning ADG (g)	Post-weaning ADG (g)	Overall ADG (g)
Treatment 1 (T1) Weaning @ 90 days	33.98 $\pm$ 1.54	43.12 $\pm$ 1.75	40.07 $\pm$ 1.18
Treatment 2 (T2) Weaning @ 60 days	24.51 $\pm$ 1.88	19.79 $\pm$ 0.87	20.84 $\pm$ 0.66
t value	3.91**	10.63**	12.81**

** - Significant at $P < 0.01$

(Table 3). Kids weaned at 60 days had significantly lower ($P < 0.01$) overall average daily gain (20.84 $\pm$ 0.66g) compared to kids weaned at 90 days (40.07 $\pm$ 1.18g). The higher post weaning and overall ADG might be due to high incidences of single birth that led to better nutrition during the suckling period which reflected in later periods. The overall average daily gain observed in the present study is lower than that reported by Venkatachalapathy *et al.* (2016) in Tellicherry kids (52.79 g/day).

Kids experience stress, growth retardation, and weight loss during weaning. Abrupt early weaning cause severe weaning shock (Lu and Potchoiba, 1988). Thus, the very low body weight at six months and nine months of age, total biomass of kids produced/kidding, post-weaning average daily gain and overall average daily gain in early-weaned kids is due to weaning shock which caused growth retardation. The kids weaned early did not have compensatory weight gain in the later periods of growth.

CONCLUSION

An investigation was carried out to study the productive and reproductive performance of Tellicherry goats under the early weaning system in comparison to the conventional weaning system. Study results showed that early weaning did not improve the reproductive performance of Tellicherry does and also had a negative impact on the productive performance of kids. Hence, the conventional 90 days weaning can be followed for better reproductive performance of does as well as the growth welfare of kids. Early weaning of kids by 60 days of age is not recommended in Tellicherry goats.

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