Physical and morphometric characterization of young Red Kandhari cattle in their breeding tract

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ABSTRACT

A study was conducted in the breeding tract of Red Kandhari cattle in Marathwada region comprising Latur, Parbhani and Nanded district to document the morphometric characteristic to know the present status of the breed. Total 535 young Red Kandhari cattle were selected morphometric measurements were recorded by using measuring tape while physical characteristic were recorded visually. The overall LSQ means at 0-3 months of Red Kandhari for chest girth, abdominal girth, body length, height at wither, height at elbow, height at hip bone, height at pin bone, length of ear, width of ear, length of face, width of fore head, length of neck, width between hook bone, width between pin bone, tail length and body weight were 70.56 ± 0.66, 72.27 ± 0.78, 64.06 ± 0.69, 69.00 ± 0.63, 42.93 ± 0.37, 69.44 ± 0.66, 65.13 ± 0.63, 13.66 ± 0.21, 7.54 ± 0.07, 23.21 ± 0.32, 11.25 ± 0.18, 25.02 ± 0.26 , 15.71 ± 0.16 , 9.08 ± 0.15, 41.66 ± 0.44 cm and 30.06 ± 0.83 kg and at 4-12 months of age were 116.21 ± 0.73, 122.86 ± 0.77, 99.89 ± 0.51, 102.32 ± 0.43, 60.49 ± 0.59, 103.71 ± 0.44, 97.51 ± 0.38, 18.38 ± 0.16, 10.28 ± 0.24, 35.55 ± 0.24, 18.11 ± 0.08, 38.50 ± 0.13, 26.43 ± 0.22, 14.83 ± 0.18, 60.90 ± 0.39 cm and 127.93 ± 2.42 kg, respectively. Majority of the Red Kandhari cattle have Brick Red coat color followed by Dark Red. The sex showed highly significant (P<0.01) to significant (P<0.05) effect on most of the traits for both the age group whereas district doesn’t play any major role on these traits. The significant to highly significant effect of sex on some of body measurements and non-significant effect of district in all traits may lead to the concrete conclusion that these factors play a major role in exhibiting the specific body measurements only in Red Kandhari cattle at 4-12 and 0-3 months of age.

Key words: Body weight, Characterization, Morphometric, Red Kandhari.

INTRODUCTION

The Red Kandhari cattle breed was recognized as descript draft purpose breed in year 1989 by the Government of India (Department of Agriculture and co-operation GOI 1989). After recognition the breed become more popular amongst the farmers in the breeding tract as the breed has got appreciation and awards at various Livestock Shows. The wide spread popularity of Red Kandhari in the breeding tract and fetching premium prices in the market livestock owner have started rearing of Red Kandhari as a major activity with much more emphasis and importance for production of breeding bulls. Providing the natural services by the elite Red Kandhari Bull has become a commercial activity amongst the breeders and farmers. This has resulted in a drastic increase in the population of young Kandhari animal in breeding tract. The present study has been planned to know the current status of Red Kandhari cattle’s morphometric characterization.

The estimation of body weight using morphometric measurements becomes very useful for smallholder livestock producers who rarely keep records.

MATERIALS AND METHODS

The present study was conducted in the Nanded, Latur and Parbhani districts of Marathwada region of Maharashtra state because the population of Red Kandhari breed is mostly concentrated in these districts. The data on physical characteristics of Red Kandhari i.e. body length, chest girth, abdominal girth, height at withers, height at elbow, height at pin bone, height at hip, length of ear, width of ear, length of face, width of fore head, horn length, width between hook bone, width between pin bone, length of neck, tail length and body weight was recorded in 535 young Red Kandhari individual irrespective of sex. The collected data were subjected to the Least Squares Analysis Technique as outlined by Harvey (1976).

RESULTS AND DISCUSSION

The body measurements and body weight of Red Kandhari cattle at various stages of growth for different sex i.e. male (S1) and female (S2) at different locations i.e. Latur (D1), Parbhani (D2) and Nanded (D3) in the breeding tract were recorded.

