

## CHARACTERIZATION OF THREE COLOUR VARIETIES OF BENGAL GOATS

Nirmal Kumar Tudu<sup>1\*</sup>, Saroj Kumar Pyne<sup>2</sup> and Nilotpal Ghosh<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of Veterinary Anatomy and Histology, West Bengal  
University of Animal & Fishery Sciences, Kolkata, West Bengal-700037, INDIA

<sup>2</sup>Professor, Institute of Agricultural Sciences, Visva-Bharati University, Sriniketan, Birbhum,  
West Bengal –731236, INDIA

<sup>3</sup>Department of Animal Science, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia,  
West Bengal –741252, INDIA

E-mail: drnktudu@gmail.com, sarojpyne@yahoo.com, gnilotpal@yahoo.com

(\* Corresponding Author)

[[#Part of PhD Thesis of the first author submitted to Visva-Bharati University]]

**Abstract:** The present study was conducted in Nadia district of West Bengal during January, 2010 to December, 2012 with specific objective to characterize the three colour varieties of Bengal goats in their home tract. Three types of head *viz.*, straight, convex and concave were noticed in all the three colour varieties of Bengal goats. Two types of ear *viz.*, erect and pendulous were noticed in the Black, Brown and White colour varieties of Bengal goats. Two types of horn *viz.*, straight and curved were noticed in the Black, Brown and White colour varieties of Bengal goats. Distribution of types of birth of Black Bengal goat out of total births recorded 38% were singlet, 52% were twins and 10% were triplets. The respective figures were 31% singlet, 61% twins and 8% triplets in Brown Bengal goats, and 26% singlet, 56% twins and 18% triplets in White Bengal goats.

**Keywords:** Bengal goats, characterization, coat colour, black, brown, white.

### Introduction

India is rich in goat population (16.7% of world share) and its genetic biodiversity (FAO, 2010). There are 23 recognized breeds of goats in India (NBAGR, 2014). On the other hand, the state of West Bengal has the 2<sup>nd</sup> highest goat population (150.69 lakh, All India Livestock Census, 18th, 2007) in the country (with 10.7% of the country's share), but it has only one recognized breed, *viz.*, Black Bengal goat. Many reports are available on the characterization of Black Bengal goats. However, information about the other two colour varieties of Bengal goats under village conditions is not commonly found in the available literatures. Keeping in view of its importance a study is being proposed to characterize the three colour varieties of Bengal goats in their home tract.

## Materials and methods

The present work was done in Nadia district in the state of West Bengal during January, 2010 to December, 2012. The Nadia district is selected purposively. It lies between 22°52`30" and 24°05`40" parallels of North latitudes and 88°08`10" and 88°48`15" meridians of East Longitudes. Considering the need for availability of data and accessibility of the area, two Gram Panchayats of the Nadia district of West Bengal were selected purposively for the present study. Five villages of each of the Gram Panchayats were considered. These were Basantapur, Dogachhia, Ghoragachha, Katabelia and Teligachha villages of Saguna Gram Panchayat and Mollabelia, Panpur, Kurumbelia, Nischintapur and Madhpur villages of Mollabelia Gram Panchayat. From each of the selected villages, 20 respondents were selected randomly. In this way 200 respondents selected from 10 villages of the two Gram Panchayats have been constituted the sample of the present study. For biometrical characterization, a total of five hundred (500) Bengal goats of the three colour varieties (250 Black, 150 Brown and 100 White) were selected irrespective to sex. The data were collected through face-to-face interview and by direct observation method. Head profile, ear type, horn type, and presence of wattles, beard and long body hair, were observed visually. Head profile was observed as straight, convex, concave; ear type as erect and pendulous; horn type as straight and curved. Information on distribution of types of birth was recorded. Data were analyzed following the standard statistical methods (Snedecor and Cochran, 1967).

## Results and discussion

### Head profile

Head profile of Black, Brown and White colour varieties of Bengal goats are presented in Table 1.

