



Morphological characterization, production and reproduction status of Munjal -A threatened sheep population of North-West India

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ABSTRACT

To characterize Munjal sheep, 107 random sheep flocks were assessed in their breeding tract. Rams (42), ewes (152) and lambs (80) were selected from 32 sheep flocks from 3 different locations for data recording on seven body biometry parameters (body weight, body length, height at wither, chest girth, paunch girth, ear length and tail length). The average adult body weight in rams and ewes was 60.05 ± 1.55 and 43.95 ± 0.51 kg respectively. Body biometry analysis suggested that Munjal sheep are quite large in size, tall, rectangular and massive with long tail. Twinning was 4–10%. The mortality in adults was 5–10% and 4–6% in lambs. Age at puberty in females was 10–12 months. Age at first lambing of ewes was 15–18 months, while age at first breeding of rams was 12–15 months. Due to socio-economic and other factors, shrinkage in breeding tract was observed. The numbers are continuously dwindling and the current population exhibited its threatened status.

Key words: Morphological characterization, Munjal sheep, Production, Reproduction, Threatened population

Determination of status and characterization of indigenous sheep genetic resources is essential for planning domestic animal diversity conservation plans (DAD-IS, FAO). The abounding treasure of genetic diversity of Indian sheep (*Ovis aries*) lies in the 40–43 breeds (Acharya 1982, Bhatia and Arora 2005) distributed across the country in 4 agro-ecological zones. Some information is available on physical and economic characters of most of the breeds only from the organized farms/institutional herds (Bhat *et al.* 1981). Acharya (1982) described the Indian sheep breeds based on published literature and also on field surveys. Systematic attempts for characterization and conservation of sheep breeds in India were initiated with the establishment of National Bureau of Animal Genetic Resources, Karnal. The present study is the outcome of these ongoing efforts.

Munjal, primarily a mutton-type sheep, is popular among the farmers of Punjab, Haryana and Rajasthan for its better reproductive efficiency. It is supposed to have originated through the breeding of Nali and Lohi sheep and is found in districts of Hisar, Ambala and Karnal of Haryana; Patiala and Bathinda of Punjab; and Ganganagar and Hanumangarh of Rajasthan (Basuthakur 1988, Mason 1988). Kushwah *et al.* (1999) studied the characteristics of Munjal sheep in parts

of Rajasthan and Punjab in farmer's flocks. Poonia (2008) suggested that under organized farm conditions that Munjal sheep is very economical due to its earlier maturity, faster growth and shorter lambing interval as compared to Magra, Malpura and Muzaffarnagri sheep breeds. But Munjal sheep is not included in the list of descriptive sheep breeds of India, and thus have lived through times of identity crisis (Yadav *et al.* 2009). As Munjal sheep is least discussed among the Indian sheep, the present study unifies the information on its breeding tract, population size, physical characteristics, production and reproduction traits and is thus a systematic continuing effort in the direction for characterization of sheep genetic resources of India.

MATERIALS AND METHODS

For characterizing the Munjal sheep, 107 random sheep flocks were assessed in their breeding tract from Karnal (Haryana), Bathinda (Punjab) and Hanumangarh (Rajasthan). Body biometry of 194 adult animals (42 males and 152 females) and body weight of 80 lambs were recorded from 32 flocks having varying numbers of Munjal sheep. All the measurements were taken with a measuring tape after making the animal stand squarely on an even ground. The body weights were recorded by weighing the animals with a weighing machine. The age of the animals was recorded by observing number of teeth, 2 teeth, 1.5 year old; 4 teeth, 2.5 years old; 6 teeth, 3.5 years old; 8 teeth, four years old and

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above. The variables used for characterization are: Y, body weight; X_1 , body height; X_2 , chest girth; X_3 , paunch girth; X_4 , body length; X_5 , ear length; X_6 , tail length and T, number of teeth of the animal, an indication of their age. Data on production and reproduction parameters were collected by interviewing farmers and officers of state animal husbandry department. Mean and standard deviations were calculated for presenting the body biometry of the animals.

RESULTS AND DISCUSSION

Analysis of the body biometry reflects that animals of Munjal sheep are quite large in size, tall, rectangular and massive with long tail (Figs. 1, 2). They have long head with Roman nose and narrow forehead. Face is generally tan or brown colour which may extend up to the neck. Both sexes are polled. Ears are large and leaf like hanging down with flat cheeks. Fleece is white and coarse. Udder is well developed and medium sized with medium teats.

Average body weight and body biometry of adult Munjal sheep and average body weights of lambs are given in Tables 1, 2 respectively. Tail and ear lengths of rams were marginally longer than of ewes. There was increasing trend in body weight of lambs with advancement in age. The yearlings weighed from 37–46 kg in males and 22–27 kg in females.

