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Different feeding systems on growth performance in Kanni Adu goats of Tamil Nadu

M JeyakumarDOI: <https://doi.org/10.22271/j.ento.2020.v8.i6ab.8765>**Abstract**

The experiment was conducted at District Livestock Farm, Chettinad, Sivaganga District in the period from August 2012 to January 2013 to assess the effect of seven feeding systems on growth performance of Kanni Adu goat. One Hundred and Forty Kanni Adu goats of six months of age were randomly selected for 7 treatment (Feeding Systems) groups having 20 animals in each. Treatments were Full day grazing (Group I). Grazing plus sorghum grain supplementation @ 1% body weight (Group II), Grazing plus sorghum grains supplementation @ 1.5% of body weight (Group III), Grazing plus sorghum grains and concentrate supplementation @ 1% body weight (Group IV), Grazing plus sorghum grains and concentrate supplementation @ 1.5% body weight (Group V), Grazing plus concentrate supplementation @ 1.5% body weight (Group VI) and stall feeding plus concentrate supplementation @ 1.5% body weight (Group VII). The average daily gain was among groups with values of 17.46, 40.18, 34.13, 40.48, 41.43, 39.17 and 50.58g for group I, II, III, IV, V, VI and VII respectively. Among the groups, V and group VII goats gain higher body weight in compare with other groups. The ADG was significantly ($P < 0.05$) higher in stall fed goats followed by protein supplemented goats others. In conclusion, it may be stated that among these feeding groups the ADG was higher stall fed goats in compare with other goats. Though the ADG was higher in stall fed grazing plus protein supplementation system can be an economical feeding optimizing live weight gain in Kanni Adu goat at farmer's level.

Keywords: Kanni Adu goats, feeding systems, growth performance**Introduction**

Successful livestock production requires applying strategies that optimize the use of the environment and available nutrient sources in order to capitalize on the livestock's potential. Tamil Nadu is situated in the southern part of India and has a goat population of 9.27 million (Report, 2007) ^[1] and also has three recognized goat breeds, Kanni Adu (Thiruvankadan *et al.*, 2000) ^[15], Kodi Adu (Jain *et al.*, 2000) ^[5] and Kanni Adu (Thiruvankadan and Karunanithi, 2006) ^[14]. Kanni Adu goat is a medium sized animal with compact body. They are hardy in nature and it can grow up well under the drought condition and serve as a source large number of landless labourers, small and marginal farmers in Virudunagar, Tuticorin and Tirunelveli districts of southern Tamil Nadu.

The approximate goat population in these district as per 2007 census was 17,10,532 which was, 18.44 percent of the total goat population in Tamil Nadu. These goats are reared under extensive system of management without any supplementary feed. Nearby range and forest land mostly serves as the feed source of these goats. In extensive system of rearing animal getting inadequate quantity of as well as reproductive performance and the presence of species reduces the availability of nutrients and increasing their requirements. Supplementation is required to mitigate both nutrient deficiency and the effect of PSM toxicity (Kawas *et al.*, 2010) ^[8]. However, Concentrate and Protein supplementation to goats enhance their performance in extensive system (Kabir *et al.*, 2002 and 2004) ^[7, 6]. During adverse climatic condition farmers have to house their goats, providing stall feeding with tree leaves and natural grasses (Hussain *et al.*, 1998). An unscientific approach to animal feeding results were low weight gain, abortion or neonatal death due to low birth weight resulting from malnutrition of pregnant does (Subhasish sahu *et al.*, 2013; Chaturvedi *et al.*, 2008) ^[13, 3]. Grazing alone might not be sufficient for optimizing live weight gain. If scavenging type of rearing can be supplemented with minimum amount of nutrients then the level of production may be increase at minimum cost.

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Considering the above facts and due to lack of information on Kanni adu goat, the present study was under taken to identify the economical rearing and feeding system for Kanni Adu goat in dry land tract.

Methodology

The present study was carried out to evaluate the impact of different feeding systems on their growth performance in Kanni Adu goat. A total of 140 female Kanni Adu goats of similar body weight (17.03+ 0.36 kg) and age (6 months) were divided in to seven groups with 20 animals in each group. The animals of group I was allowed for grazing full day, which is 8 hour, 04 hour in the morning and 04 hour in the evening. Group II& Group III goats were allowed for full day grazing in addition to that Sorghum grains supplemented in the evening @ 1% & 1.5% of body weight, respectively. Similarly, Group IV & V goats were allowed for full day grazing plus Sorghum grain and Ground Nut Cake is supplemented @ 1% and @ 1.5 % of body weight, respectively. Group VI goats were allowed for half day grazing that is 04 hours, 02hr in the morning and 02 hr in the evening in addition to that concentrate supplementation @ 1.5 % body weight plus 2 kg of tree leaves and Group VII goats were not allowed for grazing, kept under stall feeding with concentrate feed @ 1.5% body weight plus 2 kg of tree leaves and 2 kg of natural grasses. The concentrate mixture fed to the animals contained 22% CP and 72% TDN. Daily feed offer and refusal weights were taken and recorded for each pen to determine DM intake. Feed efficiency (FE) in the feedlot was computed as a proportion of the daily DM intake to the daily live body weight gain. However, the following formula was used to determine the efficiency of concentrate feed/ feed ingredients utilization in all the treatment goats. This was based on the assumption that the additional daily live weight gains of goats supplemented with feed/feed ingredient is resulted from feed/ feed ingredient intake only, a simulation from Moore *et al.* (1999). Initial body weights of goats were determined by two consecutive days of weighing and subsequent weights were taken every 15 days. All weights were taken before feeding. Average daily body weight gain was determined as a proportion of total weight change to the feeding period of 180 days.

