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Research Article

EFFECT OF STEAMING-UP ON THE GROWTH PERFORMANCE OF KIDS AND ECONOMICS IN EXTENSIVE REARING SYSTEM

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ABSTRACT

Forty five pregnant Ganjam does were randomly distributed into three treatment groups (T_1, T_2, T_3) of 15 each for evaluating the effect of concentrate supplementation two months before expected date of kidding on birth weight of kids, body weight gain upto weaning and on economics. The treatment groups' fall under different feeding regimens were as T1 (control): normal browsing at range system; T2: Control with daily supplementation of 200 g concentrate mixture; T3: Control with daily supplementation of 300 g concentrate mixture. Leftover feed was measured every morning to know the intake for economic analysis. Average concentrate consumption (g/day) was found to be 0.163 and 0.224 for T_2 and T_3 respectively. Results revealed that the kids in T_3 showed significantly ($P<0.05$) higher birth weight (3.50 ± 0.09) than those in T_1 (2.38 ± 0.08) and T_2 (3.10 ± 0.05). Weaning weight (kg) for T_2 was 9.92 ± 0.13 which is significantly higher than T_1 (7.75 ± 0.17) but significantly lower as compared to T_3 (10.84 ± 0.26). Similar to body weight, cumulative body weight gains of kids also showed the same trend where T_2 and T_3 was having significantly higher weight as compared to T_1. For average daily gain of kids (0-90 d) T_3 was having higher ($P<0.05$) ADG (81.65 ± 2.83g) than T_2 (75.70 ± 1.41g) and T_1. The extra profit due to supplementation of concentration per doe in T_2 and T_3 was Rs. 63.48 vs. Rs. 93.24 as against the control group T_1.

Key words: Body weight, Concentrate, Ganjam goat, Kid, Economics

In India goats are called as “poor man's cow”. Ganjam goat is widely distributed in the whole of Ganjam district along with parts of Gajapati district of southern Odisha (Sahu *et al.,* 2013). This breed has been a major source of livelihood of Golla tribe since generations and therefore also known as 'Golla goats'. These goats are reared under extensive system of management without any supplementary feed. Nearby range and forest land mostly serve as the feed source for these goats (Sahu *et al.,* 2015). Rapid rate of foetal growth during the final 6-8 weeks of pregnancy imposes a metabolic challenge to the doe which is met by the mobilisation of maternal body tissue (Osuagwuh and Aire, 1990) and this may result in weight loss of doe if the dietary supply of nutrients is inadequate (Rafiq *et al*., 2003; Martin *et al*., 2004). An unscientific approach to animal feeding during pregnancy may lead to reproductive wastage resulting from either abortion or neonatal death due to low birth weight resulting from malnutrition of pregnant does (Patra *et al.,* 2006). Supplemental feeding might be a possible way to overcome the above situation. Some encouraging results have been obtained by many workers by prepartum supplementation (Chaturvedi *et al.,* 2008). This also improves the overall economy to the farmers. Considering the above facts in mind, the present study was undertaken to study the effect of balanced concentrate supplement to the pregnant Ganjam does in late gestation on the birth weight of their kids, their subsequent gain upto weaning and economics involved to measure the profit.

MATERIALS AND METHODS

The investigation was carried out in Podapadar village of Chhatrapur block and Minchin patina village of Rambha block in Ganjam district of Orissa where AICRP on Goat Improvement (Ganjam Field Unit) is operating. These areas are dominated by 'Golla' people, who rear Ganjam goats traditionally in large number in range system. For this study, 45 healthy pregnant Ganjam goats (does) of similar body weight, age and parity (3rd to 5th parity) were selected. The expected dates of kidding were estimated as per the breeding history of goat given by the flock man. The pregnant goats were divided randomly into three groups of 15 does each and kept in different feeding regimens *viz.* T_1 (control): normal browsing at range system; T_2: Control with daily supplementation of 200 g concentrate mixture; T_3: Control with daily supplementation of 300 g concentrate mixture. The study was conducted for a period of five months (60 days pre partum and 90 days post partum).

