

Socio-Economic Dynamics and Management Practices Tailed for Palla Sheep of Andhra Pradesh: Insights into a Traditional Livelihood

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ABSTRACT

The present study was carried out to explore the socio-economic status and husbandry practices followed by 88 shepherds rearing Palla sheep from 304 flocks of 38 mandals of four revenue divisions of Nellore district which is the sole breeding tract of Palla sheep in India. Most of the sheep flocks (95%) were reared by family members and majority of shepherds (79.93%) raised sheep using both stationary and migratory methods. The average migration distance of Palla flocks was 74.88 km. Majority of the farmers (92.04%) provided shelter at night and the nature of houses varied from part of residence (61.35%) to separate houses (38.65 %). The open and closed type of housing was followed in 59% and 40% of the flocks, respectively, and most of the sheep habitations were having thatched roofs (68.18%). Grazing (79.50%) in the field was the popular method of feeding and varied from 6 h to more than 8 h. Majority were having primary education (73.86%) and the family size was medium (59%) with an average of 5.22 persons per family. Most of the shepherds choose ovine husbandry as a primary occupation (93.18%) and 67% were earning between Rs. 75,000 to 1,00,000 per annum. The mortality rate in lambs and adults was more than 20% and 6-10%, respectively.

Key words: Breeding tract, Husbandry practices, Palla sheep, Socio-economic status.

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INTRODUCTION

Sheep husbandry in India is an age-old practice where the real custodians of sheep genetic diversity have been rural, smallholding pastoralists. Sheep are relatively drought tolerant, small in size, easy to manage and serve as a form of liquid capital by contributing meat, wool, fertilizer and leather to their owners.

India is having rich repository of animal genetic diversity consisting of 45 recognized and registered sheep breeds (www.nbagr.res.in). The total population of sheep in India is 74.26 million (20th Livestock census, 2019) and stood at 2nd place after China (163.48 million), making up about 4.03% of total global population (FAOSTAT, 2019). Approximately 70% of India's sheep population lives in the southern states. There had been a notable growth in the sheep population from livestock census, 2012 to 2019 in India (14.13%) and Andhra Pradesh (30%). The later ranks second in the country accounting about 23.70% of total population after Telangana (25.72%).

Macherla and the Nellore are the two sheep breeds that are officially recognized in Andhra Pradesh. Nellore breed ranks highest in the category among indigenous breeds in India, accounting for 19.17% of the total (DAHDF, 2013). It is the tallest mutton purpose sheep breed known for its heavy body weight. Based on coat colour pattern, it consists of three strains, viz., Jodipi (white with brown patches), Brown (complete brown) and Palla (white). Jodipi is reared in almost all the parts of Andhra Pradesh and Telangana States, whereas, Palla and Brown are confined to Nellore district and

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Royalaseema region (Kurnool, Chittoor, Anantapur, Kadapa districts) of Andhra Pradesh respectively. Even though, the Palla sheep is known for meat production, restricted breeding tract of Palla sheep and shift in demand to rear Jodipi strain for meat production due to higher slaughter rate might be the reason for declining Palla population in the native tract. The present study was undertaken with an aim to bring to notice the socio-economic status and the traditional husbandry practices followed by the shepherds rearing Palla sheep which enables to find the suitability for conservation

and formulate appropriate breeding strategies to enhance improvement in their production potentials.

MATERIALS AND METHODS

The habitat and distribution of Palla sheep was ascertained by visiting 304 flocks in 38 mandals across four revenue divisions of Nellore district of Andhra Pradesh. Through questionnaires, primary data on housing pattern, feeding, breeding and other animal husbandry procedures were gathered from the shepherds. Veterinary hospitals and dispensaries were visited in order to record the occurrence of diseases of these sheep in the breeding tract. To study the socio-economic status, data from 88 shepherds were collected regarding information on family size and income generated through sheep rearing. χ^2 test was used to assess the shepherds for their socio-economic status and also various husbandry practices followed by them.

RESULTS AND DISCUSSION

Breeding Tract of Palla Sheep

Nellore district of Andhra Pradesh solely represents the breeding tract and takes the pride in being possessor of Palla sheep flocks since long back. Pure flocks are seen only in Atmakur, Kaluvoye and Chejerla mandals of Atmakur revenue division. Palla is the predominant among the three varieties of Nellore sheep (Acharya, 1982) but recent findings reported a drastic reduction in number (Harini, 2017).