Goats were dewormed at regular intervals and standard vaccination schedule was followed throughout the study. The data analyzed by adopting standard procedures as described by Snedecor and Cochran, (1994)^[12].

Results and Discussion

Effect of different systems of feeding systems on body weight gain and average daily gain at twelve month of age of Kanni Adu goats are shown in the Table 1. The ADG was significantly ($P<0.05$) higher in feed /feed ingredients supplemented goats compared with grazing goats with the values of 40.25, 50.18, 50.13, 60.48, 60.83, 50.17 and 70.58g for group I, II, III, IV, V,VI and VII, respectively. This may be due to variation of feeding systems. Foliage consumed by grazing goats may be deficient in nitrogen, energy minerals

and vitamins, considering that an increase digestibility with supplementation, and subsequently improved animal performance (Moniruzzaman *et al.*, 2002; Kabhir *et al.*, 2004)^[10, 6]. Supplementation needs within forage based systems or a direct response of the presence or lack of adequate nutrients and to increase the grazing capacity under pasture and range conditions (Arthington and Brown, 2005)^[2]. Supplementation can also provide a vehicle for carrying non-nutritive additives, antimicrobials and other compounds for the prevention or treatment of potential health problems such as parasitism, and to facilitate management (Lusby, 1990)^[9]. Among the groups, group VII animals gained higher ADG (70.58 g) followed by group IV & V (60.48, 60.83g, respectively) in compare with other groups. Arthington and Brown (2005)^[2] reported that, stall fed goat require maintenance as they live in the she'd throughout the day. This implies high ADG in this study. The higher ADG might be attributed to the supplementation of Nutrients in the feed/feed ingredients. Similarly, Nagpal *et al.* (1995) reported higher body gain in intensive Kutchi and Sirohi goats. Higher ADG in Group IV & V due to more efficient utilization offered feed ingredient (Table 1).

The increase ADG in group V might be due to the supplementation of protein intent measure as fiber forage intake and growth performance of goats by complementary DM intake response (Yue-Ming *et al.*, 2005)^[16], maximum rumen fermentation (Schacht *et al.* 1992)^[11].

Meanwhile, the growth rates of the grazing goats was (40.25g/day for Kanni Adu) comparable to those reported before.

DMI was significantly higher in goats supplemented with feed/ feed ingredients at rate of body weight (i.e., group VII followed by group III& VI) compared supplementation at the rate of @1% body weight- The efficiency of feed utilization of weight gain is more in group IV and V animals.

Additional cost of feed/feed ingredient supplementation is higher in stall feeding group followed by concentrate feed supplementation at the rate of 1.5% of body weight animals and protein supplemented animals. However, such intensive feeding system should be practiced with capable farmers who grow irrigated forages in their farms, but not in villages and pastoral areas where feeds are very scarce particularly during summer. Lowest cost of feed per unit weight change was obtained in maize supplemented group followed by GNC supplemented group compared with other feeding systems. This might be due to lower price of Maize compared to other feed/ feed ingredient- More returns obtained from Maize supplementation at the rate of 1% of body weight had a greater impact on returns or profitability than other factors like breed. Present study shows that, higher body weight does not gain by supplementing either energy nor protein supplementation through feed ingredient with lower cost. This also offers an opportunity for lower cost supplementation strategy as the higher efficiency of goats under the maize supplementation was translated in to lower cost of feeding. However, establishing the balance between protein and energy sources for optimum performance of goats needs to be evaluated.

Table 1: The balance between protein and energy sources for optimum performance of goats

Treatment	1	2	3	4	5	6	7
Initial Body Weight(kg)	13.45 ±0.64	13.55 ±0.73	13.59 ±0.76	13.63 ±0.77	13.68 ±0.73	13.59 ±0.77	13.86 ± 0.91
Final Body Weight(kg)	18.37±0.89	19.71 ±0.86	20.44 ±0.96	21.26 ±0.25	22.65 ±1.37	20.67 ±1.20	22.33 ±1.13
Weight gain (kg)	4.93 ^a ±0.42	6.16 ^{ab} ±0.45	6.85 ^{abc} ±0.55	7.60 ^{bcd} ±0.86	8.97 ^d ±0.81	7.08 ^{bcd} ±0.76	8.46 ^{cd} ±0.66
Extra weight gain over control	-	3.37 ^a ±0.88	2.66 ^a ±0.72	3.13 ^a ±0.77	4.50 ^a ±0.68	3.56 ^{ab} ±0.76	3.54 ^{ab} ±0.65
Quantity of concentrate feed/ Feed ingredient offered(Kg)	-	24.49 ±1.31	25.51 ±1.28	28.69 ±1.31	30.68 ±1.40	34.09 ±1.57	37.58 ±1.54
Cost of concentrate feed/ Feed ingredient offered(Rs/Kg)	-	20.25±6.00	20.25± 6.00	14.00±4.50	30.00±8.50	20.25± 6.00	20.25±6.00
Cost of feeding concentrate feed/ Feed ingredient (Rs)	-	495.94 ±26.62	516.73 ±26.08	401.78±18.47	920.45 ±42.17	690.45 ±31.83	761.14 ±31.32
Cost of concentrate feed or Feed ingredient /Kg extra weight gain(Rs)	-	171.25 ±46.28	223.06 ±46.28	115.68 ±54.27	350.54 ±48.54	493.99 ±54.27	201.99 ±46.28

Note: ^{abcd} means with different superscripts in a row differ significantly ($P < 0.05$).

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