



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(11): 2760-2763  
© 2021 TPI  
[www.thepharmajournal.com](http://www.thepharmajournal.com)  
Received: 01-09-2021  
Accepted: 03-10-2021

**Bheroo Singh Bhati**  
Krishi Vigyan Kendra,  
Banswara, MPUAT, Udaipur,  
Rajasthan, India

**Lekhu Kumar**  
Krishi Vigyan Kendra,  
Banswara, MPUAT, Udaipur,  
Rajasthan, India

**Gopal Lal Kothari**  
Krishi Vigyan Kendra,  
Banswara, MPUAT, Udaipur,  
Rajasthan, India

## Pre and post-weaning growth efficiency in Sirohi goats under field condition in Banswara district of Rajasthan

**Bheroo Singh Bhati, Lekhu Kumar and Gopal Lal Kothari**

### Abstract

A study was conducted to estimate the pre- and post-weaning growth efficiency (GE) in Sirohi goats born during 2017-18 to 2020-21 under ARYA project, KVK, Banswara. The overall least-squares mean for pre-weaning (0-3 month) and post-weaning (3-12 month) growth efficiencies were  $3.61 \pm 0.45$  and  $1.14 \pm 0.15$  Kg per kg, respectively. Type of birth, sex of kid and cluster had highly significant ( $P \leq 0.01$ ) effect on both pre and post-weaning relative growth efficiencies whereas year of birth, season of birth had highly significant effect ( $P \leq 0.01$ ) only on pre-weaning growth efficiency. Pre-weaning growth efficiency was the maximum in year 2020-21 whereas it was the minimum in year 2017-18. Kids born as multiples had higher growth efficiency than single born and Growth efficiency was higher in winter and summer season than rainy season.

**Keywords:** ARYA project, Banswara, Krishi Vigyan Kendra, pre and post- weaning, Sirohi goat

### Introduction

Goats have multifaceted utility as a livestock species and play significant role in rural economy. Rearing of goats is very useful for small and marginal farmers and landless labourers especially in the areas, where crops and dairy farming are not economical. Goat plays an important role in generating employment in rural areas. Being small in size, they do not require any large management skills and can be easily handled and managed by women and children. Goats can survive in areas with low quality vegetation. In India, goats are mainly fed on crop residues, green fodder, top feeds and non-conventional feed resources. For the poor farmers who are unable to maintain large ruminants, goat justifies its designation as “the poor man’s cow”. Under the changing agro-geo-climatic conditions and depleting resources for livelihood, the goat has tremendous potential to be projected as the Future Animal for rural prosperity. As per 20<sup>th</sup> livestock census 2019, the Goat population of India is 148.9 million. The goat population was increased by 10.1 per cent in 2019 over 2012 census (Anonymous, 2018-19) [1]. India has rank 2<sup>nd</sup> in total goat meat production. Problems related to growth rate of kids have attracted much more attention during past few years due to the cost of chevon. Growth is affected by both genetic and non-genetic factors. Among non-genetic factors, one of the important factors is the quality and quantity of feed. Even though goats thrive on poor quality roughages but for high productive performance such as higher growth rate, the higher plane of nutrition is necessary. Proteins are one of the building blocks of body tissue and needed for growth and maintenance.

Rapid growth until slaughter weight is an important goal for increased meat production. Growth rate at different ages help to determine the right marketable age of kids’ for higher economic return and carcass quality. It facilitates better survivability and faster genetic improvement by decreasing generation interval and increasing replacement rate (Singh *et. al.*, 2009) [2]. Growth rate is also a useful check of the system of feeding and management (Sharma, M.C., 2005). Growth efficiency (GE) is the weight gain during a given time interval in relation to the weight at the beginning of the time interval (Sharma, K.P., 1994) [4]. It expresses the proportionate weight gain in comparison to initial weight. It may also be expressed in percentage. Higher growth efficiency in pre-weaning stage indicates early selection (Khadda *et. al.*, 2019) [5]. Scanty of research was conducted on growth efficiency in Sirohi goats. Hence, the present investigation was planned to estimate the pre- and post-weaning growth efficiencies and genetic and non-genetic factors affecting them with genetic parameters in Sirohi goats under field condition to be incorporated as one of the objectives in future breeding strategies.

