



Growth Response of Assam Local Goats under Intensive Farming

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10.18805/ag.D-5173

ABSTRACT

Background: The experiment was conducted at farmer's field to study the growth response and efficiency of feed conversion of Assam local goats under different systems of management.

Methods: Twenty goats of one month of age were randomly selected in village Lachima of Nalbari district, Assam. The goats were randomly divided in two groups comprising of ten kids in each group viz, T₀ (Control) where goats were reared under extensive system of management with traditional grazing and browsing and T₁ (Experimental) where goats were reared under intensive system of management with *ad lib.* concentrate and fodder feeding.

Conclusion: The average initial and final body weight of the goats during the experimental periods in T₀ and T₁ groups were recorded as 2.90±0.03 kg and 2.89±0.04 kg and 10.36±0.26 kg and 16.05±0.53 kg respectively with highly significant difference (P<0.01) from 3rd week of the experiment till the end of the experiment. The overall changes in body measurement showed highly significant difference between the groups. The feed conversion efficiency on DM basis was recorded as 3.49 in the treatment group. Due to significantly higher growth rate in the intensive management system, it assures higher income in small holders' goat production system.

Key words: Assam local goats, Body measurements, Growth, Intensive system.

INTRODUCTION

Goat rearing is an integral part of farming system which has been practiced by large section of rural population in India. Goat is an important source of income and employment generation for millions of landless and marginal farmers of India. India ranks first for its genetic resources and numerical superiority of goats in the world. The total goat population in India is 135.17 million numbers and the goat population has decreased by 3.82% over the previous livestock census and the state of Assam is having 6.16 million no of Goat population and Assam's share to the total national goat population is only 4.56% (19th Livestock Census).

Goats are among the main meat producing animals in India, whose meat (chevon) is one of the choicest meats and has huge domestic demand. It is highly preferred by all types of consumer as there is no religious taboo in eating chevon. But there is huge gap between demand and supply especially in the north eastern states of India as in N.E. region almost 80% of the total population is non-vegetarian. In north eastern states, there is no significant meat type breed of Goat. Assam Hill, Assam local breeds goat are found in Assam which has been recognized as breed recently, Sikkim local breed is available in Sikkim, Bengal breed is distributed almost all the states of N.E. region, particularly in Tripura, Assam, Meghalaya, Manipur etc. (Das, 2001).

In this area although Goat rearing is an age old practice, yet Goats are not reared under scientific management system. Goats are reared under traditional system of management only. They are let loose for grazing and browsing during day time and extra feed and fodder is not provided.

Moreover, resources in terms of land availability are also shrinking thus reducing the grazing land. That's why in

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How to cite this article: Hoque, J., Deka, R.J., Sarma, N.K., Ahmed, H.F. and Laskar, S.K. (2021). Growth Response of Assam Local Goats under Intensive Farming. *Agricultural Science Digest*. 41 (Special Issue): 256-259. DOI: 10.18805/ag.D-5173.

Submitted: 26-03-2020 **Accepted:** 03-09-2020 **Online:** 09-01-2021

traditional system of rearing, Assam local goat acquires only 9.00±0.15 kg body weight only in six months (Das *et al.*, 2013) Low body weight gain is a major cause for the gap of demand and supply of chevon. The various stakeholders require promotion at various levels such as technology, entrepreneurship and financial support for promoting goat farming to a successful venture. There is an immediate need to explore the potentiality of the local goats of Assam under different farming system.

MATERIALS AND METHODS

The present study was conducted between January to May, 2017 in the field condition in Lachima village near Mukalmua under Nalbari district of Assam. The village was selected

because most of the household reared goats. The latitude of the village is 26°44' degrees north and longitude is 91°44' degrees east. The latitude of the Nalbari district is 26 degrees north and the longitude is 91 degrees east and 97 degree east. The village is located on the north bank of river Brahmaputra.

