

Morphological characterization of Mahabubnagar goats^{*}

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ABSTRACT

In a field study covering 172 farmers spread over 56 villages in 20 mandals, data were collected on the morphological characteristics of 1590 Mahabubnagar goats. The predominant coat colour was bicolour (63.5%) followed by single colour (25%) and multicolour (11.5%) on overall basis. The bicolour coat pattern consisted of mainly black and white (30.88%) followed by brown and white (22.14%) and black and brown (10.38%). Pendulous ears were predominant (91.57%) followed by erect (4.59%) and horizontal ears (3.84%). Majority of the goats (85.97%) had beard while wattles were present in only 34.34% of goats. Straight and curved horns were observed in 96.04% of animals in both sexes. Horn size was mostly medium (63.46%) followed by large size (10.81%) while 10.81% of animals had large horns oriented backward and backward and downward.

Key words: Goat, Mahabubnagar goats, Morphological characterization

Goat is an important species of livestock for the poor farmers of India as they survive better under harsh climatic conditions. Andhra Pradesh has 6.27 million goats and Mahabubnagar district tops with 5.09 lakh goats (Livestock census 2003). Mahabubnagar local goats, though yet to be recognized as a breed, are well known for their production potential. Although much research work was done on descript goat breeds in India, information on highly adaptable local goats had not been documented adequately. Hence, the present study was made to record physical characteristics such as coat color, head profile and horn condition to enable recognition of these animals as a breed.

MATERIAL AND METHODS

The data on morphological characters like coat color patterns (single, bi- or tri-colored), head profile (straight or slightly convex) and ear profile (pendulous or horizontal), wattles (present or absent), beard (present or absent), horns (present or absent), horn shape (straight or curved) and orientation (backwards and upwards, backwards, upwards and outwards) were recorded as per the proforma of National

Bureau of Animal Genetic Resources, Karnal. A total of 1590 goats from 172 farmers spread in 56 villages of 20 mandals and 3 livestock shandies and a livestock research station at Mahabubnagar.

RESULTS AND DISCUSSION

Color pattern

The color pattern of goats plays vital role in physical characterization. The predominant color pattern in Mahabubnagar goats was bicolor (63.5%) with the admixture of black and white (30.88%), brown and white (22.14%) and black and brown (10.38%) (Table 1 and Fig.1). In the present study, 25% of single color animals and 11.5% multi color patterns were observed. The single color animal categories represent black (9.69%), brown (9.06%) and white (6.23%). The findings were in close agreement with the earlier descriptions by Reddy (2004) in Mahabubnagar goats. The dominant bicolor pattern was also reported in Jamunapari (Bhat 1988), Berari (Pujari *et al.* 2004), Ganjam (Rao *et al.* 2007) and Jakrana (Verma *et al.* 2007). A small proportion of animals have white, brown and black colors.

The apparent wide variation in coat color among Mahabubnagar goats observed in this study is indicative of the fact that it has not yet been purified through selective breeding and therefore great opportunities exist for its improvement. The propensity towards white and or white in combination with other coat colors, especially black and brown, prominently exhibited by goats used in the present study appears to be an adaptation to the pronounced seasonal

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Table 1. Color pattern in Mahabubnagar goats

Color patterns		Males		Females		Pooled	
		n	%	n	%	n	%
Single color	Black	18	6.72	136	10.29	154	9.69
	White	7	2.61	92	6.96	99	6.23
	Brown	17	6.34	127	9.61	144	9.06
Bicolor	Black and white	98	36.57	393	29.73	491	30.88
	Black and brown	24	8.96	141	10.67	165	10.38
	Brown and white	60	22.39	292	22.09	352	22.14
Multicolor	Black, white and brown	44	16.42	141	10.67	185	11.64
	Total	268	100.00	1322	100.00	1590	100.00



Fig. 1. Coat color pattern in Mahabubnagar goats (bi- and multi-color).

fluctuations in the intensity and duration of light, heat and cold in this region. Coat colors and hair structure in goats have an important role to play in the adaptability of animals to different ecological zones (Banerji 1980). This argument is supported by the later assertion of Hemmer (1990) to the effect that animal domestication can be aided by the use of certain coat colors or patterns which are related behaviorally through the common metabolic pathway of pigments and catecholamine neurotransmitters.

Head profile

In the present study, 74.28% of animals had straight and 21.01% had slightly convex heads (Table 2). A lesser proportion of animals possessed (4.72%) convex type heads. Similar results were also reported in Mahabubnagar (Reddy 2004) and Osmanabadi goats (Motghare *et al.* 2005). The head profile is pictorially presented in Fig.2

Majority of the animals (91.57%) had pendulous ears followed by erect (4.59%) and horizontal ears (3.84%). Pendulous ears were also reported in Kanni Adu (Thiruvankadan *et al.* 2000), Mahabubnagar (Reddy 2004), Sangamneri (Deokar *et al.* 2005), Osmanabadi (Deokar *et al.* 2006), Marwari (Dixit *et al.* 2007) and Ganjam goats (Rao *et al.* 2007).