**Corresponding Author**  
**Bheroo Singh Bhati**  
Krishi Vigyan Kendra,  
Banswara, MPUAT, Udaipur,  
Rajasthan, India

## Material and Method

The present study was carried out by the Krishi Vigyan Kendra, Banswara district of Rajasthan. The data were collected from Sirohi goat rearers of different clusters under ARYA (Attracting and Retaining Youth in Agriculture) project, Krishi Vigyan Kendra, Banswara, Rajasthan during the period 2017-18 to 2020-21. Distributed of Sirohi goats to farmer after trained in Commercial Goat Farming under ARYA Project. Flock was allowed to graze freely during the day time in free range grazing areas on pastures under the supervision of herdsman. On return at home goats were fed green grasses or green fodder according to the season. The formulated concentration ration was given and drinking water was provided ad libitum. Goats were vaccinated against PPR, Enterotoxaemia and Peste des petites ruminants. Kids are weaned at the age of 3 months. For the study, random effect whereas year of birth, season of birth, sex of kid, type of birth and cluster were taken as fixed effects. Season of birth was classified as rainy, winter and summer. Sex was classified as male and female, type of birth as single and multiple, clusters as Anandpuri, Bagidora, Banswara, Garhi, Gangadtalai, Kushalgarh and Sajjangarh blocks of Banswara. Data so collected, tabulated and analyzed as per standard statistical procedures of Snedecor and Cochran (1994).

### The growth efficiency was calculated by following formula

$$GE = (W_2 - W_1) / W_1$$

Where

GE= Growth efficiency

$W_2 - W_1$  = Weight gain during a given time interval (in Kg)

$W_1$  = Initial body weight (in Kg)

## Result and Discussion

The overall least-squares mean for pre-weaning (0-3 month) and post-weaning (3-12 month) growth efficiencies were  $3.61 \pm 0.45$  and  $1.14 \pm 0.15$  Kg per kg, respectively which are shown in Table no. 1. Further, it was also observed that growth efficiency was higher during suckling stage than post-weaning period. This might be due to effect of dam's milk during suckling stage which serves as a complete nutritious food for kid. The finding during pre-weaning period was in close agreement as  $4.26 \pm 0.16$  kg/kg in Sirohi goats (Sharma, M.C., 2005) [3],  $3.98 \pm 0.08$  kg/kg in Pantja goats (Khadda *et al.*, 2019) [5]. However, lower estimates were also reported in Chegu kids as  $2.35 \pm 0.04$  kg/kg (Karna *et al.*, 2001) [6],  $3.1967 \pm 0.10$  kg/kg (Kumar *et al.*, 2005) [7] and  $3.11 \pm 0.08$  kg/kg in Tellicherry goats (Thiruvankadan *et al.*, 2009) [8],  $2.30 \pm 0.03$  kg/kg in Black Bengal goats (Kumar, N., 2018) [9] and  $3.71$  kg/kg in Raieni Cashmere goats (Mokhtari, *et al.*, 2019) [10] which might be due to breed difference. The mean during post-weaning period was similar to Tellicherry goats as  $1.34 \pm 0.05$  (Thiruvankadan *et al.*, 2009) [8], as  $0.9441 \pm 0.019$  in Magra sheep (Dass *et al.*, 2004) [11] and  $0.95 \pm 0.03$  Kg/kg in Muzaffarnagari sheep (Mandal *et al.*, 2003) [12]. However, lower estimate was also reported as 0.62 in Baluchi sheep

(Kesbi and Gholizadeh, 2017) [13].

### Effect of year of birth

Year of birth had highly significant effect ( $P \leq 0.01$ ) on pre-weaning growth efficiency whereas its effect was non-significant on post-weaning growth efficiency. Pre-weaning growth efficiency was the maximum in year 2020-21 whereas it was the minimum in year 2017-18. Post-weaning growth efficiency was higher in year 2019-20 whereas it was the minimum in year 2017-18, though difference was non-significant. Thus, it was clear that growth efficiency had somewhat increasing trend from 2017-18 to 2020-21 which might be due to continuous selection programme. The difference in performance for GEs over the years may be due to variation in climatic conditions and availability of fodder. Similar results were obtained in Chegu kids (Karna *et al.*, 2001) [6], Sirohi goats (Sharma, M.C. 2005) [3], Tellicherry goats (Thiruvankadan *et al.*, 2009) [8] and in Raieni Cashmere goats (Mokhtari *et al.*, 2019) [10].