A total of twenty kids of 30 days old with about 3 Kg weight were selected from the village Lachima for the experiment. The experimental goats were divided in to two groups viz. Group T₀ (Control) and Group T₁ (Treatment). Each group comprised of 10 goats. The T₀ groups was managed with normal grazing and browsing under extensive system of management and the animals under T₁ group were reared ad lib fodder and specified concentrate feed in intensive system. In both the groups the kids were weaned at the age of 60 days and reared under different managemental systems. However, the animals under T₁ group were managed under strict feeding schedule as follows:

31-60 days: 2 times suckling + *ad lib*. Concentrate + *ad lib* fodder.

On 60th day, kids were weaned. Kids were offered *adlib* concentrate + *ad lib* green fodder.

Ration-1 having 18% C.P and 70% T.D.N, was fed up to 3 months of age.

Ration-2 having 16% C.P and 75% T.D.N, was fed up to 5 months of age.

The animals of both the groups were housed in similar type of housing. The goat house was made of bamboo rails. The floor made of bamboo is raised by about 1 meter off the ground so that the excreta and urine may fall through the gap in the floor. The width of the shed was 3 meter with a manger of 35 inch wide running through the centre. Kids were tied on either side with a floor space of 0.4 sq.m per kid up to 3 months of age. From 3 months of age they were provided 1 sq.m per goat.

The experiment was carried out upto 5 months of age and information on different parameters like body weight gain, body measurement, feed intake and mortality were collected and analyzed statistically using SAS version 9.4.

RESULTS AND DISCUSSION

Body weight

The average initial body weight of the goat during the experimental period under the control and treatment groups were 2.90±0.03 kg and 2.89±0.04 kg, while the final body weight of goats were 10.36±0.26 kg and 16.05±0.53 kg respectively. There was highly significant difference (P<0.01) in body weight change among the control and treatment group from 3rd week to the 22nd week or till the end of the experimental period (Table 1). In agreement with the present finding, Patil *et al.* (2013) reported that overall weight gain in goat was significantly higher in stall fed group

(7.90±0.12 kg) compared to grazing group (5.30±0.55 kg). Johnson (1982) also reported that the animals under intensive system performed better in terms of daily gain than those under prevailing range condition. Saini *et al.*, 1986 reported that the growth rate of kids per day from 90 days to 180 days was significantly higher in intensive system of management (52 g) followed by semi-intensive (47 g) and extensive system. However, Paramsivam *et al.*, 2002 reported that Barbari goats maintained under semi-intensive system recorded significantly (p<0.01) higher body weight (17.66±1.78 kg) and body weight gain/day (66.22±0.73 g) followed by intensive system and extensive system.

Linear body measurements

The average initial body length of the goats under the control and experimental groups were 27.80±0.38 cm and 27.84±0.39 cm, while the final lengths of the goats were 42.44±0.34 and 51.31±1.25 cm respectively. There is highly significant differences (P<0.01) in 2nd, 3rd, 4th and 5th months of experimental period and also there was a significant difference (P<0.05) among the groups at 1st month after the starting of the experiment (Table 2).

The average initial height at withers of the goats under control and experimental groups were 27.56±0.34 cm and 27.6±0.45 cm., while the final heights at withers of the goats were 41.29±0.37 and 49.68±1.06 cm. respectively, in control and experimental groups. There is highly significant

Table 1: Average weekly changes in body weight (Kg) of goat.

