Open Veterinary Journal, **(2011), Vol. 1: 7-9**
ISSN: 2218-6050

Short Communication

Submitted: 10/10/2010 Accepted: 07/11/2010 Published: 21/01/2011

Physical and morphometric characterization of indigenous cattle of Assam

R.B. Kayastha[1,*], G. Zaman[2], R.N. Goswami[2] and A. Haque[2]
[1] National Research Centre on Pig, ICAR, Rani, Guwahati-781 131, India
[2] College of Veterinary Science, Assam Agricultural University, Khanapara, Guwahati-781022, India

Abstract
The present investigation was undertaken to study the physical and morphometric characteristics in indigenous cattle of Assam. The data pertain to 339 indigenous cattle of different categories. The physical characteristics included colour pattern of body coat, muzzle, tail switch, hoof and horn. Body length, height at wither, heart girth, pouch girth, length of tail, switch, neck, ear and head were taken up for morphometric characterization. The main body coat colour of indigenous cattle was brown (31.18%) followed by white (28.53%), fawn (15.29%), grey (13.53%), black (4.41%) and mixed (7.06%). The prominent colour of tail switch was black (74.53%). Most of animals had black muzzle (86.47%), black hooves (84.71%) and black horn (100%). Morphometric characteristics data obtained were classified according to location, age group and sex of the animal. The means for body length, height at wither, heart girth, pouch girth, length of tail, switch, neck, ear and head were 83.668±0.590, 91.942±0.55, 113.146±0.738, 121.181±0.761, 54.196±0.527, 26.098±0.186, 32.705±0.166, 18.131±0.111 and 35.035±0.195 cm, respectively. Age and sex had significant effect on all the morphometric characters however, location effect was non-significant. The indigenous cattle of Assam are comparatively smaller in size than most of the recognized breeds of cattle however coat colour showed sizeable variation. The data generated for indigenous cattle of Assam would be useful to characterize them.
Keywords: Indigenous cattle, Characterization, Physical, Morphometric

Introduction

With the vast bovine genetic resources, India possesses 30 cattle breeds besides larger proportion of non-descript cattle. As per 17th Livestock Census of Assam, 2003, Assam possesses 8.4 million cattle out of which 7.9 millions are indigenous (Source: Directorate of Animal Husbandry and Veterinary Department, Assam). The indigenous cattle of Assam have been evolved through several generations of natural selection in the humid and subtropical climate. The importance of these animals lies in their draught power capacity, heat tolerance, disease resistance, adaptability to harsh agro-climatic conditions and ability to survive and perform under scarce feed and fodder. All these favourable traits made these cows as popular. The present investigation was undertaken to study the physical and morphometric characteristics as part of strategy for breed improvement programme.

Materials and Methods

The present investigation was carried out in the three districts of Assam viz., Kamrup, Sonitpur and North-Cachar Hills (NC Hills) district. Investigation pertaining to physical characteristics under field conditions were recorded by observation. Morphological traits were recorded in centimeter with the help of measuring tap and were classified according to location, age group and sex of the animal. Details of the observation containing physical and morphological traits were recorded in the prescribed format of National Bureau of Animal Genetics Resources (NBAGR, Karnal) for evaluation of breed under field conditions (Animal Genetic Resources of India, Cattle and Buffalo) was modified as per need of the study in the context of Assam. The data obtained for morphometric characteristics were classified according to Location (D1: Kamrup district, D2: Sonitpur district, D3: NC Hills district), Age group (G1: below 1 yr, G2: 1-2 yrs, G3: 2-3 yrs, G4: 3-4 yrs, G5: 4-5 yrs, G6: 5 yrs and above) and sex of the animal ($X_M^/$: Male and $X_F^/$: Female). Data generated were analyzed statistically by the least squares analysis of variance technique suggested by Harvey (1975). Duncan's Multiple Range Test (DMRT) as modified by Karmer (1957) was used to find out wherever significant differences between levels of effect were obtained.