The farmers considered body weights in 3–6 months age group important for disposal of lambs and those between 12–18 months for selecting breeding rams. Kumar *et al.* (2006) characterized Muzaffarnagri, a contemporary mutton type sheep breed of North India and reported average body weights of male and females 50.21 ± 1.46 kg and 39.61 ± 0.038 kg respectively. A comparison of body weight of Munjal sheep with Muzaffarnagri breed indicates that Munjal sheep is heavier than Muzaffarnagri sheep breed under field conditions.

The lambing season in Munjal does starts from April-May (minor season) and becomes steadier during October-November (main season). Annual lambing is about 60–80% with lambing interval of 5–6 months. Twinning is 4–10%.

Table 1. Body weight and body biometry of adult Munjal sheep

Body character	Adult male (42)		Adult female (152)	
	Average $\pm$ SE	Range	Average $\pm$ SE	Range
Body weight (kg)	60.05 ± 1.55	41–83	43.95 ± 0.51	30–64
Body length (cm)	83.85 ± 0.85	68–95	75.60 ± 0.33	63–87
Height at wither (cm)	80.38 ± 0.69	72–91	73.24 ± 0.25	65–81
Chest girth (cm)	91.76 ± 0.73	80–100	83.78 ± 0.39	71–95
Paunch girth (cm)	94.33 ± 0.95	82–110	86.90 ± 0.47	70–100
Ear length (cm)	18.81 ± 0.98	14–47	18.47 ± 0.49	14–51
Tail length (cm)	47.90 ± 1.63	19–68	42.02 ± 0.68	15–62

The mortality is about 5–10% in adults and 4–6% in lambs. Age at puberty in females is 10–12 months. Age at first lambing of ewes is about 15–18 months, while age at first breeding of rams is 12–15 months. Breeding life of a ram is 6–10 years. Rams are selected on the basis of body size and conformation. Animals are generally shorn twice a year in September-October and March-April. Average greasy wool production is about 1800–2500 g/ annum as compared to 600–1000 g/ annum in Muzaffarnagri sheep (Kumar *et al.* 2006). The price of wool varied from ₹ 35–40/kg (less than 1US\$). Depending upon the condition of the animal, prices of adult ewes and rams varied from ₹ 2500–3000/- (55–65 US\$) and ₹ 8000–12000/- (175–275 US\$) respectively. Surplus three months old male lambs are sold for ₹ 1000–1200/- (22–27 US\$) whereas ewe lambs are kept for replacement. The average flock size was 53 comprising 36 ewes, 2 rams and 15 lambs. The farmers also maintain rams of Muzaffarnagri, Nali and Kheri breeds in their flocks. The percentage of Munjal sheep in the studied flocks was 42. Intermixing of nearby breeds has primarily resulted in decline in purebred population of Munjal sheep.

Our study importantly demonstrates the current status of breeding tract and population, morphological characterization, production and reproduction status of



Fig 1. Munjal ram and ewe

Table 2. Body weight of Munjal lambs

Age (month)	Male		Female	
	Average $\pm$ SE	Range	Average $\pm$ SE	Range
0-1	6.31 $\pm$ 0.48 (19)	3-10	4.13 $\pm$ 0.62 (8)	2-7
1-3	12.18 $\pm$ 1.06 (14)	7-20	10.71 $\pm$ 1.61 (7)	6-19
3-6	21.4 $\pm$ 2.62 (5)	17-30	15.86 $\pm$ 1.24 (7)	11-20
6-9	35.0 $\pm$ 2.31 (3)	31-39	20.86 $\pm$ 1.06 (7)	17-24
9-12	41.8 $\pm$ 1.80 (5)	37-46	24.20 $\pm$ 1.02 (5)	22-27

Munjal sheep. It is observed that though the sheep keepers/shepherds preferred Munjal sheep in the past because of its heavy size, early breeding and substantial wool production, yet its present population in the breeding tract indicates threatened status. The study revealed that there is substantial shrinkage in its breeding tract presently limiting to some pockets of Karnal (Haryana) and Bathinda (Punjab) districts. The scarcity of proven rams and existing genetic dilution in the farmer's flocks due to intermixing is posing serious threat to its identity and population status. Besides this, lack of initiatives on the part of developmental and policy making agencies such as recognition as a descript breed, and systematic and concerted efforts for its breeding and improvement had their own toll on the present scenario. It is recommended that besides recognizing Munjal sheep as a national sheep breed; the core action of establishing a nucleus flock and implementing it as open nucleus breeding system with exchange of rams between nucleus herd and farmers

flock is warranted immediately.

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