The concentrate mixture was fed to the does 60 days before the expected date of kidding. The concentrate mixture contained maize, groundnut oil cake, rice polish, wheat bran, mineral mixture and common salt with 40, 26, 10, 22, 1.5 and 0.5 percent, respectively. This concentrate mixture contained 22% crude protein (estimated) with 72% Total Digestible Nutrients (calculated). At the time of concentrate feeding in early morning, the goats were separated as per their treatment group by confining them in partition wall made up of bamboo and concentrate feed was offered. Individual feeding was practised by offering weighed quantity of feed in plastic container initially for first five days for adaptation, but individual feeding was shifted to group feeding as poor response was observed for concentrate intake. The left over feed was collected every morning after offering the concentrate and weighed to know the actual concentrate feed consumption for economic analysis.

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Table 1
Total concentrate consumption (kg) and average daily concentrate consumption (g) per doe at 15 days interval in different treatments

Days of concentrate supplementation	Treatments		
	T_1	T_2	T_3
0-15	0	1.8	2.85
16-30	0	2.45	3.35
31-45	0	2.75	3.55
46-60	0	2.80	3.70
Total	0	9.80	13.45
Average daily Concentrate consumption (g/day)	0	0.163	0.224

The individual body weight of the does was recorded at the beginning of the experiment and the birth weights of the kids were taken after birth and subsequently the body weight of kids were recorded at 15 days interval up to weaning age (3 months). The economics of supplementation of concentrates to the pregnant does under different treatments was estimated based on the performance of the kids born to them. The relative economics was estimated by assuming the unit cost of different attributes as Rs. 24/kg for concentrate feed, Rs. 420/kg for dressed meat and dressing percentage as 50%.

The statistical analysis of data was done by adopting standard procedures as described by Snedecor and Cochran, 1994.

RESULTS AND DISCUSSION

Total concentrate consumption of does at 15 days interval is presented in Table 1. The concentrate intake was low initially as the does were not accustomed to the concentrate feed through individual feeding. The feed intake increased steadily when group feeding was introduced and total consumption of concentrate was 9.8 kg in 60 days with the average consumption of 163 g/doe/day in T_2 as against 13.45 kg in 60 days and 224.0 g/doe/day in T_3.

The mean initial body weights of the pregnant does were statistically non significant (ranging from 33.91 ± 0.70 to 34.59 ± 0.75 kg) as the does were selected according to their body weight. However, there was a significant difference in the birth weight of kids among the different treatments observed (Table 2). Results revealed that the kids in T_3 (3.50 ± 0.09) and T_2 (3.10 ± 0.05) showed significantly (P<0.05) higher birth weight than those in T_1 (2.38 ± 0.08). The significantly higher birth weight shown by the kids in T_2 and T_3 might be due to the supplementation of concentrate to their dams during pregnancy leading to greater doe body weight gain during this period. Several reports suggest the influence of maternal nutrition and body condition during late pregnancy on kid's birth weight (Jash *et al*., 1998; Hossain *et al*., 2003). The body weight of kids increased steadily and reached the final body weight ranging from 7.75 ± 0.17 (T_1) to 10.84 ± 0.26 kg (T_3) at weaning age (Table 2). The inter group difference was found to be significant (P<0.05) during different phases of growth. The higher birth weight of the kids in T_3 and T_2 might have contributed to

Table 2
Body weight (kg) of kids during different phases of growth

[illegible]	[illegible]		
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] ±0.08 [a]	[illegible] ±0.05 [b]	[illegible] ±0.09 [c]
[illegible]	[illegible] ±0.15 [a]	[illegible] ±0.23 [b]	[illegible] ±0.19 [b]
[illegible]	[illegible] ±0.08 [a]	[illegible] ±0.18 [b]	[illegible] ±0.18 [c]
[illegible]	[illegible] ±0.09 [a]	[illegible] ±0.17 [b]	[illegible] ±0.18 [c]
[illegible]	[illegible] ±0.20 [a]	[illegible] ±0.21 [b]	[illegible] ±0.17 [c]
[illegible]	[illegible] ±0.25 [a]	[illegible].07 ±0.13 [b]	[illegible] ±0.23 [c]
[illegible] (weaning)	[illegible] 0.17 [a]	[illegible] ±0.13 [b]	[illegible] ±0.26 [c]

Means bearing different superscripts in a row differ significantly (P<0.05)

Table 3
Cumulative body weight gain (kg) of kids during different phases of growth

