



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(5): 746-749
© 2022 TPI
www.thepharmajournal.com
Received: 19-03-2022
Accepted: 22-04-2022

A Chandra Mouli
Department of Animal
Nutrition, College of Veterinary
Science, Sri Venkateswara
Veterinary University, Tirupati,
Andhra Pradesh, India

B Devasena
Department of Animal
Nutrition, College of Veterinary
Science, Sri Venkateswara
Veterinary University, Tirupati,
Andhra Pradesh, India

MVAN Suryanarayana
Department of Animal
Nutrition, College of Veterinary
Science, Sri Venkateswara
Veterinary University, Tirupati,
Andhra Pradesh, India

G Gangaraju
Department of Animal
Nutrition, College of Veterinary
Science, Sri Venkateswara
Veterinary University, Tirupati,
Andhra Pradesh, India

Corresponding Author
A Chandra Mouli
Department of Animal
Nutrition, College of Veterinary
Science, Sri Venkateswara
Veterinary University, Tirupati,
Andhra Pradesh, India

Feeding practices of Punganur cows adopted by the farmers in four Mandals of Chittoor district of Andhra Pradesh

A Chandra Mouli, B Devasena, MVAN Suryanarayana and G Gangaraju

Abstract

A survey was carried out in four mandals viz., Palamaner, Chittoor, Bangarupalem, Pakala of Chittoor district, Andhra Pradesh to understand the feeding practices traditionally followed by the farmers maintaining lactating Punganur cows. The information was obtained from 50 farmers in a pre-structured proforma by personal interviewing the livestock farmers. Results indicated that, among the dry roughages Paddy straw was fed to the animals by majority of the farmers (38.5-66.7%), followed by Bajra straw (16.6-40%), while Ragi straw (16.7-38.5%) was being used to a limited extent. Among the green fodders majority of farmers were feeding Hedge Lucerne (25-60%), followed by Super Napier (15.4-16.6%) and APBN (13.3-25.0%). While CO-4 (13.3%), Lucerne (23.1%), Cowpea (20%) were being used to a limited extent. Feeding of Homemade concentrate mixture (HMCM) is a common practice. The Maize grain and ground nut cake (GNC) combination (HMCM-I) was most preferred one (36%). Whereas few farmers were preparing the homemade concentrate mixtures of different combinations, like DORB + Green gram chuni + Cotton seed cake (HMCM-II) and DORB + Mustard cake (HMCM-III), to a limited extent (20% and 10%), depending on the availability of the ingredients. The Nutritional status of lactating Punganur cows indicated that DMI (%) and CP intake (%) of the animals indicated deficiency of (-) 17.29% and (-) 28.05%, respectively. While the TDN intake (%) was on positive side (+18.42%) as compared to ICAR, (2013) recommendations for dairy cattle. The milk yield was in the range of 1.20-1.42 kg/d, whereas milk composition indicated marginal variation, except for fat.

Keywords: Punganur cows, feeding practices, paddy straw, green fodder, home-made concentrate mixture, nutritional status

1. Introduction

India has been blessed with a large repository of indigenous bovine population (*Bos indicus*) with rich biodiversity. Indigenous cattle in India are robust, resilient and are particularly suitable to the climate and environment of their respective breeding tracts. They are endowed with qualities of heat tolerance (Kapila *et al.*, 2013) ^[5], resistance to diseases and ability to thrive under extreme climatic stress and less optimal nutrition (Srivastava *et al.*, 2019) ^[12]. In recent years, several indigenous breeds suffered decline mainly due to their crossbreeding with exotic breeds and the large-scale mechanization of agricultural operation. Hence it is not only essential to promote conservation and development of indigenous breeds but also to enhance productivity through professional management and appropriate nutrition.

Dwarf cattle breeds have special niche in the context of sustainability because of their limited feed requirements. Their smaller body size, good grazing habits, adaptability to local conditions, resilience to diseases, less feed requirement are beneficial to farms with marginal or landless dairy farmers (Srinivas and Ramesha, 2014). Less attention was focused on improvement of dwarf cattle breeds in the past owing to their low milk yield without giving much consideration to other advantages.

Punganur is a unique dwarf cattle breed which originated from Chittoor district of Andhra Pradesh in Southern India is one among the world's smallest humped (*Bos indicus*) cattle breed. The breeding tract is confined to Vayalpad, Madanapalle, Palamaner mandals of Chittoor district. They are fair milkers producing 2-3 Kg milk per day and were known as the "Poor man's cow" (Narendranath, 1993). In order to maximize the milk production, it is necessary to meet the nutritional requirements of the animal by appropriate feeding method suitable for the agroclimatic conditions. Taking the facts in to consideration, a survey was carried out to explore and assess the feeding practices adopted by the farmers, nutrient requirements and nutritional gap in lactating Punganur cows in its home tract of Chittoor district.

