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FEEDING STRATEGIES FOR THE PERFORMANCES OF GOAT BREEDS OF TAMIL NADU

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Abstract: To analyse the goat farming practices adopted by farmers under field conditions, a study was conducted in southern agro-climatic region of Tamil Nadu. Majority of the goat farmers maintaining non-descript goats (71.67 per cent) in their herds and in Thoothukudi and Virudhunagar districts. Kodi adu goats (15 per cent) and Kanni adu (13.33 per cent) were predominantly reared by the goat farmers. Farmers had an average of 10.41 ± 0.46 years of experience in goat farming. Semi-intensive system (63.33 per cent) of rearing was mostly practiced by the goat farmers followed by extensive (33.33 per cent) and intensive system (3.34 per cent). Common property resources (51.67 per cent), harvested fields (20.56 per cent), forest or road sides (24.44 per cent) were the major grazing areas for goats. Among the tree fodders, *Moringa oleifera, Leucaena leucocephala* and *Phyllanthus reticulates* are identified as superior in terms of better crude protein content. Locally available foliages contain more nutrient content as DM (27.99 per cent) and DCP (14.07 per cent) and among the foliages *Digeria agvensis, Corchorus olitorius and Merremia emerginata* were identified better for their crude protein content. The average nutrient content of various supplements (dry fodders and homemade concentrate) in terms of dry matter and crude protein were 90.36 and 15.20 per cent, respectively. Highly significant difference ($P< 0.01$) was observed in 3, 9, 12 months body weight (kg) of goats in three districts. Highly significant difference ($P< 0.01$) was observed between the breeds (Kanni adu, Kodi adu and non-descript goats) in their body weight (kg) at birth, 3 months and 6 months. Non - descript breeds of goats at 4 teeth, 6 teeth and full mouth stage had significant difference in body weight ($P< 0.01$).
Keywords: Goats - Feeding strategy - Performance – Management.

Introduction

Distribution of goats found all over the world due to their wide adaptability to varying environmental conditions and the different nutritional regimes under which they are evolved and subsequently maintained. Goats are considered as a mobile bank and often termed mortgage lifter and automatic teller machine for the weakest section of society and ray of hope in the areas where agriculture is not economically viable and ecologically sustainable. India possesses the second largest number of goats (135.54 millions) in the world which form an integral part of rural farming structure. Tamil Nadu is endowed with three recognised

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breeds of goats viz. Kanni adu, Kodi adu and Salem black which are belongs to meat type with the population of 8.18 million which contributes 6.05 per cent in total population of goats in India (Livestock census, 2012).

Materials and Methods

To document the feeding strategies of goats under different systems of management, a study was carried out in southern agro-climatic regions viz., Tirunelveli, Thoothukudi and Virudhunagar districts of Tamil Nadu. The villages were selected in consultation with the Department of Animal Husbandry, Government of Tamil Nadu of the selected districts on the basis of goat population existing there and goat herds were selected at random. A total of 180 goat herds from 60 villages spread in thirty blocks in three districts (Tirunelveli, Thoothukudi and Virudhunagar) were selected using multi-stage random sampling technique. The details of body weight at different age groups in Kanni goats, Kodi goats and Non-descripts were properly documented in different feeding strategies followed by the farmers and statistically analysed.

Results and Discussion

In all the three districts, majority of the farmers maintained non-descript breeds (71.67 per cent) followed by Kodi adu goats (15.00 per cent) and Kanni adu goats (13.33 per cent). Kanni adu goats are predominantly (30.00 per cent) reared in Virudhunagar district whereas Kodi adu goats are reared in (35.00 per cent) Thoothukudi district. Chi-square test revealed that there was a significant association ($P<0.05$) between the goat breeds and districts.

Table 1. Pervasiveness of goat breeds in the study area

District	Goat breeds			Overall	Chi-square
	Tirunelveli	Thoothukudi	Virudhunagar		
Kanni adu	5.00 (3)	5.00 (3)	30.00 (18)	13.33 (24)	**48.04****
Kodi adu	3.33 (2)	35.00 (21)	6.67 (4)	15.00 (27)	
Non-descript	91.67 (55)	60.00 (36)	63.33 (38)	71.67 (129)	

Chi-square test revealed that there was no significant difference observed between the production system and category of herds in Tirunelveli and Virudhunagar districts, whereas chi-square test showed highly significant difference ($P<0.05$) observed between systems of production and category of herds in Thoothukudi district.