Results and Discussion

The coat colour pattern of local cattle of Assam was found to be mostly patchy type (92.35%) in comparison to true solid pattern 7.65%. Out of various coat colour patterns observed in local cattle of Assam, the majority of cattle were brown in colour (31.18%) followed by white (28.53%). The other colours recorded were fawn (15.29%), grey (13.53%), black (4.41%) and mixed (7.06%). Sizeable variation of colour characteristics of indigenous cattle was fairly in

*Corresponding author: National Research Centre on Pig, ICAR, Rani, Guwahati-781 131, India.
Email: kayasthavet@yahoo.co.in

agreement with the observations reported by Sarkar *et al*. (2007) working in Desi cattle of West Bengal. He observed white (44.62%) as the predominant coat colour. The other colours were black (25.81%), brown (19.35%) and grey (10.22%). The colour pattern of Zanzibar zebu cattle as reported by Ali (1998) was comparable to the present findings on local cattle of Assam. The predominant muzzle colour was found to be black colour (86.47%) followed by black with white spots (13.59%). The common switch colour recorded were white (5.59%) and red (3.53%). The hoof colour was found to be black (84.71%) and white (15.29%). The common colour of horn in indigenous cattle of Assam was found to be black with a frequency of 100%.

In a total of 339 morphometric study, the means for body length, height at wither, heart girth, pouch girth, length of tail, switch, neck, ear, and head were 83.668±0.590, 91,942±0.55, 113.146±0.738, 121.181±0.761, 54.196±0.527, 26.098±0.186, 32.705±0.166, 18.131±0.111 and 35.035±0.195 cm, respectively, as seen in Tables 1 and 2.

Table 1: Least-square means and standard errors with the results of Duncan's Multiple Range Test for various factors affecting body length, height at wither, heart girth and pouch girth of Indigenous cattle of Assam.

Subclass description	Body length(cm)		Height at wither(cm)		Heart girth(cm)		Pouch girth(cm)		N
	LSM	SE	LSM	SE	LSM	SE	LSM	SE	
μ	83.668	0.590	91.942	0.550	113.146	0.738	121.181	0.761	339
District									
D_1	83.686	0.872	92.458	0.814	114.284	1.092	122.285	1.125	128
D_2	84.740	0.983	92.385	0.917	113.573	1.230	121.290	1.268	112
D_3	82.576	0.983	90.982	0.905	111.581	1.214	119.967	1.251	99
Age									
G_1	51.868^a	1.969	62.305^a	1.837	71.874^a	2.465	75.927^a	2.540	22
G_2	75.288^b	1.462	87.770^b	1.364	105.831^b	1.836	113.583^b	1.886	40
G_3	82.061^c	1.790	92.244^c	1.670	112.358^c	2.241	120.133^c	2.309	28
G_4	94.832^d	1.185	99.027^d	1.106	121.855^d	1.484	132.070^d	1.529	61
G_5	96.882^e	1.092	104.909^e	1.019	133.444^e	1.367	141.773^e	1.409	75
G_6	101.075^f	0.883	105.396^e	0.824	134.604^e	1.105	143.597^e	1.139	113
Sex									
X_M	91.200^a	0.816	98.092^a	0.762	121.689^a	1.022	130.427^a	1.053	144
X_F	76.135^b	0.754	85.792^b	0.703	104.604^b	0.944	111.934^b	0.972	195

LSM : Least-squares means ; SE : Standard error ; N : Number of observations. Sub-class means with different superscripts differ significantly ($P < 0.05$).

Table 2: Least-square means and standard errors with the results of DMRT for various factors affecting tail length, switch length, neck length, ear length and head length of Indegenous cattle of Assam

