Study on Morphometric Traits of Different Genetic Groups of Adult Cattle in Jajpur District of Odisha

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ABSTRACT

Morphometric traits of different genetic groups (Binjharpuri, graded Hariana and crossbred Jersey) was studied in 439 dairy animals belonging to 102 farmers which were selected from 3 blocks of Jajpur district covering 7 villages in the state of Odisha. The study revealed that average body weight was 215.63±4.76, 278.79±8.58, 260.93±6.28 Kg; average body length was 114.98±0.86, 123.52±1.48 and 122.89±0.93 cm; Heart girth was 141.56±1.35, 156.06±2.25 and 153.26±1.49 cm; Height at wither was 108.81±0.93, 118.56±1.65 and 115.75±0.49 cm and Tail length was 94.93±1.45, 102.62±2.26 and 87.61±2.4 cm respectively for Binjharpuri, graded Hariana and crossbred Jersey. Body weight, body length, heart girth, paunch girth, height at wither, head length, tail length and ear length were found significant among genetic groups. Horn length was found non-significant among the groups

***Key words**: Morphometric traits; Binjharpuri; Ggraded Hariana; Crossbred Jersey;*

India is endowed with forty recognized cattle breeds with promising characteristics (*NBAGR, 2015-16*). Out of these, Odisha is home to four indigenous cattle breeds and one of them is Binjharpuri breed which is most important in terms of productive performance and draft capacity. Most of the farmers feel obsessive for possessing a pair of Binjharpuri bullocks. Binjharpuri cattle are of medium size, thriving on grazing alone without any feed supplementation. They are well adapted to the local agro- climatic conditions and managemental practices.

In Odisha, exotic germplasm of Jersey and Holstein are introduced for crossbreeding and Hariana germplasm is used for upgrading including the areas covering the breeding tracts of Binjharpuri cattle. The status of Bijaripuri cattle in terms of numbers is in a receiving end in the state. Conservation of this breed is of paramount important in its native tract. With the depletion of genetic variability, the rate of genetic improvement will be slow and unpredictable. Due to unidirectional breeding policy in the native tract of Binjharpuri cattle, various genetic groups like graded Hariana and Red Sindhi cattle, crossbred Jersey and Holstein cattle are found today with different productive and reproductive performances. The present investigation was carried out to evaluate the morphometric traits of indigenous Binjharpuri cattle and other genetic groups found in its native tract and adjoining areas with the objective of recommending to Government for its conservation.

METHODOLOGY

The study was carried out in Jajpur district of Odisha as it is the main district from where Binjharpuri breed has evolved. Along with Binjharpuri cattle and other genetic groups namely crossbred Jersey, upgraded Hariana cattle developed due to artificial insemination and purchased from other areas were included in the study. Data were collected through personal interview using structured schedule from 3 blocks of Jajpur district covering 7 villages, and from 439 cattle of 102 farmers. Analysis of data was done by using simple statistical techniques like percentage, mean and standard deviation. Since the data were distributed unequally over

the above subclasses and it was non orthogonal, the least squares analysis for two way classification without interaction was followed.

RESULTS AND DISCUSSION

Body weight: The findings presented in the Table 1 reveals that average of body weight (e"2years) of Binjharpuri, graded Hariana and Jersey cattle were 215.63±4.76, 278.79±8.58, 260.93±6.28 Kg, respectively. The analysis of variance shows highly significant difference (Pd"0.01) between genetic groups i.e. Binjharpuri, graded Hariana and crossbred Jersey cattle (Table 2). Adult body weight of Binjharpuri cattle in present study was higher than the other cattle types of Odisha as reported by *Dash and Sethi (2007)* in Motu cattle, *Dhal et al. (2007)* in Khariar cattle and *Samantaray et al. (2009)* in Ghumusari cattle where as *Sahoo (1989)* in his study on Binjharpuri cattle reported higher body weights than the present findings on Binjharpuri and graded Hariana.

Body length: The average body length in Binjharpuri, graded Hariana and Jersey cattle were found 114.98 ±0.86, 123.52±1.48 , 122.89±0.93 cm, respectively. Significant difference (Pd"0.01) was also observed between genetic groups i.e. Binjharpuri, graded Hariana and crossbred Jersey cattle (Table 2). *Sahoo (1989)* in Ghumusari cattle of Odisha, *Pundir and Singh (2008[a])* in Red Kandhari cattle of Maharashtra, *Samantaray et al. (2009)* in Ghumusari cattle of Odisha and *Ganapathi et al. (2013)* in Bargur cattle in Tamil Nadu reported similar body length as compared to Binjharpuri cattle in present study.

Heart girth: The averages of heart girth in Binjharpuri, graded Hariana and Jersey cattle were observed as 141.56±1.35, 156.06±2.25 and 153.26±1.49 cm, respectively. Highly significant difference (Pd"0.01) was observed between Binjharpuri, graded Hariana and crossbred Jersey cattle on this trait. *Sahoo (1989)* in Binjharpuri cattle of Odisha, *Gaur et al. (2002)* in Ongole cattle of Andhra Pradesh , *Singh et al. (2002)* in Deoni cattle Maharastra and *Pundir and Singh (2008[b])* in Kakrej cattle of Gujrat reported higher heart girth than graded Hariana cattle in present study

Paunch girth: The least square averages of paunch girth in Binjharpuri, graded Hariana and Jersey cattle were 151.61±1.26, 168.70±2.74, 168.50±1.99 cm, respectively. Analysis of variance shows highly significant difference (Pd"0.01) between Binjharpuri, graded Hariana and crossbred Jersey cattle (Table 2). *Sahoo (1989)* in Binjharpuri cattle of Odisha, *Pundir and Singh (2007)* in Red Sindhi cattle in farm conditions and *Pundir and Singh (2008[b])* in Kakrej cattle of Gujrat reported higher heart girth than graded Hariana cattle in present study.