Weeks	Control group	Treatment group	t-value	P-value
Initial	2.90±0.03	2.89±0.04	-0.198	.845
1 st	3.32±0.05	3.36±0.05	0.616	.546
2 nd	3.77±0.03	3.90±0.03	1.857	.080
3 rd	4.15±0.05	4.57±0.07	4.957	<.001
4 th	4.60±0.08	5.22±0.08	5.471	<.001
5 th	4.98±0.04	5.83±0.04	4.672	<.001
6 th	5.35±0.1	6.46±0.18	5.498	<.001
7 th	5.74±0.06	7.09±0.07	5.709	<.001
8 th	6.11±0.13	7.73±0.23	6.157	<.001
9 th	6.48±0.14	8.38±0.24	6.856	<.001
10 th	6.86±0.16	9.02±0.24	7.553	<.001
11 th	7.23±0.17	9.65±0.27	7.526	<.001
12 th	7.58±0.2	10.22±0.29	7.527	<.001
13 th	7.89±0.21	10.78±0.32	7.603	<.001
14 th	8.21±0.22	11.45±0.33	8.102	<.001
15 th	8.54±0.23	12.11±0.34	8.683	<.001
16 th	8.82±0.23	12.75±0.36	9.217	<.001
17 th	9.13±0.25	13.36±0.38	9.329	<.001
18 th	9.4±0.25	13.92±0.42	9.21	<.001
19 th	9.63±0.26	14.49±0.45	9.302	<.001
20 th	9.90±0.26	15.07±0.49	9.289	<.001
21 st	10.14±0.26	15.62±0.52	9.41	<.001
22 nd	10.36±0.26	16.05±0.53	9.589	<.001

P-value < 0.05 is significant; P-value < 0.01 is highly significant; P-value >0.05 is not significant.

difference ($P < 0.01$) in body height change among the control and treatment group at the 2nd, 3rd, 4th and 5th month of the experiment and also there was a significant difference ($P < 0.05$) among the groups at 1st month after starting the experiment (Table 3).

The average initial heart girth of the goats under the control and treatment groups were 30.07 ± 0.25 and 30.01 ± 0.29 centimetre respectively, while the final heart girths of the goats were 48.29 ± 0.31 and 57.69 ± 1.35 centimetre, respectively in control and experimental group. There is highly significant difference ($P < 0.01$) in heart girth change among the control and experimental group at 1st, 2nd, 3rd, 4th and 5th month during the experimental period (Table 4).

The linear body measurements (*viz.* length, height at wither and heart girth) increases with the advancement of age and increment of body weight. Differences in body length, height at wither and heart girth among control and treatment group may be due to differences of body growth in both the group. The present finding was in agreement with the findings of Khan *et al.* (2006) in Beetal goats, Singh *et al.*, 1987 in Black Bengal goats and Pander *et al.*, 1989 in (Black Bengal x Beetal) goat. The present findings are also in close agreement with Khargharia *et al.*, 2015 who conducted a study on the morphological traits of 67 female Assam Hill Goat of North East India. The body weight (BW), Body length (BL), height at withers (HAW), rump height (RH), chest depth (CD), heart girth (HG), paunch girth (PG), canon bone length (CL), canon bone circumference (CC), Sacral pelvic width (SPW), Shoulder width (SW) and sternum height (SH) were estimated to be 24.86 ± 0.80 kg, 61.48 ± 0.57 , 54.57 ± 0.57 , 58.05 ± 0.59 , 14.57 ± 0.23 , 13.11 ± 0.27 , 27.68 ± 0.45 , 71.93 ± 0.99 , 86.05 ± 1.77 , 12.14 ± 0.17 , 7.71 ± 0.10 , 76.93 ± 1.34 , 15.66 ± 0.24 and 26.89 ± 0.49 cm, respectively.

Feed Consumption and Feed Conversion Efficiency

Ad lib fodder and concentrate were given to the treatment group and recorded daily basis. Control group was reared under extensive system of rearing with normal grazing and browsing, in which no fodder or concentrate feed was supplemented. DM content in concentrate feed and fodder was found 90% and 23% respectively in laboratory analysis. Mean DM intake from the concentrate and fodder was recorded 112.01 ± 6.53 and 186.55 ± 12.45 gram respectively. DM intake per kg of live weight gain (Feed Conversion efficiency) was found 3.49 (Table 5). Johri and Talapatra, 1971 reported that the average dry matter intake in Jamunapari goats per head per day was 286 g for an average body weight of 8.52 kg, which works out to 3.41 kg per 100 kg body weight. However, the present findings are much lower than the findings of Johri and Talapatra (1971) which may be attributed to differences in breed size. Mathur *et al.*, 2009 reported that the average fodder consumed by Marwari and Parbatsar goat (1 month of post parturition) in complete stall fed *ad lib.* were 980 and 1067 g/animal/day on dry