Subclass description	Body length(cm)		Height at wither(cm)		Heart girth(cm)		Pouch girth(cm)		N
	LSM	SE	LSM	SE	LSM	SE	LSM	SE	
μ	83.668	0.590	91.942	0.550	113.146	0.738	121.181	0.761	339
District									
D_1	83.686	0.872	92.458	0.814	114.284	1.092	122.285	1.125	128
D_2	84.740	0.983	92.385	0.917	113.573	1.230	121.290	1.268	112
D_3	82.576	0.983	90.982	0.905	111.581	1.214	119.967	1.251	99
Age									
G_1	51.868^a	1.969	62.305^a	1.837	71.874^a	2.465	75.927^a	2.540	22
G_2	75.288^b	1.462	87.770^b	1.364	105.831^b	1.836	113.583^b	1.886	40
G_3	82.061^c	1.790	92.244^c	1.670	112.358^c	2.241	120.133^c	2.309	28
G_4	94.832^d	1.185	99.027^d	1.106	121.855^d	1.484	132.070^d	1.529	61
G_5	96.882^e	1.092	104.909^e	1.019	133.444^e	1.367	141.773^e	1.409	75
G_6	101.075^f	0.883	105.396^e	0.824	134.604^e	1.105	143.597^e	1.139	113
Sex									
X_M	91.200^a	0.816	98.092^a	0.762	121.689^a	1.022	130.427^a	1.053	144
X_F	76.135^b	0.754	85.792^b	0.703	104.604^b	0.944	111.934^b	0.972	195

LSM : Least-squares means ; SE : Standard error ; N : Number of observations. Sub-class means with different superscripts differ significantly ($P < 0.05$).

The higher values of body length (male: 102.5±0.5cm and Female: 97.1±0.5cm) and heart girth (140.6±0.5cm) were reported by Gaur *et al*. (2004) on Ponwar breed of cattle, while Singh *et al*. (2002) reported the height at wither of adult male and female Deoni cattle as 134.36±2.03 cm and 122.22±1.23 cm, respectively. Much longer tail length including tail switch (109±4.7cm for bull and 88±1.8 cm for cows) in Siri cattle was reported by Panchung and Roden (1996). They reported the mean head length of Siri bulls and cows as 52±1.5 cm and 45±1.3 cm, respectively. Similarly, Singh *et al*. (2002) reported the mean head length of male and female Deoni cattle as 54.87±7.10 cm and 49.82±0.92 cm, respectively. The head length as observed in the present study was less than the observation made by all above workers.

Effect of location, age and sex:

In the present study body length, height at wither, heart girth, pouch girth, length of tail, switch, neck, ear and head length were found to differ significantly between different age groups and sex of the animals. Height at wither, heart girth, pouch girth, head length showed significant increase till the age of 4 to 5 years, after which the increase was non-significant. However, effect of location on the above mentioned traits were found to be non-significant.

The physical and morphometric characters recorded in the present investigation revealed that indigenous cattle of Assam are comparatively small in size than most of the recognized breeds of cattle. However, coat colour showed sizable variation.

Acknowledgement

The authors are thankful to the Dean of College of Veterinary Science, AAU, Khanapara, Guwahati-781022 for providing the facilities for conducting this study.

References

Ali, K.O., 1998. Indigenous cattle of Zanzibar: the need for conservation. *Anim. Genetics Resc. Infor*., 23, 13-20

Gaur, G.K.; Singh, A.; Singh, P.K. and Pundir, R.K., 2004. Morphometric characteristics and present status of Ponwar cattle breed in India. *AGRI.*, 34, 17-25

Harvey, W.R., 1975. Least-squares Analysis of Data with Unequal Sub-class Numbers. ARS, USDA, Beltsville, Maryland, 20, 8

Karmer, C.Y., 1957. Extension of multiple range test to group correlated adjusted means., Biometrics 13, 13-18

Panchung and Roden, J.A., 1996. Characterization of the Siri breed and the Mithun cross Siri in Bhutan. *AGRI.*, 20, 27-34.

Sarkar, A.; Dhara, K.C.; Ray, N; Goswami, A. and Ghosh, S.K., 2007. Physical characteristics, productive and reproductive performances of comparatively high yielding Deshi Cattle of West Bengal, India. *Livestock Research for Rural Development*, 19(9). www.lrrd.org

Singh, G.; Gaur, G.K.; Nivsarkar, A.E.; Patil, G.R. and Mitkari, K.R., 2002. Deoni cattle breed of India. A study on population dynamics and morphometric characteristics. *AGAR.*, 32, 35