### Effect of season of birth

Season of birth had highly significant effect ( $P \leq 0.01$ ) on pre-weaning GE but non-significant on post-weaning GE. For 0-3 month age, GE was higher of kids born during winter or summer season and lower in rainy season which might be due to more environmental stress and disease risk during monsoon which negatively affects the growth rate. In southern Rajasthan, there is plenty of grazing material having high dry matter content from March to June whose grazing provides more nutrients to animals. On other hand, being its post-harvest time and more grazing time due to increased day length, goats had more feed intake. As a result of all these reasons, kids had higher growth rate during summer. The results were in concordance with Chegu kids (Karna *et al.*, 2001) [6], Sirohi goats (Sharma, M.C. 2005) [3] and Tellicherry goats (Thiruvankadan *et al.*, 2009) [8]. However, non-significant effect of season on 0-3M growth efficiency was also reported in Tellicherry goats (Kumar *et al.*, 2005) [7], in Black Bengal kids (Kumar, N., 2018) [9] and in Pantja goats (Khadda *et al.*, 2019) [5] which might be due to difference in population and environmental conditions.

### Effect of type of birth

Type of birth had highly significant ( $P \leq 0.01$ ) effect on both pre- and post-weaning growth efficiencies in Sirohi goats. For both age durations, kids born as multiples had higher growth efficiency than single born due to compensatory growth phenomenon. Another reason may be use of initial body weight as denominator in calculation of Growth efficiency which is usually lower in multiple than single for same age group. Same findings were noted in Sirohi goats (Sharma, M.C. 2005) [3], in Pantja goats (Khadda *et al.*, 2019) [5] and in Raieni cashmere goats (Mokhtari *et al.*, 2019) [10]. However, non-significant effect of type of birth was also reported in Tellicherry goats (Kumar *et al.*, 2005 and Thiruvankadan *et al.*, 2009) [7, 8] as well as in Black Bengal goats (Kumar, N., 2018) [9].

**Table 1:** Pre and Post weaning Growth Efficiency (Kg/kg) in Sirohi goat.

Effect	Pre-Weaning GE (0-3 Month)	Post-Weaning GE (3-12 Month)
Overall	3.61±0.45	1.14±0.15
<b>Year of Birth</b>		
2017-18	3.20±0.08	1.04±0.12
2018-19	3.45±0.70	1.10±0.35
2019-20	3.74±0.25	1.25±0.10
2020-21	4.05±0.55	1.18±0.30
<b>Season of Birth</b>		
Rainy	3.75±1.05	1.05±0.27
Winter	4.10±0.95	1.08±0.45
Summer	4.02±0.25	1.10±0.80
<b>Type of Birth</b>		
Single	3.90±0.65	1.10±1.02
Multiple	4.30±1.15	1.25±0.32
<b>Sex</b>		
Female	3.85±0.19	1.12±0.26
Male	3.97±0.05	1.20±0.18
<b>Cluster</b>		
Anandpuri	3.10±1.05	1.15±0.89
Bagidora	3.95±1.21	1.70±0.37
Banswara	4.10±0.39	0.98±0.91
Gangadtalai	2.95±0.35	1.55±1.13
Garhi	4.05±0.24	1.05±1.85
Kushalgarh	2.70±1.32	1.30±0.48
Sajjangarh	2.85±0.93	0.92±0.33

#### Effect of sex of kid

Sex of kid had highly significant ( $P \leq 0.01$ ) effect on both pre- and post-weaning growth efficiencies in Sirohi goats. In both age durations, male had higher growth efficiency than females which is due to testosterone hormone effect. The results were in concordance with Chegu goats (Karna *et al.*, 2001)<sup>[6]</sup> and Pantja goats (Khadda *et al.*, 2019)<sup>[5]</sup>. Non-significant effect of sex on growth efficiency was reported in Sirohi goats (Sharma, M.C. 2005)<sup>[3]</sup>, in Tellicherry goats (Kumar *et al.*, 2005 and Thiruvankadan *et al.*, 2009)<sup>[7, 8]</sup> in Black Bengal goats (Kumar, N., 2018)<sup>[9]</sup> and in Raieni cashmere goats (Mokhtari *et al.*, 2019)<sup>[10]</sup>. The difference may be due to variation in population under study.