Table 2. Systems of goat production (per cent)

Particulars	Name of the District			Overall	Chi - square
	Tirunelveli	Thoothukudi	Virudhunagar		
Extensive	33.33 (20)	26.67 (16)	40.00 (24)	33.33 (60)	**3.07^{NS}**
Semi-Intensive	63.33 (38)	68.33 (41)	58.33 (35)	63.33(114)	
Intensive	3.34 (2)	5.00 (3)	1.67 (1)	3.34 (6)	

The mean grazing duration followed was 6.77 ± 0.25, 7.23 ± 0.33 and 7.10 ± 0.27 h in Tirunelveli, Thoothukudi and Virudhunagar districts, respectively. The overall mean grazing duration followed in the study area was 7.03 ± 0.16 h. No significant difference was observed between the mean duration of grazing and districts. Most of the farmers grazed their animals for more than 8 h (55.56 per cent), while others allowed the animals for 6 to 8 h grazing (23.33 per cent). Few farmers (17.78 per cent) allowed just less than 6 h grazing. Similarly, Gokhale *et al*. (2002) found that 66.27 per cent of the farmers allowed their goats for 6 to 8 h grazing in the selected villages of Maharashtra. Singh and Rai (2006) also observed that more than 65 per cent of the farmers primarily raised the Barbari goats on browsing of shrubs and forest leaves with 6 to 8 h grazing under extensive system of management in Uttar Pradesh. The mean duration (h) and distance covered (km) during grazing for goats followed by goat farmers in the study area is presented in Table 20. The mean distance covered by the goat farmers during the grazing h were 4.83 ± 0.29, 4.95 ± 0.35 and 5.43 ± 0.38 km, respectively in Tirunelveli, Thoothukudi and Virudhunagar districts. The mean overall distance of grazing allowed for goats in the study area was 5.07 ± 0.20 km. There was no significant association observed between the grazing hour and districts. Regarding the grazing area, common property resources (51.67 per cent), harvested fields (20.56 per cent), forest or road sides (24.44 per cent) were available for grazing of goats in southern agro-climatic region of Tamil Nadu. There was a significant ($P<0.05$) association between the grazing area and district.

Table 3. Grazing management (per cent) of goat farming system

Particulars	Category	Districts			Overall	Chi-square
		Tirunelveli	Thoothukudi	Virudhunagar		
Grazing duration (h)	More than 8 hrs	53.33 (32)	58.33 (35)	55.00 (33)	55.56 (100)	**10.40^{NS}**
	6- 8 hrs	15.00 (9)	23.33 (14)	31.67 (19)	23.33 (52)	
	Less than 6 hours	28.33 (17)	13.33 (8)	11.67 (7)	17.78 (32)	
	Not allowed for grazing	3.33 (2)	5.00 (3)	1.67 (1)	3.33 (6)	
Grazing distance (km)	Less than 3 km	30.00 (18)	28.33 (17)	35.00 (21)	31.11 (56)	**3.74^{NS}**
	3 - 5 km	15.00 (9)	25.00 (15)	18.33 (11)	19.44 (35)	
	5-10 km	51.67 (31)	41.67 (25)	45.00 (27)	46.11 (83)	
	Not allowed for grazing	3.33 (2)	5.00 (3)	1.67 (1)	3.33 (6)	
Grazing area	Common property resources	41.67 (25)	58.33 (35)	55.00 (33)	51.67 (93)	**16.59***
	Harvested fields	36.67 (22)	8.33 (5)	16.67 (10)	20.56 (37)	
	Road side areas	18.33 (11)	28.33 (17)	26.67 (16)	24.44 (44)	
	No grazing	3.33 (2)	5.00 (3)	1.67 (1)	3.33 (6)	

The major foliages available in the grazing location of Tirunelveli district were *Cynodon dactylon, Brachiaria mutica, Echinochola colona, Acalypha indica and Phyllanthus reticulates* and they were present in 36.67, 33.33, 8.33, 11.67 and 10.00 per cent, respectively in grazing area. The major foliages available in the grazing location of Thoothukudi district were *Digitaria sanguinalis, Corchorus olitorius, Merremia emerginata, Trianthema portulacastrum and Ziziphus mauritiana* and they were present in 41.67, 35.00, 8.33, 10.00 and 5 per cent, respectively in grazing area. The major foliages available in the grazing location of Virudhunagar district were *Dactylotenium aegyptium, Digeria agvensis, Cyperus rotundus, Cassia auriculata and Abubilon indicum* as 31.67, 18.33, 13.33, 15.00 and 21.67 per cent, respectively in grazing area.

On analysis, the average dry matter and crude protein contents of the locally available foliages (on dry matter basis) offered to the goats were 27.99 and 14.07 per cent, respectively. But in Janshi, Radotra *et al*. (1998) reported that the goats were given

concentrate diet containing 13.73 per cent crude protein. This indicates that goats were able to survive and grow with minimal nutrients in the supplemented diet in addition to grazing. It was observed that 47.22 per cent of the goat farmers were supplementing green fodders to their goats. The practice of dry fodder supplementation was more prevalent in the study area. Nearly 44.44 per cent of the goat farmers were practicing the dry fodder supplementation for their goats.

