Research paper

Study of performance and management practices of Dumba sheep in semi-arid region of the India

AK Mishra[1]*, A Jain[1], S Singh[1] and KS Rathore[2]

[1]*ICAR- National Bureau of Animal Genetic Resources, Karnal- 132001 (Haryana) India*
[2]*Deptt. of Animal Husbandry, Government of Rajasthan, India*

ABSTRACT

Characterization and performance evaluation of fat –tailed Dumba sheep was undertaken through survey in Jaipur, Nagaur and Ajmer districts of Rajasthan. The data on body biometry, phenotypic characters and other performance traits were collected through measurements, personal observations and information provided by the sheep farmers. Dumba animals are large in size which is also reflected by its body weight and body biometry. The coat colour is white, brown, white with brown patches and white with black patches all over the body. The predominant colour is white (43.86%), followed by brown or mixture of white and brown (41.23%) and black-white mixture (14.91%). Ears are large, pendulous and drooping. Ear length ranged from 9 to 26 cm. Legs, face and belly are devoid of wool. Head is slightly convex in majority of animals (62.02%). Muzzle is pink and hooves are light brown or grey in colour. Both the sexes are polled, however, horns were observed in some of the males. The price of Dumba animals is very high as claimed by sheep owners. Adult animals are sold at the rate of Rs 60000 to 125000 and lambs @ Rs 25000-40000. The average flock size was 16.04. The average adult body weight of rams and ewes were 83.89 ± 3.95 and 58.76 ± 1.79 kg, respectively which ranged from 50 to 124 kg in rams and 35 to 96 kg in ewes. The overall body length, height, chest girth, paunch girth, face length, face width, ear length and tail length were 71.88 ± 0.55, 76.07 ± 0.60, 93.38 ± 0.79, 94.78 ± 0.85, 20.86 ± 0.18, 9.59 ± 0.08 and 17.69 ± 0.22 cm respectively. Body weight of lambs in the age groups of 1-3 and 3-6 months ranged between 11-32 and 20 -60 kg respectively. Animals are maintained under intensive or semi-intensive system of management with no grazing. Dumba sheep is maintained primarily for sacrifice (*qurbani)* or earn handsome money from sale during the *Bakr-Eid* festival. Dumba sheep, on account of its demand for the religious ritual, is contributing to the livelihood of sheep farmers.

Keywords: Biometry, body weight, Dumba sheep, performance evaluation
***Corresponding author:** anilmishra65@gmail.com
Manuscript received: 06.6.2018

INTRODUCTION

Fat-tailed sheep breeding is an important traditional system of sheep production in arid /or semi-arid region. Dumba sheep are characterized by the deposition of fat in the tail (Pourlis, 2011). They are well known for their ability to walk long distances and to cope with harsh environmental conditions such as long periods of drought and high temperatures (Kashan *et al*., 2005). In India, Dumba sheep breeding is practiced since quite some time under semi-intensive production system in arid or semi-arid region. Dumba sheep are maintained by the sheep farmers as well as live animal traders in Jaipur, Nagaur and Ajmer districts of Rajasthan, Delhi, Malerkotla tehsil of Punjab and Muzaffarnagar district of UP. The primary purpose of rearing Dumba sheep is to earn handsome income during the Eid festival as this sheep has great aesthetic and religious value. Dumba sheep are hardy and able to withstand the tough challenges of desert life. Therefore, these animals exhibit promising growth rate and attain high body weights when maintained under semi intensive and intensive system of management