#### Effect of Cluster

Cluster had highly significant ( $P \leq 0.01$ ) effect on both pre- and post-weaning growth efficiencies in Sirohi goats. Pre-weaning growth efficiency (0-3 month) was higher in Banswara cluster whereas post-weaning growth efficiency was higher in Bagidora cluster, regarding. The cause of variation among clusters might be due to management practices and availability of feeds and fodder. Similar finding were observed in Sirohi goats (Sharma, M.C. 2005)<sup>[3]</sup> and in Pantja goats (Khadda *et al.*, 2019)<sup>[5]</sup>.

#### Conclusion

The present investigation revealed that in Sirohi goats, pre-weaning growth efficiency was very higher than post-weaning growth efficiency. Multiple born kids had higher growth efficiencies which suggest for setting of breeding plan to get multiple births which would provide more economic gain to farmers. Medium to high heritability of growth efficiency offer a scope for individual selection for further genetic improvement. Growth efficiency was higher in kids born during winter or summer season and lower in rainy season which might be due to more environmental stress and disease risk during monsoon which negatively affects the growth rate.

#### References

1. Anonymous. Department of animal husbandry, dairing and fisheries, Ministry of agriculture and Farmers Welfare, Govt. of India 2018-19.
2. Singh MK, Rai B, Singh NP. Environmental and genetic effects on growth traits in Jamunapari kids. Indian Journal of Animal Sciences 2009;79(6):582-586.
3. Sharma MC. Genetic Investigation of body weight and morphometry traits in Sirohi goats in the field. Ph.D. thesis. Maharaja Pratap University of Agriculture and Technology, Udaipur 2005.
4. Sharma KP. Analysis of growth rate in Deogarhi and Parbatsari goats. M.Sc. Ag. Thesis, Rajasthan Agricultural University, Bikaner 1994.
5. Khadda BS, Singh B, Singh DV, Singh SK, Singh CB. Factors affecting relative growth rate of Pantja kids under field conditions. Indian Journal of Small Ruminants 2019;25(1):37-40.
6. Karna DK, Koul GL, Bisht GS. Birth weight, morphometry and relative gain in body weight of Cheghu kids. Indian Journal of Animal Sciences 2001;71(2):180-182.
7. Kumar KG, Thiruvankadan AK, Karunanithi KK. Factors affecting growth traits of Tellicherry kids in different seasons. Indian Journal of Small Ruminants 2005;11(1):88-91.
8. Thiruvankadan AK, Murugan M, Muralidharan J, Chinnamani K. Genetic and non-genetic factors affecting body weight in Tellicherry goats. South African Journal of Animal Science 2009;39:107-111.
9. Kumar N. Growth performance of Black Bengal goat under farm and village conditions of management. M.V.Sc. Thesis, LPM, Birsa Agricultural University, Ranchi, Jharkhand 2018.
10. Mokhtari MS, Razmkabir M, Ghiasi H, Mohammadi Y. Genetic evaluation of growth rate and efficiency related traits in Raeini Cashmere goats. Iranian Journal of Applied Animal Science 2019;9(2):275-282.

11. Dass G, Sing VK, Ayub M. Growth performance of Magra sheep under hot arid climate. *Indian Journal of Animal Sciences* 2004;74(4):441-443.
12. Mandal A, Pant KP, Nandy DK, Rout PK, Roy R. Genetic analysis of growth traits in Muzaffarnagari sheep. *Tropical Animal Health and Production* 2003;35:271-284.
13. Kesbi FG, Gholizadeh M. Genetic and phenotypic aspects of growth rate and efficiency-related traits in sheep. *Small Ruminant Research* 2017;149:181-187.