Azadirachta indica, Tamarindus indica, Leucaena leucocephala, Gliricidia sepium, Morinda pubescens, Ficus religiosa, Sesbania grandiflora, Acacia nilotica and Albizia lebbek were the major tree fodders available for feeding the goats during grazing. Jain *et al*. (2000) reported that the Babul (*Acacia nilotica*) Umbrella thorn (*Acacia planiformis*) and Prosopis (*Prosopis juliflora*) were the major tree species found in south east coastal region of Tamil Nadu and these tree leaves were offered to the Kodi adu breed of goats. Though different varieties of fodders are available in the study area, *Acacia* species are found to be the common one utilised by goats throughout the country. This can be also taken otherwise that wherever *Acacia* species is abundant the farmers are choosing goats for their livelihood. Cheema *et al*. (2011) reported that the tree leaves were rich in crude protein and total digestible nutrients which can meet out the nutritional requirements for goats. The average dry matter and crude protein content (per cent DM basis) offered through tree fodders to the goats were 55.99 and 14.86 per cent, respectively. Nutritional evaluation of some fodder tree leaves was done by Azim *et al*. (2011). In West Bengal, most of the tree leaves offered to the goats contained crude protein and crude fibre level varying between 8 to 15 and 1 to 25 per cent, respectively (Mandal, 1997).

The major foliages available in the grazing location of Tirunelveli district were *Cynodon dactylon, Brachiaria mutica, Echinochola colona, Acalypha indica and Phyllanthus reticulates* in the grazing area. The major foliages available in the grazing location of Thoothukudi district were *Digitaria sanguinalis, Corchorus olitorius, Merremia emerginata, Trianthema portulacastrum and Ziziphus mauritiana* in the grazing area. The major foliages available in the grazing location of Virudhunagar district were *Dactylotenium aegyptium, Digeria agvensis, Cyperus rotundus, Cassia auriculata and Abubilon indicum.* It is peculiar to note that the foliages available in one district were not seen in other districts. This indicates the diversity in the foliages of southern agro-climatic region of state, which is the strength and advantage of these places for goat rearing.

Highly significant difference (P< 0.01) was observed between the breeds (Kanni adu, Kodi adu and non-descript goats) and body weight (kg) at birth, 3 months and 6 months. A significant difference (P< 0.05) was observed in 6 teeth age group. In Kodi adu goats body weight (kg) at 4 teeth and full mouth differed significantly (P< 0.01). Non-descript breeds of goats at 4 teeth, 6 teeth and full mouth had significant difference (P< 0.01). Highly significant difference (P < 0.01) was observed between the body weight at different age groups (2-teeth, 4-teeth, 6-teeth). Kodi adu breed had significantly (P< 0.01) higher body weight at 2 teeth and 4 teeth category compared to other two breeds. But Kanni adu had significantly (P< 0.01) higher body weight in 6 teeth category. In full mouth goats, both Kanni adu and Kodi adu had significantly (P< 0.05) higher body weight than Non-descript goats.

Summary and conclusion

Duration of grazing played a major role for getting adequate nutrition on DM basis in goats. For every one hour full grazing, the goat can meet out 10 per cent of the dry matter from the available foliages, fodders and tree leaves in the grazing location. Majority of the goat farmers preferred to provide the cultivated green fodders and tree fodders to their herd mainly for better weight gain. Where grazing is not available during rainy days, goat farmers were feeding homemade concentrate to the goats to meet out the nutrition requirements. This feeding strategies helps the body weight gain in different categories of animals in different plane of nutrition. Between systems of management a significant difference (P < 0.05) was observed in body weight (kg) at 6 months, highly significant difference (P < 0.01) was found in 12 months age group. In intensive system the rate of weight gain was more at 6 months age since lack of movement favours more weight gain. But, 12 months body weight was higher in extensive system due to the chances of consuming varieties of nutritious roughages in grazing.

Body weight of Kanni adu goats was significantly higher than Kodi adu and non-descript goats. In another comparison, 3 months and 6 months body weights of Kanni adu and Kodi adu were higher than the same age group of non-descript goats. Kanni and Kodi goat are the choice of breeds for goat farming in the breeding tracts and the goat farmers in other parts chosen non descriptive goats. Kanni and Kodi goats fetch more price in markets than non descript goats. Natural foliages and tree fodders play major role for growth performances of goats in southern agro-climatic region of Tamil Nadu.

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