



Research Article

Improving Productive and Reproductive Parameters of Thalli Sheep by Modern Husbandry Practices in Farming System

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MSN designed and conducted research. AF helped in the conduct of research and wrote the paper. AW and NAT helped in data analysis and write-up. SMH and MAA helped in write-up. AA helped in review of paper.

Keywords

Sheep, Birth weight, Weaning weight, Fertility, Management



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Abstract | Thalli Sheep are present in Thall region having qualitative characteristics like roman nose with black mouth, black long ears with different white body parts. Thalli Sheep transferred from different livestock Farms (Livestock Experiment Station Rakh Ghulaman, Government livestock Farm Kallurkot and Wool Sheep Farm 205 TDA Sarai Mohajir to Camel Breeding and Research Station (CBRS) Rakh Mahni for rearing and propagation during period 2014-2016. The farm management worked to improve and propagate the breed of Thalli Sheep. Different management practices like identification, weighing, vaccination, deworming, dipping, spraying, hoof trimming, shearing, breeding, lab screening and weather management were practiced to increase the fertility and decrease the mortality percentage. Average birth weight was improved from 3.5 to 3.6, 4, 4.4 and 4.5 kg in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively due to these adopted practices. Average weaning weight was improved from 27 to 28, 30, 32 and 33 kg in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. The fertility rate was improved from 97.5 to 162, 165, 172 and 183 % in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19. While mortality percentage was reduced from 0.8 to 1.8, 0, 0 and 0 in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. Higher fertility and lower mortality percentage up to zero was achieved. These results and prescribed practices could be used to improve the productive and reproductive parameters in sheep husbandry.

Novelty Statement | Sheep play an important role in the subsistence livestock economy and socio-economics of rural poor in the country. By improving its productive and reproductive parameters, the sheep rearing enterprise will flourish and it will pave the way for poverty alleviation in Pakistan.

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Introduction

Livestock sector is a source of food security, employment, and daily cash income which is attractive and meaningful

for the lives of small, landless, and poor rural families. It decreases the ups and downs in income particularly at the time of crop failure thus playing an imperative role in elevating the socio-economic status of poor and rural communities (Faraz *et al.*, 2019). Livestock sector has a great impact on the lifestyle of more than 600 million individuals and important contributor to food security

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particularly in developing countries (Thornton 2007). Population of sheep is 31.6 million heads in Pakistan (GOP, 2020-21) that plays a significant role in food security and sovereignty for smallholders from various parts of the country (Iqbal *et al.*, 2019; Faraz *et al.*, 2021a).

Sheep is a very important native genetic source of livestock; a chief meat source for arid, semi-arid, and irrigated areas (Faraz *et al.*, 2021a; Jehan *et al.*, 2021). Sheep are vital provider of meat, manure, and cash-income in subsistence production under traditional/extensive production systems (Hassen *et al.*, 2004; Akbar *et al.*, 2022). Sheep husbandry acts as risk mitigator in crop failure and may act as source of investment and monetary savings along with cultural and social functions (Tibbo, 2006; Faraz *et al.*, 2021b). Sheep production has been increased as a feasible adaptation to low quality feed resources; so, it has become an integral chain in domestic industry in developing countries (Odabasogluo *et al.*, 2009). Keeping in view the above discussion, current study takes into consideration the productive and reproductive parameters of Thalli sheep in response to modern husbandry practices for the period 2014-2019.

Materials and Methods

Meteorological conditions

Breeding and Research Station (CBRS) is located in zone III of agro-ecological part in Desert Thal where climate is arid having very wide range of the highest to lowest temperature from 45.6°C to 5.5 and 1.3 °C in winter and. The rainfall is mostly noted high and ranged between 150 to 350 mm in the south-north (Rahim *et al.*, 2011).

General management practices

All sheep were tagged with ear tags from the day of their arrival at the farm, their births, and keep the record of all animals. Animal's live weights were measured on monthly basis by digital weighing balance (Impressum, Pakistan). Scheduled vaccination was performed conferring to the prescribed plan for ETV, PPR, CCPPV, and Sheep Pox. Sheep deworming were performed after every three months with Oxytoclozanide, Oxfendazole, and using Albendazole with best available dewormer for eradication and control of internal parasites in circular rotation. To control internal parasites, ticks, and skin diseases, 1% Ivermectin injection was also used after every three months. The Cypermethrin was sprayed in the sheds for the elimination of ticks during the summer season. Trimming was done with a *hoof trimmer* according to the requirement. All Animals were sheared two times during a year to control skin diseases and for better results. Two times breeding was allowed in a breeding season to get better fertility and different Rams were used for the different groups (control breeding) and then evaluated

the progress of best Ram for future use. Blood and fecal screening were performed according to the requirement in laboratory for better results and to control diseases. Diseased animals were treated separately. In winter season, curtains and high voltage bulbs were used to control cold and save the animals from chill.