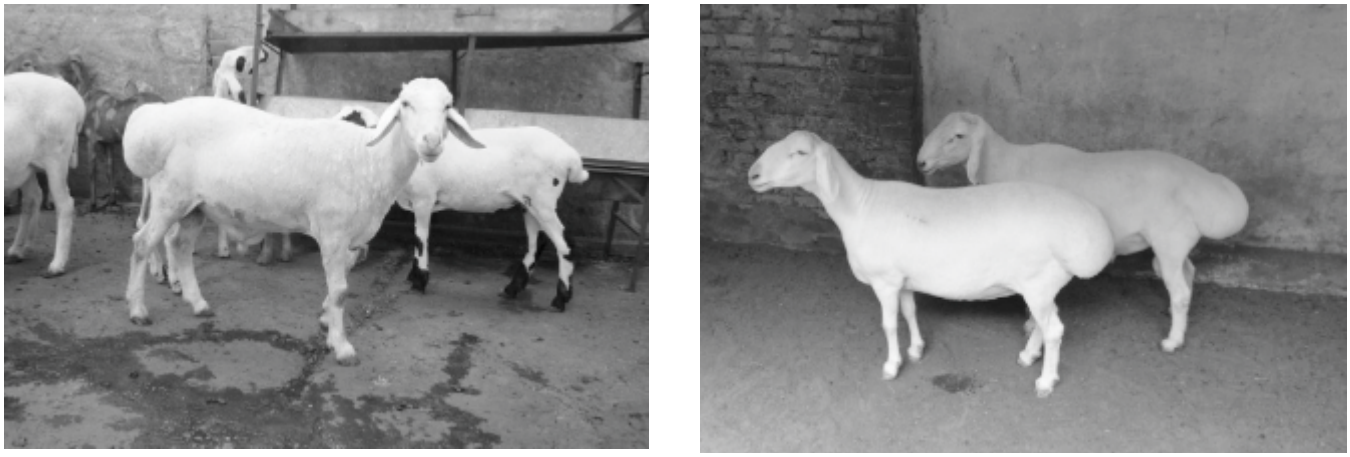

Figure 1. Dumba Sheep

under arid and semi-arid conditions of Rajasthan in India. In view of above, the present study was conducted to study the phenotypic characters, performance traits and management practices followed by sheep farmers in its distribution area.

MATERIALS AND METHODS

The survey was undertaken in May 2016 and February 2017 in twelve villages and mohllas belonging to Jaipur, Ajmer, Nagaur and Bikaner districts of Rajasthan, India. A total of 25 sheep flocks were surveyed during the study. The body biometry traits viz. body length (BL), height at wither (HW), chest girth (CG), paunch girth (PG), ear length (EL), face length (FL), face width (FW), tail length (TL), Rump length (RL), rump height (RH) and body weight (BW) were recorded from 118 adult animals (28 male and 90 females) as per the standard performae developed for phenotypic characterization of sheep genetic resources. Body weights of 73 lambs belonging to different age groups from birth to 12 months were also recorded. The body weight was recorded using spring weighing balance and biometric traits were recorded using measuring tape after making the animal to stand squarely on even ground. The data on other physical traits viz. head profile, ear orientation, color pattern, production performance; reproduction traits etc. and management practices were collected by personnel observations and interviewing sheep farmers. The data were statistically analyzed as per standard statistical techniques (Snedecor and Cochron, 1989).

RESULTS AND DISCUSSION

Phenotypic characteristics

Dumba is maintained mainly in Jaipur, Nagour and Ajmer districts of Rajasthan. The animals are also available in Delhi, Malerkotla tehsil of Punjab and Muzzfarnagar districts of UP. Main objective of rearing Dumba is for sacrifice (*qurbani*) or earning of money during the Eid festival as they have great aesthetic and religious value. The biometry and body weight of Dumba reflects that it is large in size. The prominent coat colour is white (Figure1) and brown, however, some black animals and mixture of black-white and brown-white were also observed. The predominant colour is white (43.86%), followed by brown or mixture of white and brown (41.23% and black-white mixture (14.91%). The sheep are characterized by the deposition of fat in the tail. Leg, face and belly are devoid of wool. Head is slightly convex in majority of animals (62.02%). Muzzle is pink in colour and hooves are light brown or grey. Both the sexes are polled, however, horns were observed in some males. Ears are large in size, pendulous and drooping. Besides sheep, almost all sheep farmers reared goats and some poultry. The average flock size was 16.04 (range: 2 to 65), comprising 15.88 Dumba and 0.16 others sheep. Of the Dumba sheep, 2.08 were male, 10.32 female and 3.48 lambs on an average. The udder is medium sized with medium sized teats.