Three types of head *viz.*, straight, convex and concave were noticed in all the three colour varieties of Bengal goats. Maximum goats were with straight head (74.6%) followed by convex (19.2%) and concave (6.2%) type of head in all the three colour varieties of the goat breed. The highest percentage of straight (76%) followed by convex (18.8%) and concave (5.2%) type of head in Black, straight (74%) followed by convex (19.33%) and concave (6.67%) type of head in Brown and straight (72%) followed by convex (29%) and concave (8%) type of head in White Bengal goats. The present findings are in accordance to findings of earlier workers (Sahoo *et al.* 2004, Samanta *et al.* 2009). Sahoo *et al.* (2004) reported that three types of head *viz.*, straight, convex and concave were observed in the breed. On overall basis 69.9% of the goats possessed straight head, followed by convex (25.2%) and concave

(4.8%) type. Distribution of head profiles was also different in different zones of West Bengal. Samanta *et al.* (2009) reported that the head may be straight, convex or concave. However, straight type is predominant (69.9%) followed by convex (25.2%) and concave (4.8%).

### **Ear type**

Ear type of Black, Brown and White colour varieties of Bengal goats are presented in Table 1.

Two types of ear *viz.*, erect and pendulous were noticed in the Black, Brown and White colour varieties of Bengal goats. Erect type of ear was found to be maximum (95.6%) followed by pendulous type (4.4%) in all the colour varieties of the goat breed *viz.*, Black Bengal (94% and 6% respectively), Brown Bengal (96.67% and 3.33% respectively) and White Bengal goats (98% and 2% respectively). Acharya (1982) reported that the ears were short, flat and carried horizontally. Black Bengal goat has short and upright ears (ICAR, 2002). Sahoo *et al.* (2004) reported that ears were either erect or pendulous. However, up to 10 cm in length, ears were mostly erect types. When length was more than 10 cm, relative proportion of pendulous type increased. Samanta *et al.* (2009) reported that the ear is mostly erect type.

### **Horn type**

Horn type of Black, Brown and White colour varieties of Bengal goats are presented in Table 1.

Two types of horn *viz.*, straight and curved were noticed in the Black, Brown and White colour varieties of Bengal goats. Straight type of horn was found to be maximum (96.2%) followed by curved type horn (3.8%) in all the three colour varieties of Bengal goats *viz.*, Black Bengal (96.4% and 3.6% respectively, Brown Bengal (95.33% and 4.67% respectively) and White Bengal goats (97% and 3% respectively). Acharya (1982) reported that the both sexes have small to medium horns, directed upward and sometimes backward. Black Bengal goat, horns have slightly tilted upward or straight (ICAR, 2002). Sahoo *et al.* (2004) observed that two types of horn, *viz.*, curved and straight were found in Bengal goat. Samanta *et al.* (2009) reported that the two types of horns-curved and straight were found in Bengal goat and majority of the horns were straight. Jimcy *et al.* (2011) observed that the based on physical traits, the populations were not very distinct and variations were seen with respect to presence or absence of horns.

### **Presence of wattles, beard and long body hair**

Presence of wattles, beard and long body hair of Black, Brown and White colour varieties of Bengal goats are presented in Table 1.

The highest percentage of wattles were observed in White (9%) followed by Brown (8.67%) and Black (8.40) colour varieties of Bengal goats. The highest percentage of beard were observed in Black (6.80 %) followed by Brown (6%) and White (6%) Bengal goats. The highest percentage of long body hair were observed in White (27%) followed by Black (20.40%) and Brown Bengal goats (20%). Acharya (1982) reported that the hair coat was short and lustrous beard was observed in both sexes. Sahoo *et al.* (2004) reported that presence of wattles in the breed was low. Only 9.6% of the animals in the population possessed wattles with narrow zonal variation. On overall basis 6.7% of Bengal goats were found to have beard. Generally hair coat of the breed was thin, smooth and shiny as required for higher heat tolerance. However about 11% members of the breed were found to have long hair in some body regions, *viz.* shoulder, thigh, back, thigh-back, leg and tail. Out of the different body regions back and leg possessed long hair respectively in 30.1% and 20.1% cases. Presence of long hair was minimum in tail (5.3%). Zonal variation in this characteristic is not much prominent. Banerjee (2006) reported that Bengal goat possessed soft but short hair and beard was found in both sexes. Samanta *et al.* (2009) reported that the incidences of wattles in the breed were low. Jimcy *et al.* (2011) found that the based on physical traits, the populations were not very distinct and variations were seen with respect to coat colour pattern, tassels or beard and hair pattern.