Topography of the Breeding Tract

SPSR Nellore is the southernmost district of one of the nine erstwhile coastal districts of Andhra Pradesh where agriculture is the primary occupation for the people. It lies between 14°6' and 15°51' of the Northern Latitude and 79°0' and 80°42' of the Eastern Longitude spreading over an area of 10,440 sq.kms accounting for about 6.40 % of total area of the state. The climate is generally dry and it lies on the area of precarious with uncertain rainfall.

The majority of shepherds are using tree leaves such as Neem, Tamarind, Acacia, Subabul, Sesbania, natural grasses viz. *Heteropogon contortus*, and *Dicanthium annulata* etc., and diverse range of weeds prevalent in the grazing lands and wastelands to feed these sheep.

Flock Husbandry Practices

The flock husbandry practices such as size of the flock, source of animals, type of flock rearing followed by the shepherds assessed from 304 flocks are presented in Table 1. Most of the sheep flocks (95%) were reared by family members, while, the rest depended on hired labour. Chi-square test indicated that there was significant heterogeneity among the flock sizes, source of animals used and type of flock rearing with majority of the flocks in the category of smaller flock size. Out of 304 flocks, the average flock size of Palla sheep in the

pure flocks was 65±0.98 that comprised of 39 ewes, 1.3 rams and 24 lambs.

Table 1: Flock information of Palla sheep (N=304 flocks)

Item	Category	N	%	χ^2 value
Flock size	30-50	130	42.76	41.79**
	51-80	126	41.44	
	>100	48	15.78	
Source of animals	Rams			
	Home grown	73	24.01	13.62**
	Purchased	106	34.86	
	Both	125	41.11	
	Ewes			
	Home grown	234	76.97	272.61**
Purchased	7	2.30		
Both	63	20.72		
Type of flock rearing	Migratory	20	6.57	301.21**
	Stationary	41	13.48	
	Both	243	79.93	

** Highly significant ($p < 0.01$).

Housing Practices Followed

The housing pattern followed by the sheep farmers are shown in Table 2. The study noted that, majority of the farmers (92.04 %) provided shelter at night. by confining them in backyards next to their residences or in croplands. Similar practices were also reported by Thiruvankadan *et al.* (2004), and Kumar *et al.* (2006) in Mecheri, and Muzaffarnagri sheep breeds, respectively. The nature of houses and the type of roof used for housing observed in the present study is in accordance with the findings of Haripriya *et al.* (2018) in Madras Red sheep and Reddy *et al.* (2020) in Macherla sheep.

Mud/gravel was used for kutcha flooring while cement, stone, bricks were used for pucca flooring as also reported by Sharma (2001). In contrast to the present study, Haripriya *et al.* (2018) reported that 72 % of the farmers followed open housing in Madras Red sheep. Chi-square results revealed a significant difference among shepherds with respect to housing practices.

Table 2: Housing pattern of Nellore Palla sheep flocks (n=88 shepherds)

Housing	Category	n	%	χ^2 value
Provision of housing	Yes	82	95.65	65.64**
	No	6	4.34	
Housing provided during	Day time	2	2.27	131.70**
	Night time	81	92.04	
	Both	5	5.68	
Nature of housing	Separately	34	38.65	19.17**
	Part of residence	54	61.35	

Type of housing provided	Open	52	59.09	12.034**
	Closed	36	40.90	
Floor type of the houses	Kutchra	72	81.18	90.94**
	Pucca	13	14.77	
	Others	3	3.40	
Roof type of the houses	Asbestos	21	23.86	97.00**
	Thatched	60	68.18	
	Tiles	2	2.27	
	Others	5	5.68	

** Highly significant (p<0.01).

Feeding Practices

Grazing in the fields was the most popular method of feeding (79.5 %) Roughly, 20.45 % of farmers adopted grazing and supplementation approach with grains, green fodder, dry fodder, and concentrates especially, for breeding rams and pregnant ewes. This form of additional practice assists in sealing the gap between nutrient requirement and nutrients obtained from grazing. These results were in concurrence with the reports of North coastal sheep of Andhra Pradesh (Anandarao, 2010; Gangaraju, 2010) and Macherla sheep (Reddy *et al.*, 2020). Addition of concentrates in sheep feed enhances the overall growth, skeletal development, fertility and productivity of the animals.