Feeding practices

Early in the morning, Thalli sheep were routinely sent to the bush grazing with shepherd on daily basis. Animals eat naturally growing vegetation (Beri, Lana, Phog, Kikar) and after that went to fields of different fodders (Jawar, Lucern, Gawara, Jai, Bajra) according to the particular sowing season. They were watered twice a day. Concentrate mixture (0.5-1 kg) was provided to the animals according to the availability and season on a daily basis (Table 1). Animals were grouped according to their live body weights and age in their sheds (separate sheds for pregnant ewes as well as for non-pregnant animals). Adult female, adult male, young stock, and diseased animals were grouped separately according to their class and age. Flushing was practiced before and after breeding/lambing season @ 1 kg/d. Descriptive statistics of specific parameters were obtained by SPSS (Steel *et al.*, 1997).

Table 1: (a) Ingredients of experimental ration (b) chemical composition of experimental ration

(a) Ingredients (%)	Exp- ration	(b) Parameters (%)	Exp-ration
Maize grain	10	DM	90.22
Wheat bran	23	CP	18.04
Cotton seed cake	24	NDF	29.12
Rape seed cake	7	ADF	14.62
Corn gluten 30%	21	TDN	72
Molasses	13	ME (Mcal/ kg DM)	2.51
DCP	1		
Salt	1		

DCP, dicalcium phosphate; DM, dry matter; CP, crude protein; NDF, neutral detergent fiber; ADF, acid detergent fiber; TDN, total digestible nutrients; ME, metabolizable energy.

Results and Discussion

Table 2 reveals that average birth weight was improved from 3.5 to 3.6, 4, 4.4 and 4.5 kg in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. Average weaning weight was improved from 27 to 28, 30, 32 and 33 kg in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. The fertility rate was improved from 97.5 to 162, 165, 172 and 183 % in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. While mortality percentage was reduced from 0.8 to 1.8, 0, 0 and 0 in 2014-15, 2015-16, 2016-17, 2017-18 and 2018-19, respectively. Higher fertility and lower mortality percentage up to

Zero was achieved during the study by adopting the modern husbandry practices on scientific lines. Pictorial presentation of productive, reproductive parameters and modern husbandry practices of Thalli sheep at CBRS is shown in [Figure 1a, b](#).





Characteristic and description	Pictures
Thalli Ram	
Group of Thalli Sheep	
Thalli Progeny	
Maximum birth weight: 7 kg in male suckler and 6 kg in female suckler Ear size: large in size and black in appearance Mouth: black with Roman nose	

Figure 1a: Pictorial presentation of productive and reproductive parameters of Thalli sheep in response to modern husbandry practices at CBRS.

Characteristic and description	Pictures
Shearing of Thalli sheep (two times in a season before the start of breeding season to get better fertility and to save the animals from mange, ticks and heat stroke in summer season)	
Dipping (dip the animals after shearing)	
Trimming of hooves (to save the animals from Foot rot and lameness)	
Feeding (animals coming from grazing and feeding of concentrate in the sheds)	
Monthly live weight measurements	
Sampling done in animals and after microscopic examination, dewormed animals according to the load of parasites	
Vaccination of animals to save from different diseases. (ETV, CCPPV, PPR, Sheep Pox) Inj. Ivermectin (to save the animals from Ticks, mange diseases and to control from internal/external parasites after every three months)	
Covering the sheds from front and back sides to control cold and save the animals from chill/coldness and decreases mortality in lambs and adult animals	

Figure 1b: Pictorial presentation of modern husbandry practices in sheep husbandry at CBRS.

There are three main production systems regarding sheep husbandry that exists; viz: (1) extensive production system, (2) intensive production system, and (3) traditional pastoralism. Different types of routine farming systems have the ability to run fruitful products, suitable sources, labour veterinary care, and husbandry like additional feed. The major risk in traditional pastoralism is the unpredictable climate which has a definite influence on the rising season of forages and plants. Higher losses of the newborn are harmful as restrictions are applied on the supply of precocious females to enable replacement flock ([Kilgour et al., 2008](#); [Morris, 2017](#)). Despite the drastic decrease in the sheep population, the sheep numbers have been increased dramatically in response to modern husbandry practices as the lambing percentage increased from 98-125% from 1987 to 2008 while carcass weights have been increased from 14 to 17 kg in New Zealand ([Morris, 2009](#)).