### **Distribution of types of birth**

Distribution of types of birth in three colour varieties of Bengal goats are presented in Table 2. In case of Black Bengal goat out of total births recorded 38% were singlet, 52% were twins and 10% were triplets. The respective figures were 31% singlet, 61% twins and 8% triplets in Brown Bengal goats, and 26% singlet, 56% twins and 18% triplets in White Bengal goats. So multiple births were more in White Bengal goat (74%) followed by Brown Bengal (69%) and Black Bengal goats (62%). The present findings of multiple birth are in close conformity with the findings of Kanaujia *et al.* (1986), Husain *et al.* (1990), Misra and Sinha (2001), Samanta *et al.* (2009) and Tudu *et al.* (2015); however, they reported the trait in case of Black Bengal goat only. Lower incidence of multiple births was reported by Singh *et al.* (1987) and Verma *et al.* (1991). This may be due to difference in genetic makeup of the goat breeds studied by the respective workers.

## Conclusion

From the present study, it can be concluded that White Bengal goats were better, followed by Brown and Black, especially in regard to kidding interval and multiple births (twins and triplets) were more in White Bengal goat followed by Brown Bengal and Black Bengal goats.

## References

- [1] 18<sup>th</sup> *All India Livestock Census*. 2007. Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture, Govt. of India, New Delhi.
- [2] Acharya, R.M. 1982. Sheep and Goat breeds in India. Animal production and Health paper No.30, *Food and Agricultural Organization of the United Nations*, Rome, pp. 190.
- [3] Banerjee, G.C. 2006. *A Textbook of Animal Husbandry*. Oxford and IBH publishing Co. Pvt. Ltd., New Delhi, pp. 932-979.
- [4] FAOSTAT. 2010. *Production Data*, [www.faostat.org](http://www.faostat.org)
- [5] Husain, S.S., Mostafa, K.G. and Rahman, M.M. 1990. Studies on the reproductive characteristics of Black Bengal goats in some selected areas under rural conditions. *Bangladesh J. Anim. Sci.*, **19**: 1-7.
- [6] ICAR. 2002. Goat production. In. *Hand book of Animal Husbandry*. Indian Council of Agricultural Research, New Delhi, pp. 121-205.
- [7] Jimcy, J., Raghavan, K.C. and Sujatha, K.S. 2011. Diversity of local goats in Kerala, India, based on morpho-biometric traits. *Livestock Res. Rural Dev.*, 23, Article #119. Retrieved May 13, 2014, from <http://www.lrrd.org/lrrd23/5/jimc23119.htm>
- [8] Kanaujia, A.S., Pander, B.L., Vinayak, A.K. and Kalra, S. 1986. Seasonal variation in reproductive parameters of does: a note. *Indian J. Anim. Prod. Manage.*, **2**: 168-170.
- [9] Misra, S.K. and Sinha, R. 2001. Studies on the incidence of multiple birth and reproduction of Black Bengal goat in village condition. *J. Interacad.*, **5**: 212-215.
- [10] NBAGR. 2014. *National Bureau of Animal Genetic Resources*, Indian Council of Agricultural Research, [www.nbagr.res.in](http://www.nbagr.res.in)
- [11] Sahoo, A.K., Pan, S., Tantia, M.S. and Ahlawat, S.P.S. 2004. *Bengal goat*. National Agricultural Technology Project (Mission Mode), West Bengal University of Animal & Fishery Science, Kolkata, and National Bureau of Animal Genetic Resources, Karnal, Haryana, pp. 1-63.
- [12] Samanta, A.K., Rai, B. and Senapati, P.K. 2009. *Black Bengal goat*. AICRP on Goat improvement; Black Bengal Field Unit, Kolkata, West Bengal University of Animal &

Fishery Sciences, Kolkata, and Central Institute for Research on Goats, Makhdoom, Farah, Uttar Pradesh, pp. 1-66.