Variation in the grazing time per day could be attributed to factors such as urbanization, desertification, climate change and shift in livestock production methods. The range land forage availability diminishes significantly during the late spring and summer season. To compensate for the reduced forage availability per unit area, sheep often extend their grazing duration and foraging range to meet their daily feeding requirements and disperse more widely. As a result of increased energy expenditure for thermo regulation and decreased feed intake, it ultimately leads to reduction in the production and reproduction efficiency of these animals. To mitigate these challenges and enhance sheep productivity, integrating sheep production with land development activities such as water shed management, afforestation and waste land reclamation is essential. There was a significant difference observed (p<0.01) among the shepherds for various feeding practices followed by them as shown in Table 3.

Table 3: Feeding pattern of Nellore Palla sheep flocks in the home tract (n=88 no. of shepherds)

Feeding Practices	Category	n	%	χ^2 value
Feeding practice adopted	Grazing	70	79.54	86.51**
	Stall feeding	0	-	
	Both	18	20.45	
Form of supplementation	Green fodder	48	54.54	17.49**
	Dry fodder	24	27.27	
	Concentrates	16	18.18	

Grazing time / day	6-8 h	36	40.90	12.03**
	>8 h	52	59.09	
Type of grazing lands available	Community lands	18	20.45	69.91**
	Forests	5	5.68	
	Waste lands	10	11.36	
	All types	55	62.50	
Source of fodder for supplementation	Home grown	35	39.77	47.88**
	Purchased	53	60.22	
	Crop residues	0	-	
Watering	At housing	2	2.27	41.08**
	At grazing	35	39.77	
	Both	51	57.95	
Practice of weaning	Yes	4	4.54	1676.19**
	No	84	95.45	

** Highly significant (p<0.01).

Breeding Practices Adopted

Cohabitation of Palla ewes with breeding rams in grazing areas as well as in pens, result in continuous lambing round the year in pure flocks. The major and minor breeding seasons, are July to September and March to May, respectively. Most of the farmers owned with 30 ewes or more were maintaining breeding rams. Breeding rams were traditionally chosen by farmers based on body size and confirmation. The average male to female ratio was observed as 1: 43.42 in the pure flocks in harmony with other sheep genetic groups of Andhra Pradesh as described by Anandarao (2010; 1:43.81) in North Coastal sheep and Reddy *et al.* (2020) in Macherla sheep (1:39.27) breeds.

Maintaining one ram for every 20-25 ewes is crucial to prevent inbreeding and ensure optimal ram health. Wider male to female ratio of breedable population indicated that there is a shortage of rams for breeding purpose. The inadequacy of proven rams of Palla sheep and haphazard crossbreeding with other strains of Nellore sheep will result in breed dilution and threat to the Palla sheep's genetic integrity and population. It is imperative to disseminate information regarding the benefits of inter-herd breeding to sheep rearers.

Health Management Practices

Health management practices followed by the shepherds such as deworming, vaccination, use of acaricides, knowledge on prevalence of various diseases, treatment, disposal of sick animals and mortality of animals in the flocks are shown in Table 4.

Evaluation of husbandry techniques in Palla strain of Nellore sheep revealed that, the ovine rearing in the breeding tract is mostly conventional, with minimal adoption of modern technologies such as deworming and vaccination that too, relied on government veterinary dispensaries.



Table 4: Health management practices followed by shepherds for Palla sheep (n=88 no. of shepherds)

Health practices	Category	n	%	χ ² value
Practice of deworming	Yes	88	100	88.00**
	No	Nil	-	
Control of ecto-parasites	Yes	62	70.45	14.73**
	No	26	29.54	
Frequency of deworming in a year	Once	Nil	-	79.93**
	Twice	20	22.72	
	Thrice	68	77.27	
Vaccination done	Yes	84	95.45	72.73**
	No	4	4.54	
Prevalence of diseases	Blue Tongue	50	56.8	139.34**
	PPR	72	81.81	
	Pox	25	28.40	
	Enterotoxaemia	65	73.86	
	FMD	6	6.81	
Type of treatment	Traditional	19	21.59	28.41**
	Allopathy	69	78.40	
Disposal of sick animals	By selling	85	96.59	76.41**
	Self-consumption	3	3.40	
Disposal of dead stock	By selling	7	7.95	85.03**
	Throwing animals away	71	80.68	
	By tying to tree	9	10.22	
Information on mortality	Among adults			
	< 5 %	39	44.31	32.50**
	6 – 10%	45	51.13	
	>10%	4	4.54	
	Among lambs			
	< 10 %	18	20.45	6.36**
	11 – 20%	33	37.50	
> 20%	37	42.04		