Periods	Treatments		
	T_1	T_2	T_3
0 - 15	0.96 ±0.17 [a]	1.46 ±0.23 [b]	1.50 ± 0.19 [b]
0 - 30	2.04 ±0.03 [a]	3.17 ±0.18 [b]	3.83 ± 0.20 [c]
0 - 45	2.94 ±0.07 [a]	4.26 ±0.17 [b]	4.99 ± 0.19 [c]
0 - 60	3.77 ±0.18 [a]	5.12 ±0.20 [b]	5.77 ± 0.17 [c]
0 - 75	4.59 ±0.25 [a]	5.96 ±0.12 [b]	6.35 ± 0.25 [b]
0 - 90	5.37 ±0.15 [a]	6.81 ±0.13 [b]	7.35 ± 0.25 [c]

Means bearing different superscripts in a row differ significantly P<0.05)

Table 4
Average daily gain (g) of kids during different phases of growth

Periods	Treatments		
	T_1	T_2	T_3
0 - 30	68.16 ±1.02 [a]	105.76 ±5.89 [b]	127.56 ±6.60 [c]
0 - 60	62.78 ±3.03 [a]	85.37 ±3.37 [b]	96.23 ±2.82 [c]
0 - 90	59.66 ±1.65 [a]	75.70 ±1.41 [b]	81.65 ±2.83 [c]

Means bearing different superscripts in a row differ significantly (P<0.05)

Table 5
Economics as total cost of concentrate feeding and profit (Rs.) out of it under different treatments

Attributes	T1	T2	T3
Body weight gain of kids (kg)	5.37	6.81	7.35
*Dressed weight of kids (kg)	2.69	3.40	3.68
Return from sale of extra meat (Rs.)	1129.8	1428.0	1545.6
Total concentrate offered to the does (kg)	0	9.78	13.44
#Cost of feeding concentrates (Rs.)	0	234.72	322.56
+Net return from sale of extra meat (Rs.)	1129.8	1193.28	1223.04
Extra profit due to supplementation of concentration to does (Rs.)	0	63.48	93.24

*Dressing % of kids is 50%, #Cost of feed is Rs. 2400/q, +Cost of meat is Rs. 420/ kg

higher growth rate of the kids in different treatment groups.

The cumulative body weight gains of kids (Table 3) during 0-90 days of age ranged from 5.37±0.15 kg (T_1) to 7.35±0.25kg (T_3). The inter group difference was found to be significant (P<0.05) during different phases of growth which was highest for T_3 and lowest for T_1. The average daily gain of kids during different phases of growth ranged from 59.66± 1.65 g (T_1) to 81.65± 2.83 g (T_3) from 0-90 days of age and varied significantly among different treatments during different phases of growth (Table 4). In all the phases, ADG was significantly (P<0.05) higher for T_3 than T_2 and T_1 while T_2 had higher value (P<0.05) as compared to control group. This might be due to the fact that the biomass yield of the community range land was low and was not sufficient to meet the nutrient requirement of does during late gestation in T_1 while concentrate supplementation in T_2 and T_3 might have improved the production performance of the does and growth rate of their kids. This study is in agreement with Rastogi *et al.* (2008) who suggested that the feed supplement may be given to pregnant does from 120 days to term to have kids with higher body weights.

The economics of concentrate supplementation has been presented in Table 5. The consumption of extra 9.78 kg and 13.49 kg of concentrate per doe during last two months of pregnancy in T_2 and T_3 yielded 0.71 kg (T_2) and 0.99 kg (T_3) of more dressed meat in kids than T_1. By taking the existing market price of goat meat and cost of feeding concentrate, there is a positive balance of Rs. 63.48 and Rs. 93.24 per animal in T_2 and T_3, respectively compared to the non- supplemented group. Economic benefits in T_3 compared to T_2 and T_1 is due to higher birth weight and subsequent gain to have the significant weaning weight. Our findings are in accordance with Rastogi *et al.* (2008) and Chaturvedi *et al.* (2008) who reported pre partum concentrate feeding results in better kids' performance and subsequent economic benefits.

The present study revealed that supplementation of concentrate to a level of 300 g improved the birth weight of kids, subsequent body gain upto weaning and thus resulted in higher net income under extensive system of management.

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