The average body weight of rams and ewes were 83.89 ± 3.95 and 58.76 ± 1.79 kg, respectively which

Table 1. Body weight (kg) and biometry (cm) of adult Dumba sheep

Traits	OverallMean ±SE	Sex	Male Mean±SE (Range)	Female Mean±SE (Range)
N	118		28	90
Body weight	65.80±2.03	**	83.89±3.95 (50-124)	58.76±1.79 (35-96)
Body length	71.88±0.55	**	76.75±1.04 (69-88)	70.37±0.56 (60-86)
Height at wither	76.07±0.60	**	82.75±1.01 (72-91)	73.99±0.56 (60-84)
Chest girth	93.38±0.79	*	99.96±1.45 (88-111)	91.33±0.82 (73-109)
Paunch girth	94.78±0.85	*	101.50±1.73 (84-113)	92.69±0.87 (73-110)
Face length	20.86±0.18	**	22.50±0.30 (19-25)	20.36±0.17 (17-29)
Face width	9.59±0.08	**	10.29±0.14 (9-12)	9.38±0.08 (6-11)
Ear length	17.69±0.22	NS	17.75±0.39 (11-21)	17.68±0.27 (9-26)
Rump length	19.07±0.43	**	22.29±0.91 (14-32)	18.07±0.44 (9-25)
Height at rump	18.72±0.41	**	23.00±0.87 (13-29)	17.78±0.44 (8-27)

*NS: non-significant, * P<0.05, ** P<0.001*

Table 2. Body weight of Dumba lambs (kg)

Age	0-1 months	1-3 months	3-6 months	9-12 months
Overall	11.07±0.82 (22)	21.50 ± 1.64 (14)	35.13 ± 1.75 (30)	59.57 ±2.99 (7)
Sex		**	**	
Male	10.78± 1.20 (9)	24.00 ± 1.92 (9)	39.75 ± 2.58 (16)	60.40 ± 3.04 (5)
Female	11.27 ± 1.15 (13)	17.00 ± 1.82 (5)	29.86± 1.37 (14)	57.50 ± 9.50(2)
Range	4-18	11-32	20-60	48-72

** Significant at p≤ 0.01; figures within parentheses are number of observations

ranged from 50 to 124 kg in rams and 35 to 96 kg in ewes. The overall body length, height, chest girth, paunch girth, face length, face width, ear length and tail length were 71.88 ± 0.55, 76.07 ± 0.60, 93.38 ± 0.79, 94.78 ± 0.85, 20.86 ± 0.18, 9.59 ± 0.08 and 17.69 ± 0.22 cm respectively (Table 1). The average body weight of adult Dumba sheep are more than that of other mutton producing sheep in the region viz. Malpura (Mishra *et al.*, 2005) and Jaislameri (Arora *et al.* 2007). There is significant difference between sexes for all the biometric traits under study except for ear length. Body weight of lambs in the age groups of 1-3 and 3-6 months were ranges between 11-32 and 20 -60 kg respectively (Table 2). The 3 to 6 months body weight of lambs is very important for marketing point of view. The study also reveals that 78.56% adult males weighed more than 60 kg and 51.38 % adult females weighed from 50 to 70 kg (Table 3). The body biometry and adult body weight of Dumba sheep reveals that this sheep is quite large in size and weigh more than other sheep breed of the country.

Management of Dumba sheep

In contrast to other sheep breed of the country, Dumba sheep are maintained under intensive system of management with no grazing. 100% farmers provide concentrate and fodder to sheep. The major fodder was loom, leaf of Ardu and Rijika. The present findings were not in agreement with earlier reports of Mishra *et al.,* (2005), Mishra *et al*., (2016) and Arora *et al*., (2007). The majority of sheep farmers kept sheep in covered area. The hundred percent sheep farmers have PUCCA housing and 60% constructed separate houses and some farmers (12%) kept Dumba animals on upper story of their residence. The sheep are generally shorn 3 to 5 times in a year. The majority of farmers reported average greasy wool production from 100 g to 300 g per shearing. The marketing age of male lambs was reported to be 4 months by 54.17 % farmers (Table

Table 3. Frequency distribution of body weight of Dumba sheep

Group (kg)	Male	Female
<50	3.57 % (1)	29.16 % (21)
50-60	17.86 % (5)	33.33 %(24)
60-70	10.71 % (3)	18.05 % (13)
70-80	7.14 % (2)	9.72 % (7)
80-100	42.86 % (12)	9.72 % (7)
>100	17.85 % (5)	