2. Materials and Methods

2.1 Study of feeding practices adopted by the farmers

A field survey was conducted in the surrounding villages pertaining to Palamaner, Chittoor, Bangarupalem and Pakala mandals of Chittoor district, Andhra Pradesh. A Pre-structured questionnaire is used to obtain the information from the farmers. During the survey, the information regarding the type of green forages, dry roughages, concentrate ingredients/concentrate mixture, along with the quantities fed to the cows was collected from the farmers maintaining Punganur cows. The feeds and fodders samples offered were collected from individual farmers to assess the nutrient intake and nutritional status of the lactating Punganur cows.

2.2 Estimation of nutrient intake

Body weight of animals was arrived by using Shaeffer's formula (Length in inches) X (Girth in inches) 2 /300 = body weight (lbs) as suggested by Sastry and Thomas (1983) [11] and then converted to Kilograms. The intake of different feeds and milk production quantities were recorded on the day of survey. The amount of dry matter (DM), digestible crude protein (DCP) and total digestible nutrients (TDN) available to the animals were calculated from the actual measurements of feed and fodder intake made during sample collection, by using the average nutritive values of various feeds and fodders as per ICAR (2013) [2]. The estimated supply of the DM, DCP and TDN to the lactating animals were compared with the standard nutrient requirements for cattle in India (ICAR, 2013) [2].

2.3 Milk composition

Representative samples of milk were collected in to sterile milk sample bottles at the time of survey and were analysed for fat, solids not fat (SNF), protein, lactose, by using Milkoscan Minor type 78110.

3. Results and Discussion

3.1 Feeding practices adopted by the farmers

3.1.1 Dry Roughages

The survey on feeding practices adopted by farmers (%) in four mandals viz., Palamaner, Chittoor, Bangarupalem, Pakala mandals of Chittoor district (Table 1) revealed that Paddy straw was the major dry roughage offered by the farmers (38.5-66.7%) and Bajra straw was second major dry roughage offered by the limited number of farmers (16.6-40%). While Ragi straw was being used to a limited extent (16.7-38.5%) for feeding Punganur cows in Chittoor district. The survey results of several authors (Reddy Varaprasad, 2011; Devasena, 2012; Suresh babu and Sarjan Rao, 2013; Subramanyam *et al.*, 2016) [9, 1, 14, 13] also indicated similar type of roughage feeding to lactating crossbred cattle in different regions of Andhra Pradesh.

3.1.2 Green Forages

Among the green roughages majority of farmers (25-60%) were feeding Hedge lucerne to the animals, followed by Super Napier (15.4-16.6%) and APBN (13.3-25.0%). While CO-4 (13.3%), Lucerne (23.1%), Cowpea (20%) were being offered to a limited extent for feeding Punganur cows in Chittoor district. Present findings are well correlating with Ramesh (2006) [8] and Suresh babu and Sarjan Rao (2013) [14] who also reported that legumes were fed in majority of the occasions to the crossbred cattle, followed by non-legumes. Findings of

Parameshwara *et al.* (2020) [7] revealed that feeding of cultivated grasses is limited (11%) in Malnad Gidda as compared to naturally available grass (89%) as grazing resource.

3.1.3 Concentrate feeding

Feeding of concentrate ingredients in the form of homemade concentrate mixture (HMCM) is a common practice. The farmers in the Chittoor district were offering Punganur cows with different types of homemade concentrate mixtures (HMCM), among which Maize grain and ground nut cake (GNC) combination (HMCM-I) was the most preferred concentrate mixture by the farmers (36%). The other ingredients were also used in homemade concentrate mixtures with different combinations, like DORB + Green gram chuni + Cotton seed cake (HMCM-II) and DORB + Mustard cake (HMCM-III), but to the limited extent (20% and 10%). Commercial compounded cattle feed either in the (mash or pellet) form was used by few farmers (4-18%) in the surveyed area. The situation observed was similar to the reports of several reports (Ramesh, 2006; Reddy Varaprasad, 2011; Devasena, 2012; Suresh babu and Sarjan Rao, 2013; Subramanyam *et al.*, 2016) [8, 9, 1, 14, 13] regarding feeding of homemade concentrate mixture to the productive animals, while feeding of compounded concentrate mixture was limited to progressive farmers (Ramesh, 2006; Reddy Varaprasad, 2011; Sabapara *et al.*, 2015) [8, 9, 10].