** Highly significant (p<0.01).

Socio-Economic Attributes

The socio-economic standing of the shepherds of Nellore Palla sheep are listed in Table 5. Palla sheep flocks in all revenue divisions under study were mostly managed by the Yadava community. The farmers’ average family size reported in the present study is higher than the verdicts of the Gangaraju (2010; 2.39), Choudary (2013; 4.34) and Mane *et al.* (2024; 5.12). In contrary, Rajanna *et al.* (2012) reported a higher average family size (5.69) than the current study.

Although all of the farmers in this poll were found to be literate, majority (73.86 %) had only elementary education. Education significantly enhances the effectiveness and efficiency of usage of sheep husbandry practices, leading to

better profitability and productivity. These findings were not in harmony with the reports of Thiruvankadan *et al.* (2004), Virojirao *et al.* (2008), Anandarao (2010), Rajanna *et al.* (2012), Guruprasad *et al.* (2019) and Mane *et al.* (2024) in different studies conducted in various sheep breeds of Tamil Nadu, Andhra Pradesh, Karnataka where the shepherds were either illiterate or few had a primary level of education. On the other hand, Kanakaraja *et al.* (2024) reported 80% of shepherds to have literacy. Awareness about profitability might be the reason for most of the educated people to be involved in sheep farming in this area. Sheep husbandry was chosen as the primary occupation as also reported by of Rao (2012) in Prakasam, and Lavanya *et al.* (2016) in Nellore districts of Andhra Pradesh.

The majority of shepherds (90.20 %) relied on their families to render help for their flocks as a means of support. The average land owned by the farmers, type of land and primary source of income for the choosen shepherds observed in this study were in close agreement with the findings of Saravanakumar (2003), Gangaraju (2010) and Rajanna *et al.* (2012). According to the current survey, the average income of the shepherds in the breeding tract was Rs. 1,01,892 per annum. The combination of small land holdings, adequate land area, fewer labourers and favourable climatic conditions might be key factors for successful sheep farming.

Table 5: Socio-economic attributes of Palla sheep farmers (n=88 no. of shepherds)

Socio-economic attribute	Category	n	%	χ ² value
Family size	Small (up to 3 members)	12	13.63	26.96**
	Medium (4 to 6)	52	59.09	
	Large (above 6)	24	27.27	
Education	Primary school	65	73.86	68.18**
	Secondary school	21	23.86	
	Degree	2	2.27	
Adoption of sheep husbandry as	Main occupation	82	93.18	65.64**
	Subsidiary occupation	6	6.81	
Land holding (acres)	Landless Laborer	25	28.40	33.99**
	Marginal Farmers (0-2.5)	21	23.86	
	Small Farmers (2.5- 4)	32	36.36	
	Medium Farmers (5-10)	10	11.36	
Type of land	Large Farmers (>10)	Nil		72.73**
	Dry	4	4.54	
No. of farmers cultivated fodder	Wet	84	95.45	43.68**
	Cultivated	13	14.77	
	Not cultivated	75	85.22	

Source of income	Agriculture	Nil	-	
	Sheep Rearing	67	76.13	76.84**
	Sheep rearing + Agric.	21	23.86	
Annual Income (Rs.)	75000-100000	59	67.04	
	100000-150000	25	28.40	50.14**
	150000-200000	4	4.54	

** Highly significant ($p < 0.01$).

CONCLUSION

Shepherds of Nellore Palla sheep confront numerous obstacles, including severe summer grazing shortages, little financial support, a lack of scientific knowledge, and unpredictable disease outbreaks. Effective awareness programmes to educate both literate and illiterate farmers during non-grazing hours by showcasing success stories of sheep rearing, proper health care, modern management techniques and animal husbandry development programs available can inspire them to adopt innovative practices. This will ensure the shepherds to reduce the mortality of their flocks and thereby, produce greater number of animals ready for market with optimal body weight thus increasing meat production in the country. This will improve the livelihoods of shepherds making sheep farming a more lucrative venture.

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