Table 2. Morphological characteristics of Mahabubnagar goats

Character	Males		Females		Pooled	
	n	%	n	%	n	%
Head profile						
Straight	80	29.85	1101	83.28	1181	74.28
Convex	39	14.55	36	2.72	75	4.72
Slightly convex	149	55.60	185	13.99	334	21.01
Total	268	100.00	1322	100.00	1590	100.00
Ears						
Erect	9	3.36	64	4.84	73	4.59
Pendulous	251	93.66	1205	91.15	1456	91.57
Horizontal	8	2.99	53	4.01	61	3.84
Total	268	100.00	1322	100.00	1590	100.00
Beard						
Present	146	54.48	77	5.82	223	14.03
Absent	122	45.52	1245	94.18	1367	85.97
Total	268	100.00	1322	100.00	1590	100.00
Wattles						
Present	76	28.36	470	35.55	546	34.34
Absent	192	71.64	852	64.45	1044	65.66
Total	268	100.00	1322	100.00	1590	100.00
Horns						
Horned	263	98.13	1264	95.61	1527	96.04
Polled	5	1.87	58	4.39	63	3.96
Total	268	100.00	1322	100.00	1590	100.00
Horn shape						
Straight	99	37.64	770	60.92	869	56.91
Curved	164	62.36	494	39.08	658	43.09
Total	263	100.00	1264	100.00	1527	100.00
Horn orientation						
Backward	114	43.35	591	46.76	705	46.17
Backward and downward	111	42.21	504	39.87	615	40.28
Backward and downward and outward	7	2.66	41	3.24	48	3.14
Backward and forward	14	5.32	76	6.01	90	5.89
Upward	17	6.46	52	4.11	69	4.52
Total	263	100.00	1264	100.00	1527	100.00



Fig. 2. Head profile of Mahabubnagar goats

Beard

Most of the animals (85.97%) had beard. Among the animals with beard, males were predominant (54.48%). A similar pattern was also observed in Barbari (Bhat 1988), Malabari (Acharya 1992), Mahabubnagar (Reddy 2004), Sangamneri (Deokar *et al.* 2005) and Osmanabadi goats (Motghare *et al.* 2005).

Wattles

In the present study, 34.34% of Mahabubnagar goats had wattles with an equal distribution among both the sexes. Similar results were recorded by Reddy (2004) in Mahabubnagar goats and Deokar *et al.* (2005) in Sangamneri goats. In contrast to the present findings, Bhat (1988) in Jamunapari, Thiruvankadan *et al.* (2000) in Kanni Adu, Motghare *et al.* (2005) in Osmanabadi, Deokar *et al.* (2006) in Osmanabadi goat breeds reported that the wattles were absent in both the sexes. The wattles may help in storage of fats and water.

Horns

Horns were noticed in both sexes. About 96.04% of Mahabubnagar goats had horns while lesser proportion of animals were polled (Table 3).

The horn pattern revealed straight (56.91%) and curved (43.09%) shapes. In majority of horned animals, horns were oriented backward (46.17%) and backward and downward (40.28%). In most of horned animals (63.46%) medium size horns of 15–25 cm length were observed, while in 10.81% of animals large horns were noticed. Presence of horns in both sexes was in agreement with the observations on Tanzanian (Madubi *et al.* 2000), Kanni Adu (Thiruvankadan *et al.* 2000), Jakhrana (Rai *et al.* 2001), Mahabubnagar (Reddy 2004), Osmanabadi (Motghare *et al.* 2005 and Deokar *et al.* 2006) and Jakhrana goats (Verma *et al.* 2007). The findings of horn length and orientation are corroborated with the reports on Kanni Adu (Thiruvankadan 2000), Sangamneri (Deokar *et al.* 2005) and Osmanabadi (Deokar *et al.* 2006) goats.

Table 3. Horn length in Mahabubnagar goats

Age	Small (< 15 cm)		Medium (15 to 25 cm)		Large (> 25 cm)		Total	
	n	%	n	%	n	%	n	%
Overall	393	25.74	969	63.46	165	10.81	1527	100.00
Males								
Two teeth	35	13.31	38	14.45	4	1.52	77	29.28
Four teeth	5	1.90	44	16.73	9	3.42	58	22.05
Six teeth	4	1.52	25	9.51	8	3.04	37	14.07
Full mouth	6	2.28	52	19.77	33	12.55	91	34.60
Total	50	19.01	159	60.46	54	20.53	263	100.00
Females								
Two teeth	174	13.77	42	3.32	2	0.16	218	17.25
Four teeth	59	4.67	214	16.93	7	0.55	280	22.15
Six teeth	50	3.96	132	10.44	7	0.55	189	14.95
Full mouth	60	4.75	422	33.39	95	7.52	577	45.65
Total	343	27.14	810	64.08	111	8.78	1264	100.00

Mahabubnagar goats had predominantly bicolor pattern with black, brown and white colors followed by single and multicolored patterns. Ears were mostly pendulous followed by erect and horizontal ears. Majority had beard while wattles were present in only 34.34% of goats. Straight and curved horns were observed in 96.04% of animals in both sexes. Horn size was mostly medium. These goats compare with most of the native breeds of goats in morphological characters.

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