3.1.4 Mineral mixture and salt

Mineral mixture utilization was not regular except for occasional therapeutic use as recommend by veterinarian. Around 5-10% of farmers were using common salt regularly in the surveyed area.

The differences in feeding systems followed in cattle depends on seasonal availability of pasture and fodder, cropping pattern followed in the region, agroclimatic condition in the areas, availability of feed ingredients and economical status of the farmer under study (Sabapara *et al.*, 2015) [10].

3.2 Nutritional status of lactating Punganur cows

The data related to feeds and fodders offered (quantity), body weight, milk yield of lactating Punganur cows were recorded for individual cow during the survey. After collection of data, the nutritional status of the lactating Punganur cows in four mandals of Chittoor district was assessed in terms of dry matter (DM), digestible crude protein (DCP) and total digestible nutrients (TDN) and was compared with the standards (ICAR, 2013) [2].

3.2.1 Dry matter intake

The average dry matter intake (kg/d) in the surveyed area was 4.64 (kg/d/head) which is majorly from Paddy straw and bajra straw (Table 2). Hedge lucerne was the major green fodder used followed by Super Napier, APBN, CO-1, and cow pea to a limited extent. There was a deficiency of 17.29% in the DM required for the animals, when compared to the requirements (ICAR, 2013) [2].

3.2.2 Crude protein intake

The average crude protein intake found to be 295 (g/d/head), which was supplied by Hedge lucerne and home-made concentrate mixture (Maize grain + Ground nut cake combination) by majority of the farmers. There was a deficiency of 28.05% in the DCP required as compared to its

supply (ICAR, 2013) [2]. Farmers generally did not attempt to fill the gap by feeding supplementary feeds, reported to be due to low production capacity of the animals, low purchasing power and lack of knowledge (Jarial *et al.*, 2013) [3].

3.2.3 Total digestible nutrients

The TDN supplied to the farmers in the study area was 2.25 (kg/d/head) when compared to the requirements. It was 18.42% excess. As the major quantity of dry matter was from straws and limited quantity of concentrates that might have resulted in the excess TDN intake.

As The majority of the studies (Ramesh, 2006; Kannan *et al.*, 2011; Devasena, 2012; Lakshmi Narayana, 2020) [8, 4, 1] carried out in this area were on the crossbred cows, which also reported the deficiency of nutrient supply in terms of (DMI 15.6-19%, DCP 6.56-28.84% and TDNI 7-31%) to the cattle reared by the farmers. This indicated that might be due to the lack of knowledge regarding the scientific feeding or due to the low production capacity of the animals.

The availability of the nutrients to the animals depends on feeds and fodders offered, seasonal availability of pasture,

fodder and concentrates, topographical conditions, cropping pattern, land holding capacity and economic status of the farmers (Sabapara *et al.*, 2015) [10].

3.3 Milk yield and composition of lactating Punganur cows maintained by farmers in four mandals of Chittoor district

The average milk yield (Kg/d) and composition (%) of lactating Punganur cows maintained by the farmers in four mandals of Chittoor district are given in the Table 3. The average milk yield (Kg/d) was 1.42, 1.32, 1.20 and 1.41 in Palamaner, Chittoor, Bangarupalem and Pakala mandals, respectively. The average milk composition (%) in terms of Fat (4.66-5.02), SNF (9.41-9.62), Protein (3.36-3.55), Lactose (4.01-4.29) and Total solids (14.25-14.62) in Palamaner, Chittoor, Bangarupalem and Pakala mandals indicated marginal variation, except for fat. The milk composition observed in the present study is corroborating with the range reported by Venkata Ramana *et al.* (1996) [15] and Manjunatha *et al.* (2020) [6] in Punganur and Malnad Gidda cows which are dwarf breeds.

