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Impact of lactation stage on milk yield and lactation length of Attappady black and malabari goats

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Abstract

The objective of the study was to evaluate the influence of lactation stage on milk yield, lactation length of Attappady Black and Malabari goats. Newly kidded thirty does of Attappady Black and ten Malabari goats were selected for this study. The does were hand milked daily at 8 am prior to feeding and yield measured for each animal at weekly interval. The milk yield was maximum ($P < 0.01$) in Malabari goats compare than Attappady Black goats. The milk yield was noticed in 2nd and 3rd weeks for Attappady Black and Malabari goats respectively. Results showed that milk yield and lactation length differed significantly ($P < 0.01$) between the small ruminant breeds. Malabari goats had relatively higher milk yield and lactation length than Attappady Black goats.

Keywords: Milk yield, lactation length, stage of lactation, attappady black, malabari goats

Introduction

Goats are important especially for the livelihood of the poor in rural India because of the milk and meat production with low maintenance cost and their adaptation to extreme climatic conditions. Goat farming in India contributes to the agricultural economy through meat, milk, skin etc., which accounts for around 8.4 per cent of GDP from the livestock sector (CIRG, 2015) [8]. India is the highest goat milk producing country in the world with an annual milk production of 15.2 million metric tons during 2014-15 as per Basic Animal Husbandry and Fisheries Statistics (2015) [6, 7]. This huge amount of goat milk production has been achieved by inhabiting world's second highest share of 135.17 million of goat population with 34 recognized breeds in India against the global goat population of 921 million. In Kerala, there are 12.3 lakhs heads of goats and they are the second major livestock species by population next to cattle with 14.1 lakh heads (DAHS, 19th All India Livestock Census, 2012) [6]. The Attappady Black and Malabari goats are the recognized goat breeds of Kerala, India. The Attappady Black goat is found entirely in Attappady, a hilly region of Western Ghats, located in north eastern part of Palakkad district of Kerala. It is a meat purpose breed with a milk yield of less than 300 ml per day. Malabari breed is widely distributed in Malabar region of Kerala. It is a dual purpose breed with an average milk yield of 0.5 to 1 litres per day (Stephen *et al.* 2005) [31]. Therefore; this study was undertaken with consequent objectives to compare the milk yield and lactation length of Attappady Black and Malabari goats.

Methods and Materials

Location of the study

The research was carried out in the ex-situ conservation units of Attappady black goats in Kerala Veterinary and Animal Sciences University. The units are, University Goat and Sheep farm, College of Veterinary and Animal Sciences, Mannuthy. The station is located at longitude of 76°15' E and latitude of 10°31' N and at altitude of 30 m above the sea level and Livestock Research Station, Thiruvazhamkunnu which is located at longitude of 76°36' E and latitude of 11°03' N and at altitude of 35 m above the sea level.

Management

Animals were maintained under semi- intensive method with morning hours (6h) grazing and feeding seasonally available green fodder with concentrate mixture at the rate of 500g day. The animals were maintained in slated floor type. The study was conducted for a period of seven months.

Sample analysis

Animals were hand milked once daily (08.00am) and the quantity of milk harvested from each doe was measured by using graduated plastic container (1000 ml capacity) as per Mahmoud *et al.* (2014) until the end of lactation. The Milk samples (approximately 100 ml) were collected from all does in clean and sterile plastic container at first on seventh day of lactation and then every three weeks interval of the does till the end of lactation

Statistical analysis

Data obtained in the experiment were subjected to statistical analysis as per Snedecor and Cochran (1994) [30] and results were interpreted. Within each breed, comparison between weeks was done by using repeated measures ANOVA followed by LSD and between breed comparisons in every week was done by using independent t – test with using of SPSS. 20.0 version.

Results and Discussion

Average test day milk yield and overall lactation yield

The milk yield of experimental animals on various lactation stages are summarized in Table 1 and graphically depicted in Fig. 1. The Milk yield progressively increased from week 1 for both the breeds and attained peak production in week 2 in

Attappady Black and week 3 in Malabari does. Then it starts to decline as lactation progressed. Milk yield differed significantly ($P<0.01$) within the breeds of various lactation stages and there is a significant difference ($P<0.01$) between the breeds in all weeks of lactation. Present finding was in agreement with the results observed by Das and Singh (2000) [24], who reported that the stage of lactation had a significant effect on the milk yield and the highest yield was recorded in 3rd week of lactation then it start to decline after 5th week and reached as low milk yield on week 11 of lactation. Similarly, Agnihotri and Rajkumar (2007) [20] reported that the milk yield differed significantly between the stages of lactation and the highest yield was noted in week 2 of lactation then it started to decline ($P<0.01$) after week 6 and reached as low milk yield on week 13 of lactation. In contrary to present findings, Gurmessa and Melaku (2012) [25] reported the significantly ($P<0.05$) highest yield noticed during mid-stage of lactation followed by the early period and lowest in late stage of lactation. In the present study, milk yield was increased in early lactation because of frequent suckling and milking during early lactation leads to intensify the mammary development, enhance the both mammary proliferation and differentiation of mammary cells of goats and this mammary proliferation continuous for the first few weeks of postpartum in goats.