matter basis for a period of 60 days. The present study is also in close agreement with Sahu *et al.*, 2013 who carried out a study to evaluate the impact of concentrate supplementation to the Pregnant Ganjam Goat on their growth performance in periparturient period. Average daily feed intake was 225 g when offered 300 g feed on daily basis. Bhuyan, 1995 and Saikia *et al.*, 1995 recorded feed conversion efficiency in Beetal x Assam local crossbred kids ranging from 5.93 to 12.55 and 5.78 to 12.01 respectively, which is higher than the present value. This may be due to the difference in the quality of the ration fed.

Table 2: Average monthly changes in body length (cm).

Months	Control group	Treatment group	t-value	P-value
Initial	27.80±0.38	27.84±0.39	0.074	.942
1 st	31.81±0.31	33.88±0.82	2.384	0.030
2 nd	35.36±0.34	39.24±0.89	4.061	.001
3 rd	38.06±0.38	44.11±0.92	6.081	<.001
4 th	40.38±0.33	47.98±1.05	6.87	<.001
5 th	42.44±0.34	51.31±1.25	6.846	<.001

P-value < 0.05 is significant; P-value < 0.01 is highly significant; P-value > 0.05 is not significant.

Table 3: Average monthly changes in height at wither (cm).

Months	Control group	Treatment group	t-value	P-value
Initial	27.56±0.34	27.6±0.45	0.071	0.944
1 st	31.4±0.2	32.62±0.54	2.108	0.049
2 nd	34.71±0.31	37.58±0.63	4.079	.001
3 rd	37.28±0.27	42.6±0.65	7.502	<.001
4 th	39.19±0.31	46.44±0.89	7.711	<.001
5 th	41.29±0.37	49.68±1.06	7.457	<.001

P-value < .05 is significant; P-value < .01 is highly significant; P-value > .05 is Not significant.

Table 4: Average monthly change in heart girth (cm).

Month	Control group	Treatment group	t-value	P-value
Initial	30.07±0.25	30.01±0.29	-0.158	0.877
1 st	35.21±0.22	37.01±0.57	2.922	.009
2 nd	39.51±0.21	43.44±0.81	4.684	<.001
3 rd	43.41±0.22	49.62±0.95	6.351	<.001
4 th	46.22±0.3	54.46±1.22	6.54	<.001
5 th	48.29±0.31	57.69±1.35	6.778	<.001

P-value < .05 is significant; P-value < .01 is highly significant; P-value > .05 is not significant.

Table 5: Feed conversion efficiency (FCE).

DM intake from concentrate feed (kg)	112×22×7 = 17.24
DM intake from fodder (kg)	186×22×7 = 28.72
Total DM intake (kg)	45.94
Initial body weight (kg)	2.89
Final body weight (kg)	16.05
Body weight gain (kg)	13.16
Feed conversion efficiency (FCE)	45.94/13.16 = 3.49

CONCLUSION

From the present study it may be concluded that rearing goat in intensive system with *ad lib.* concentrate and fodder witnessed higher growth and vigor which assured more economical return. Present study also revealed that in intensive system of management with *ad lib.* concentrate and fodder feeding, body weight gain of goat in was increased significantly in compared to extensive system of management with normal grazing and browsing. The DM intake per kg body weight gain (Feed Conversion Efficiency) was also higher.

Author's contribution

The research was carried out as a part of fulfillment of M.V.Sc. Degree Programme. All authors contributed to the research works and are members of the research advisory committee. All authors read and approved the final manuscript.

Ethics approval

The research was carried out according to the guidelines of Institutional Animal Ethics Committee of Assam Agricultural University, Khanapara, Guwahati-781 022 as per the ethics application approval number 770/ac/CPCSEA/FVSc/AAU/IAEC/16-17/409 dated 30.07.2016.

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