Table 1: Percent of farmers adopting different feeding practices in four mandals of Chittoor district rearing lactating Punganur cows

Feed Stuffs	Mandals				
	Palamaner	Chittoor	Bangarupalem	Pakala	Overall
	(n=15)	(n=13)	(n=12)	(n=10)	(n=50)
Dry Roughages					
Paddy straw alone	66.7	38.5	66.7	60.0	58.0
Bajra straw	33.3	23.0	16.6	40.0	28.0
Ragi straw	-	38.5	16.7	-	14.0
Green Roughages					
Super Napier	-	15.4	16.6	-	8.0
APBN	13.3	-	25.0	20.0	14.0
CO-4	13.3	-	-	-	4.0
Para grass	-	-	-	20.0	4.0
Hedge Lucerne	53.3	38.4	25.0	60.0	44.0
Lucerne	-	23.1	-	-	6.0
Cow pea	20.0	-	-	-	6.0
Concentrate mixtures					
HMCM-I	40.0	38.4	41.6	20.0	36.0
HMCM-II	46.6	-	25.0	-	20.0
HMCM-III	-	23.1	-	20.0	10.0
CCF-P	13.3	23.1	16.6	20.0	18.0
CCF-M	-	-	-	20.0	4.0

HMCM-Homemade concentrate mixture,
 HMCM-I (Maize + Ground nut cake),
 HMCM-II (De-oiled rice bran + Green gram chuni + Cotton seed cake),
 HMCM-III (De-oiled rice bran + Mustard cake),
 CCF-P-Commercial concentrate feed pelleted,
 CCF-M-Commercial concentrate feed mash,

Table 2: Nutritional status of lactating Punganur cows in four mandals of Chittoor district

Name of Mandals	No. of cows	Dry matter intake (DMI Kg/d)			Crude protein intake (CPI g/d)			Total digestible nutrient intake (TDNI Kg/d)		
		Required	Supplied	% Excess/Deficit	Required	Supplied	% Excess/Deficit	Required	Supplied	%Excess/Deficit
Palamaner	15	5.58 ± 0.16	4.74 ± 0.33	-15.05	398 ± 10.2	337 ± 24	-16.08	1.92 ± 54.24	2.35 ± 0.15	+22.39
Chittoor	13	5.66 ± 0.19	4.84 ± 0.26	-14.48	425 ± 13.6	307 ± 31	-27.76	1.88 ± 55.66	2.29 ± 0.13	+21.80
Bangarupalem	12	5.88 ± 0.21	4.61 ± 0.23	-21.59	427 ± 19.0	272 ± 26	-36.29	1.98 ± 56.43	2.26 ± 0.13	+14.14
Pakala	10	5.32 ± 0.19	4.39 ± 0.24	-17.48	393 ± 17.9	267 ± 23	-32.06	1.82 ± 56.38	2.11 ± 0.11	+15.93
Overall	50	5.61 ± 0.11	4.64 ± 0.09	-17.29	410± 8.87	295± 16	-28.05	1.90 ± 0.03	2.25± 0.05	+18.42

Table 3: Milk yield and composition of lactating Punganur cows in four mandals of Chittoor district

Mandals	No. of cows	Milk yield (Kg/d)	Milk composition (%)				
			Fat	SNF	Protein	Lactose	Total solids
Palamaner	n=15	1.42 ± 0.16	4.84 ± 0.18	9.41 ± 0.06	3.47 ± 0.07	4.25 ± 0.13	14.25 ± 0.08
Chittoor	n=13	1.32 ± 0.21	4.97 ± 0.11	9.49 ± 0.05	3.49 ± 0.13	4.29 ± 0.11	14.47 ± 0.17
Bangarupalem	n=12	1.20 ± 0.18	5.02 ± 0.13	9.42 ± 0.06	3.36 ± 0.12	4.13 ± 0.15	14.62 ± 0.13
Pakala	n=10	1.41 ± 0.33	4.66 ± 0.13	9.62 ± 0.08	3.55 ± 0.11	4.01 ± 0.21	14.26 ± 0.15
Overall	n=50	1.34 ± 0.25	4.92 ± 0.11	9.49 ± 0.04	3.47 ± 0.03	4.17 ± 0.04	14.40 ± 0.08

4. Conclusion

A Comprehensive survey of feeding practices adopted by the farmers rearing Punganur cows in four mandals viz., Palamaner, Chittoor, Bangarupalem, Pakala of Chittoor district indicated that among the dry roughages Paddy straw was fed to the animals by majority of the farmers followed by Bajra straw, while Ragi straw was being used to a limited extent. Feeding Hedge Lucerne was predominant among the fodders followed by Super Napier and APBN. Concentrate feeds in the form of Homemade concentrate mixture (HMCM) is a common practice and Maize grain and ground nut cake (GNC) combination was most preferred one, while other combinations to a limited extent depending on the availability of the ingredients. It was observed that the animals under study were showing marginal deficiency of DM and moderate deficiency of DCP, which may be corrected by providing concentrate feed (about 500-1000g or 400-500g of ground nut cake or with 1-1.5 kg of chuni or bran). The quantity of homemade concentrate mixture can be reduced and protein supplement can be increased. The milk yield was in the range of 1.20-1.42 kg/d, whereas milk composition indicated marginal variation, except for fat.