[13] Singh, D.K., Singh, C.S.P. and Singh, L.B. 1987. Reproductive traits of Black Bengal goats. *Indian J. Anim. Sci.*, **57**: 605-608.

[14] Snedecor, G.W. and Cochran, W.G. 1967. *Statistical Methods*. 8<sup>th</sup> Edn., The Iowa State University Press, Ames, Iowa, USA.

[15] Tudu, N.K., Goswami, K.K. and Ghosh, N. 2015. Black Bengal goat farming: An important component of integrated farming system. *J. Crop weed*, **11**: 80-85.

[16] Verma, R.R.P., Singh, B.K., Sing, M.P. and Singh, B. 1991. Factors affecting reproductive performance in Black Bengal goats. *Indian Vet. J.*, **68**: 235-239.

**Table 1: Variation in head profile, ear type, horn type and presence of wattles, beard and long body hair of three colour varieties of Bengal goats**

Parameters	Percentage (%)		
	Colour varieties		
	Black (250)	Brown (150)	White (100)
<b>Head profile</b>			
Straight	76.00 (190)	74.00 (111)	72.00 (72)
Convex	18.80 (47)	19.33 (29)	29.00 (20)
Concave	5.20 (13)	6.67 (10)	8.00 (8)
<b>Ear type</b>			
Erect	94.00 (235)	96.67 (145)	98.00 (98)
Pendulous	6.00 (15)	3.33 (5)	2.00 (2)
<b>Horn type</b>			
Straight	96.40 (241)	95.33 (143)	97.00 (97)
Curved	3.60 (9)	4.67 (7)	3.00 (3)
<b>Presence of wattles</b>	8.40 (21)	8.67 (13)	9.00 (9)
<b>Presence of Beard</b>	6.80 (17)	6.00 (9)	6.00 (6)
<b>Presence of long body hair</b>	20.40 (51)	20.00 (30)	27.00 (27)

(Figures in the parenthesis indicate number of observation)

**Table 2: Parity wise distribution of kidding in three colour varieties of Bengal goats**

Parity	Number of kids			Distribution of kidding (%)								
	Black	Brown	White	Black			Brown			White		
				Singlet	Twins	Triplet	Singlet	Twins	Triplet	Singlet	Twins	Triplet
Overall	250	150	100	38 (95)	52 (130)	10 (25)	31.33 (47)	60.67 (91)	8 (12)	26 (26)	56 (56)	18 (18)
1 <sup>st</sup> Kidding	107	57	46	53.27 (57)	34.57 (37)	12.15 (13)	49.12 (28)	47.37 (27)	3.51 (2)	50 (23)	43.48 (20)	6.52 (3)
2 <sup>nd</sup> Kidding	59	45	27	47.46 (28)	45.76 (27)	6.78 (4)	55.55 (25)	33.33 (15)	11.11 (5)	40.74 (11)	48.15 (13)	11.11 (3)
3 <sup>rd</sup> Kidding	45	23	11	33.33 (15)	60 (27)	6.67 (3)	30.43 (7)	47.83 (11)	21.74 (5)	27.27 (3)	54.54 (6)	18.18 (2)
4 <sup>th</sup> Kidding	25	14	9	28 (7)	48 (12)	24 (6)	14.28 (2)	57.14 (8)	28.57 (4)	22.22 (2)	55.56 (5)	22.22 (2)
5 <sup>th</sup> Kidding	14	11	7	28.57 (4)	57.14 (8)	14.28 (2)	27.27 (3)	54.54 (6)	18.18 (2)	28.57 (2)	57.14 (4)	14.28 (1)

(Figures in the parenthesis indicate number of observation)