Table 1: Average test day milk yield and overall lactation yield of attappady black and malabari goats during lactation

Stages of lactation (In weeks)	Milk yield (ml)		t-value	p-value
	Attappady black (n = 30)	Malabari (n = 10)		
1	318 ± 18.48 ^c	550.50 ± 18.71 ^b	6.353**	<0.001
2	380.67 ± 22.38 ^a	579.00 ± 20.57 ^b	4.648**	<0.001
3	352.17 ± 21.20 ^b	652.00 ± 25.95 ^a	7.533**	<0.001
4	323.50 ± 19.97 ^c	565.00 ± 15.58 ^b	6.711**	<0.001
5	288.67 ± 18.94 ^d	482.00 ± 11.03 ^c	5.743**	<0.001
6	247.17 ± 17.73 ^e	426.50 ± 13.33 ^d	5.627**	<0.001
7	221.38 ± 17.73 ^f	387.00 ± 21.78 ^e	4.992**	<0.001
8	171.83 ± 15.57 ^g	352.50 ± 23.44 ^f	5.977**	<0.001
9	131.50 ± 14.86 ^h	311.00 ± 23.27 ^g	6.182**	<0.001
10	94.83 ± 12.62 ⁱ	267.00 ± 20.12 ^h	6.946**	<0.001
11		225.50 ± 17.40 ⁱ		
12		191.00 ± 9.62 ^j		
13		164.00 ± 8.19 ^k		
14		138.00 ± 5.33 ^l		
15		101.00 ± 3.48 ^m		
16		72.00 ± 7.86 ⁿ		
F-value	145.794**	170.124**		
p-value	<0.001	<0.001		
mean	252.97 ± 7.82	341.63 ± 14.85	5.280**	<0.001
Overall Lactation Length (L)	26	55		

**Significant at 1% level,*Significant at 5% level and means with same lower case as superscripts have no significant difference between the weeks

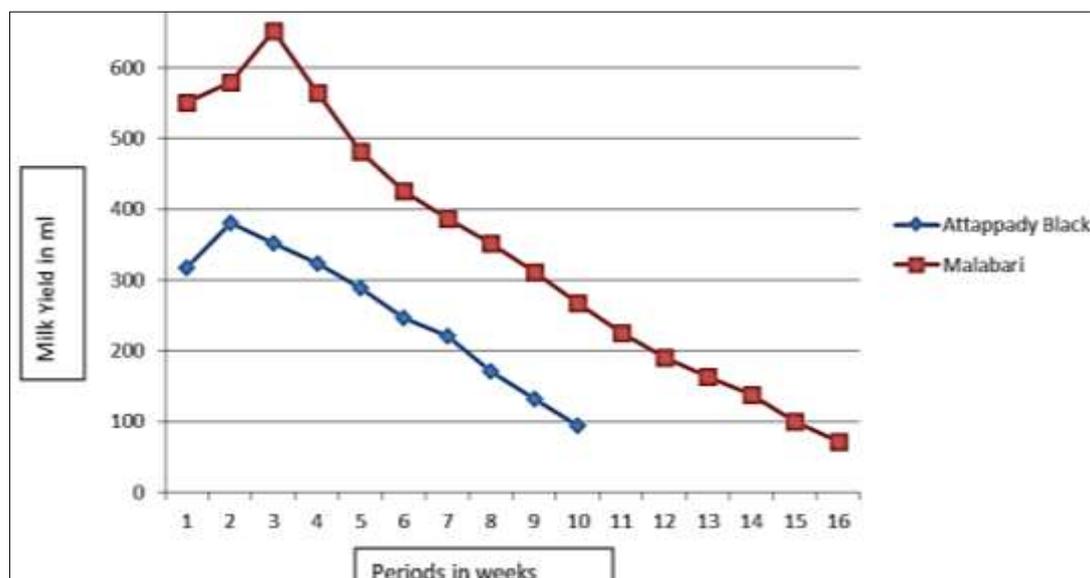


Fig 1: Milk yield of attappady black and malabari goats during lactation

The milk yield was significantly ($P < 0.01$) higher for Malabari does in all weeks of study than Attappady Black. The overall lactation yield (L) of Attappady Black and Malabari goats were 26 and 55 respectively. The overall mean milk yield differed significantly ($P < 0.01$) between the breeds. The Mean test day milk yield of both breeds are recorded in table 1. The present findings are in agreement with the findings of Stephen *et al.* (2005) [31] and Saika *et al.* (2000) [29] in Attappady Black and Malabari goats respectively. In contrary to present findings, Verma *et al.* (2009) [33] reported that the daily average milk yield of Malabari goats were 0.5 to 1.5 L/d which was higher than the present findings. Similarly, Prasad and Sengar (2002) [28] observed the higher average test day milk yield in Barbari, Barbari x jamunapari, Barbari x beetal, Barbari x black Bengal breeds compared to Attappady Black and Malabari goats.

Lactation length

The average lactation length (d) of Attappady Black and Malabari goats were represented in Table 2 and there was a significant difference ($P < 0.01$) between the lactation length of both breeds. The results are in bestowment with the findings in different breeds. Upadhyay *et al.* (2013) [32] and Kuralkar *et al.* (2013) [27] reported the lactation length of local Rohilkhand region goats had 90 d and 130 d in Berari goats respectively. But, findings were contrary to Khan and Roy (2000) [9] and Stephen *et al.* (2005) [31] they reported the higher lactation length than the present findings in Sirohi, Marwari and Kutchi breeds and Attappady black goats respectively. The breed, nutrition, parity, environment and health condition could be incriminating for the variations in the lactation length within the same orvarious breeds or species.

Table 2: Lactation length of attappady black and malabari goats

Breed	Lactation length (d)
Attappady Black (n = 30)	88.10 ± 2.20
Malabari (n = 10)	130.40 ± 1.66
T-value	10.668**
p-value	<0.001

**Significant at 1% level,*Significant at 5% level and means with same lower case as superscripts have no significant difference between the weeks

Conclusion

The chemical composition of milk on Attappady Black and Malabari goats had a significant effect in various lactation periods. In general terms, the overall composition and milk yield had a similar relation in all among the goat breeds in India. However, the specific knowledge about Attappady Black and Malabari goats has gained and it can be used for improve the management of the goat breeds in India.

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