Using of good quality feeds and adoption of supplemental feeding in respect to energy, protein and crude protein would be beneficial to improve nutritional status of the animals and there by productivity.

5. Acknowledgement

The financial support rendered by NAHEP (National Agricultural Higher Education Project) to carry out the research is highly acknowledged.

6. References

- Devasena B, Ramana JV, Prasad P, Eswara Prasad J, Rama. Nutritional Status of Crossbred Cattle in Chittoor District of Andhra Pradesh. *Indian Journal of Animal Nutrition*. 2012;29(4):377-383.
- ICAR. *Nutrient Requirements of Cattle and Buffalo*. Published by ICAR, New Delhi, 2013.
- Jarial S, Anil K, Padmakumar V. Assessment of feeding practices, nutritional status, and gap for dairy buffaloes in hilly districts Tehri Garhwal and Pithoragarh of Uttarakhand, India. *Indian Journal of Animal Science*. 2013;83(9):960-963.
- Kannan A, Garg MR, Kumar BV, Mahesh. Effect of ration balancing on milk production, microbial protein synthesis and methane emission in crossbred cows under field conditions in Chittoor district of Andhra Pradesh. *Indian Journal of Animal Nutrition*. 2011;27(2):103-108.
- Kapila N, Kishore A, Sodhi M, Sharma A, Mohanty AK, Kumar P, *et al*. Temporal changes in mRNA expression of heat shock protein genes in mammary epithelial cells of riverine buffalo in response to heat stress *in vitro*. *International Journal of Animal Biotechnology*. 2013;3:3-9.
- Manjunatha HT, Thirumalesh T, Nagabhushana V, Shettar VB. Effect of Different Levels of Energy and Protein on Performance of Lactating Malnad gidda cows. *Indian Journal of Animal Nutrition*. 2020;37(3):227-234.
- Parameshwara Prathapa Simha BV, Veeranna KC, Manjunatha L, Vijayakumar B, Gopala GT, Krishnamurthy TN, *et al*. Breeding and feeding practices of malnad gidda cattle in malnad region of Karnataka. *Journal of Entomology and Zoology Studies*. 2020;8(3):218-222.
- Ramesh S. Assessment of Feeding Systems and Mineral Status of Animals in Mahaboobnagar District of Andhra Pradesh. M.V.Sc. thesis, Acharya N.G. Ranga Agriculture University, Rajendranagar, Hyderabad, 2006.
- Reddy Varaprasad. A study on the performance of Jersey X Sahiwal crossbred cows in progeny testing implemented areas of Chittoor district, M.V.Sc thesis, Sri Venkateswara Veterinary University, Tirupati, 2011.
- Sabapara GP, Fulsoundar AB, Kharadi VB. Milking and health Care management practices followed by dairy animal owners in rural areas of Surat district. *Scholars Journal of Agriculture and Veterinary Sciences*. 2015;2(2A):112-117.
- Sastry NSR, Thomas CK, Singh RA. Shaeffer's Formula for body weight of cattle described in *Farm Animal Management and Poultry Production*. 1983 (5th Edition), Vikas Publishing House, India.
- Srivastava AK, Patel JB, Ankuya KJ, Chauhan HD, Pawar MM and Gupta JP. Conservation of indigenous cattle breeds. *Journal of Animal Research*. 2019;9(1):1-12.a
- Subramanyam Prasad RMV, Venkateswarlu S. Livestock rearing practices and knowledge levels of dairy farmers in Kadapa district of Andhra Pradesh. Paper presented in International Livestock conference and Expo on "Innovative designs, implements for global environment and entrepreneurial needs optimizing utilitarian sources, Indigenous and 23rd Annual convention of Indian Society of Animal Production and Management", Hyderabad, India, 2016, 28-31.
- Suresh Babu, Sarjan Rao. Feeding Practices of Cattle Adopted by the Farmers in Four Mandals of Chittoor District of Andhra Pradesh. *International Journal of Scientific Research*. 2013;2(6):2277-2281.
- Venkata Ramana K, Rama Prasad J, Suresh J. Studies on The Effect of Different Feeding Systems on Yield and Composition of Milk, Nutrient Digestibility and Growth Performance of Punganur Cattle. M.V.Sc Thesis, Sri Venkateswara Veterinary University, Tirupati, India, 1996.