figures within parentheses are number of observations

Table 4. Management practices adopted by Dumba sheep farmers

Particulars	Items	% of sheep farmers
Housing pattern		
Housing	Pucca	100%
	Kutcha	0.00
	Separate	60.00%
	Part of owners house	40.00; (12% at upper story of house)
Breeding practices		
Age at first breeding: Males	10- 12 months	45.83 %
	12 months	50.00%
	12 to 18 months	4.17 %
Lambing %	80- 90 %	22.73%
	90-95%	13.64%
	>95 %	63.64% (6: 100%)
Age at first lambing	12 to 15 months	25%
	15-18 months	75%
Disposal of ewes	7- 8 years	18.18 %
	8-10 years	9.09%
	> 10 years to till death	68.18%
Marketing age	< 4 months	29.17 %
	4 months	54.17 %
	4-6 months	4.17%
	> 6 months	12.50%
Adult cost/ males (`)	15000 to 25000	40%
	25000 to 50000	12%
	50000 to 80000	36%
	80000 to 1.25 lacs	12%
Health Management		
Lamb Mortality	<5%	41.67%
	5-10 %	4.17%
	10-20 %	54.17%
Adult mortality	1-2%	62.5%
	2- 5 %	20.83%
	> 5%	16.67%

4) with market price from Rs. 25000 to 40000 by majority of sheep farmers. The market price of adult/ old aged rams and ewes ranged from Rs. 15000 to 1.25 lacks (Table 4). Though, the ewes are not milked, however, the daily milk yield was reported to range from 250 to 500 ml. The mortality was reported to be 1 to 2% (Table 4) in adult (62.5 % farmers) and 10 to 20% in lambs (54.17 % sheep farmers).

Reproduction

The ewes are bred through natural mating. The average number of rams per flock was 1.28 with a ram-ewe ratio of 1:8.06. The rams-ewes ratio was much higher than that reported by Mishra *et al.* (2016) in Kajali sheep. In all the surveyed flocks only Dumba ram was being used for breeding purpose. The rams are either selected from their own flock or exchanged with the other breeders. The rams are selected based on body conformation, especially the fat tail. Age at first mating in rams was reported about 12 months by 50% sheep breeders while as age at first lambing was reported about 15-18 months by 75% of farmers. The lambing take place throughout the year as reported by majority (78.26%) of sheep farmers, from November to January (21.74% farmers) and from July to September (72% sheep farmers). Majority of farmers reported that twining varied from 1 to 2 %. The annual lambing rate was reported as 95% by 63.64% farmers. The majority of farmers reported twinning rate 1-2%.

The study reveals that Dumba sheep is one of the heaviest sheep of India and managed in intensive system of management and reared for fetching

higher money during *Bakr-Eid* festival. The adaptation of Dumba sheep to the arid and semi-arid climate of Rajasthan, promising growth rate and their market demand indicated a fair scope of its propagation and development in India.

ACKNOWLEDGEMENT

The authors are thankful to the Director, ICAR-National Bureau of Animal Genetic Resources, Karnal for providing the facilities. Our sincere gratitude to all sheep keepers to allowed measurements of their animals. We also sincerely thank the Director, Animal Husbandry, Govt. of Rajasthan (India) and Deputy Directors of Jaipur, Ajmer and Nagaur districts and all veterinary officers of distribution area of Dumba sheep available in Rajasthan.

REFERENCES

Arora A L, Prince, L L L and Mishra A K. 2007. Performance Evaluation of Jaisalmeri Sheep in Farmers' Flocks. *The Indian Journal of Animal Sciences*. 77 (8): 759-762.

Kashan, NEJ, Manafi Azar, GH, Afzalzadeh, A, Salehi, A. 2005. Growth performance and carcass quality of fattening lambs from fat-tailed and tailed sheep breeds, Small Ruminant Research, 60, 267–271

Mishra AK, Arora AL, Kumar Sushil, Sharma RC and Singh VK. 2005. MALPURA: A Mutton type sheep breed, published by ICAR- Central Sheep and Wool Research Institute, Avikanagar, via. Jaipur (Rajasthan)-304 501.

Mishra AK, Raja KN, Vohra V, Singh S and Singh Y. 2016. Phenotypic traits and performance of Kajali Sheep: a lesser known ovine genetic resource of Punjab, India. Indian Journal of Animal Sciences, 86(11): 1279-1282.

Pourlis AF. 2011. A review of morphological characteristics relating to the production and reproduction of fat-tailed sheep breeds, Trop Anim Health Prod, 43:1267–1287.

Snedecor GW and Cochran WG. 1989. Statistical Methods, 8th Edn., Affiliated East-West Press, New Delhi and Iowa State University Press, Iowa, USA.