In very earlier studies, it was prescribed that lambs born for each ewe could be doubled or tripled by using intensive management practice systems and by using different innovations. Ewe selection is one important practice that produces many births two times in a lambing year, breeding ewes to lamb at one year of ewe age, producing diets for optimum animal weight gain, and control of animal death ratios due to parasites and other different diseases ([Harrison, 1980](#)). [Combellas \(1980\)](#) determined that tropical and sub-tropical breeds have lower genetic potential than temperate breeds. but it could be enhanced by modern husbandry practices. The mean values in improved production systems were found to be 580g, milk per day; 115g, daily weight gain; 1.3 lambs per parturition, and 2.6 kg birth weight. These values support the current research findings as improved husbandry practices played a significant role in productive and reproductive parameters.

[Kosgey \(2004\)](#) exclaimed those limitations to small ruminant production comprised of a small level of disease and parasite challenge, poor marketing, management, and inadequate feed. These could be overcome only by adoption of modern husbandry practices. [Suresh et al. \(2007\)](#) investigated about sheep production in semi-arid zones in India and reported that sheep husbandry is a major source of income for the poor people of rural areas in Rajasthan. Mode of sheep production in the rural areas is unorganized and traditional. The morbidity among the sheep was found to be 87% and the major diseases were foot and mouth disease (FMD) and enterotoxaemia. The mortality was reported to be 14%, mainly due to enterotoxaemia and FMD. The lack of proper disease care and the herders are mainly dependent on ethnoveterinary performance. They further exclaimed that the development of new technologies will augment the sheep production in the rural areas and help to reduce the pressure on the deteriorating natural resources.

Table 2: Productive and reproductive parameters of Thalli sheep in response to modern husbandry practices at CBRS.

Sr. No	Parameters	Year				
		2014-15	2015-16	2016-17	2017-18	2018-19
1	Adult female	118	85	124	102	123
2	Total No. of births	115	138	205	175	225
3	Average birth weight (kg)	3.5	3.6	4	4.4	4.5
4	Average weaning weight (kg)	27	28	30	32	33
5	Fertility (%)	97.5	162	165	172	183
6	Mortality (%)	0.8	1.8	Nil	Nil	Nil

CBRS, camel breeding and research station.

Abera *et al.* (2014) investigated the regional native sheep husbandry practices in central Ethiopia and inferred that better husbandry services and practices help the livestock farmers in sustainable and profitable livelihood, especially to the rural people. Thus, technological intervention is very vital to these traditional practices for the improvement of sheep production. The improved production of goats could be attained with the help of identification of present production systems with limitations and improving existing practices in the production system and involvement of modern husbandry practices (Kebede *et al.*, 2015). Chanie (2015) studied husbandry performance as the pre-weaning growth of goats and deduced that the present production of goats is better and had a full potential which required to be expressed by refining husbandry practices, by using suitable disease control methods. They could be improved by applying planned forage growth and different type of feeding practices. In Brazil, many challenges existed for sheep production, especially the practical issues which should be covered to allow the economic feasibility of profitable lamb production. The basic handling measures were ignored by farmers and lack of control over various aspects like record keeping, nutritional discrepancies and labour problems (Raineri *et al.*, 2015).

Nigussie *et al.* (2015) studied the different production systems of local sheep in Eastern Ethiopia and concluded that the contribution of sheep husbandry to the family revenue is substantial to note. The introduction of wise planning and relevant genetic improvement strategies could have better success abilities. In addition, the comparatively better reproductive and productive performance traits of sheep under harsh environmental conditions would have a chance to improve the production of sheep via noticing the major problems. Yadav *et al.* (2016) compiled a training manual about advances in sheep and goat production and management and deduced that indigenous sheep breeds have the immense genetic potential for production, reproduction, and hardiness, but due to poor environmental conditions their optimum potential has not been expressed which could be exploited by modern husbandry practices.

Conclusions and Recommendations

Different general managemental practices adopted to increase the fertility percentage and to decrease the mortality percentage during different financial years and the farm administration achieved maximum fertility percentage and decreased the mortality percentage up to Zero. The results are of great interest and these modern husbandry practices could be exploited and in vogue among sheep farmers for maximum gains.

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Conflict of interest

The authors have declared no conflict of interest.

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