Height at wither: The least square averages of height at Binjharpuri, graded Hariana and Jersey cattle were found 108.81±0.93, 118.56±1.65 and 115.75±0.49cm, respectively (Table1). The analysis of variance between different genetic groups presented in Table 2 shows highly significant difference (Pd"0.01) on this trait. *Gaur et al. (2004)* in Ponwar cattle of Uttar Pradesh and *Sarkar et al. (2007)* in high yielding desi cattle of West Bengal, reported the average height at withers similar to current findings in Binjharpuri cattle.

Head length: The least square averages of head length Binjharpuri, graded Hariana and Jersey cattle were

Table 1. Least squares means and standard error of morphometric traits in different genetic groups of adult cattle.

Traits	Genetic Groups		
	Binjharpuri (170)	Graded Hariana (65)	Crossbred Jersey (47)
Body weight (Kg)	215.63±4.76	278.79±8.58	260.93±6.28
Body length (cm)	114.98±0.86	123.52±1.48	122.89±0.93
Heart girth (cm)	141.56±1.35	156.06±2.25	153.26±1.49
Paunch Girth (cm)	151.61±1.26	168.70±2.74	168.50±1.99
Height at wither (cm)	108.81±0.93	118.56±1.65	115.75±0.49
Head Length (cm)	42.17±0.97	46.09±1.27	42.37±0.59
Tail length (cm)	94.93±1.45	102.62±2.26	87.61±2.4
Ear Length (cm)	21.65±0.41	24.18±0.35	20.32±0.29
Horn length(cm)	13.20±0.69	13.34±0.80	15.38±0.95

The figures in bracket indicates sample size (n)

Table 2. Analysis of variance showing difference between genetic groups for morphometric trait of adult cattle

Traits	MS_G	MS_S	MS_E	F_S	F_G
Body weight	195691.899	84915.187	2046.267	41.498**	95.634**
Body length	3874.146	986.609	60.027	16.436**	64.540**
Heart girth	9771.555	3492.965	140.112	24.930**	69.741**
Paunch girth	16417.327	1785.251	209.651	8.515**	78.308**
Height at wither	543106.345	197860.195	7332.113	26.985**	74.072**
Head length	113.160	626.949	863.772	20.234**	14.687**
Tail length	2520.930	3817.531	169.661	22.501**	14.859**
Ear length	149.546	227.442	6.794	33.478**	22.012**
Horn length	50.476	43.953	38.801	1.301NS	1.133NS
DF	2	1	278		

MS_G –Mean sum of squares between genetic groups, MS_E –Error mean sum of squares,
**Pd"0.01-highly significant, NS- not significant

42.17±0.97, 46.09±1.27 and 42.37±0.59 cm, respectively (Table 1). Highly significant difference (Pd"0.01) was observed between Binjharpuri, graded Hariana and crossbred Jersey cattle. The average head length in graded Hariana in current study was similar to the report of *Pundir and Singh (2008[a])* in Red Kandhari cattle of Maharashtra and *Pundir and Singh (2008[b])* in Kankrej cattle of Gujrat.

Tail length: The averages of tail length of Binjharpuri, graded Hariana and Jersey cattle were 94.93±1.45, 102.62±2.26 and 87.61±2.4 cm, respectively. Significant difference (Pd"0.01) was also observed between genetic groups. Tail length of Binjharpuri cattle in current study was similar to the report of *Dash et al. (2010) and (2013)* in Binjharpuri cattle.

Ear length: The averages of ear length in Binjharpuri, graded Hariana and Jersey cattle were 21.65±0.41, 24.18±0.35 and 20.32±0.29 cm, respectively. Highly significant difference (Pd"0.01) was observed between genetic groups i.e. Binjharpuri, graded Hariana and crossbred Jersey cattle. *Dhal et al. (2007)* in Khariar cattle of Odisha, *Singh et al. (2002)* in Deoni cattle of Maharashtra and *Pundir and Singh (2008[a])* in Red Kandhari cattle of Maharashtra reported similar ear length as graded Hariana cattle in present study.

Horn length: The least square averages of horn length in Binjharpuri, graded Hariana and Jersey cattle were 13.20±0.69, 13.34±0.80 and 13.34±0.80 cm, respectively. Highly significant difference (Pd"0.01) was observed between genetic and groups i.e. Binjharpuri, graded Hariana and crossbred Jersey cattle. *Dhal et al. (2007)* in Khariar cattle of Odisha, *Samantaray et al. (2009)* in Ghumusari cattle of Odisha, *Dash et al. (2010) and (2013)* in Binjharpuri cattle observed average horn length similar to Binjharpuri cattle in current study.

CONCLUSION

The study revealed that most of the morphometric traits like body length, heart girth, paunch girth, height at wither, head length, tail length, etc., of Binjharpuri cattle are significantly different from the graded Hariana and crosbred Jersey. Purity of Binjarpuri breed of cattle can be maintained looking in to the above said morphometric characters for future use. The animal husbandry department may have to devise suitable breeding strategy to conserve this breed in its native tract.

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