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The overall Least Squares mean (Table 1) for chest girth at 0-3 months of age group was 70.56 ± 0.66 cm, which is in agreement with Munde (2012) and Shinde (2013) in Gaolao cattle and Red Kandhari cattle, respectively. The overall Least Squares mean for abdominal girth at 0-3 months of age group was 72.27 ± 0.78 cm which is in agreement with Pundir et al. (2015) in indigenous cattle of Manipur. The overall Least Squares mean for body length of Red Kandhari cattle at 0-3 months of age group was 64.06 ± 0.69 cm which is agreement with Yadav (2008) and Shikhalgar (2011) in Deoni cattle, and Khillar cattle, respectively. The overall Least Squares mean for height at wither of Red Kandhari cattle at 0-3 months of age group was 69.00 ± 0.63 cm which is in agreement with Shikhalgar (2012) in Khillar cattle. The overall Least Squares mean for height at elbow of Red Kandhari cattle at 0-3 months of age group was 42.93 ± 0.37 cm. The overall Least Squares Mean for height at hip bone of Red Kandhari cattle at 0-3 months of age group was 65.13 ± 0.63 cm. The overall Least Squares mean for length of ear at 0-3 months of age group was 11.25 ± 0.18 cm which is in agreement with Pundir (2012) in Hill cattle. The overall Least Squares mean for width of ear of Red Kandhari cattle at 0-3 months of age group was 7.54 ± 0.07 cm. The Least Squares mean for length of face in S1 and S2 sex were averaged 23.71 ± 0.31 and 22.72 ± 0.55 cm. The overall Least Squares mean for length of face of Red Kandhari cattle at 0-3 months of age group was 23.21 ± 0.32 cm which is in agreement with Pundir (2012) in Hill cattle. The overall Least Squares means for width of fore head of Red Kandhari cattle at 0-3 months of age group was 11.25 ± 0.18 cm. The overall Least Squares mean for length of neck of Red Kandhari cattle at 0-3 months of age group was 25.02 ± 0.26 cm. The overall Least Squares means for width between hook bone of Red Kandhari cattle at 0-3 months of age group was 15.71 ± 0.16 cm. The overall Least Squares means for width between pin bone of Red Kandhari cattle at 0-3 months of age group was 28.80 ± 0.76 cm which is in agreement with Pundir and Singh (2008) in Red Kandhari cattle. The Least Squares mean for chest girth of Red Kandhari cattle for S1 and S2 sex were averaged 42.36 ± 0.44 and 40.95 ± 0.76 cm. The overall Least Squares mean for tail length at 0-3 months of age group was 41.66 ± 0.44 cm. which is in agreement with Pundir and Singh (2008) in Red Kandhari cattle. The Least Squares mean of body weight of Red Kandhari cattle for S1 and S2 sex were averaged 31.97 ± 0.82 and 28.15 ± 1.43 kg. The overall Least Squares mean for body weight of Red Kandhari at 0-3 months of age group was 30.06 ± 0.83 kg which in agreement with Pawar (2002) in Khillar Cattle.
The overall picture of body measurements and body weight of Red Kandhari calves at 0-3 months of age revealed that all the LSMs are on lower side as compared to their counterpart calves as reported earlier by Nikam (2013) and Shinde (2013) in Red Kandhari cattle of the same age group. The overall lower body measurements and body weight observed at 0-3 months of age may be attributed to the fact that these cattle are reared in field condition with less genetic factors, non-genetic factors, and poor feeding conditions prevailing in Maharashtra region.

The significant effect (Table 3) of sex on almost all body measurement and body weight parameters is indicative of the fact that male surpass in all these traits as compared to female counterparts. Only the non-significant effect of district (location) doesn’t play any role in exhibiting these traits being a non-genetic factor.

The overall Least Squares mean for chest girth of Red Kandhari cattle at 4-12 months of age group was 116.21 ± 0.73 cm is in agreement with Singh et al. (2006); Salim (2014) in Dhofari Cattle and Deoni cattle, respectively. The overall Least Squares mean for abdominal girth of Red Kandhari cattle at 4-12 months of age group was 122.86 ± 0.77 cm which is in agreement with Parveen et al. (2009) in Sahiwal cattle. The overall Least Squares mean for body length at 4-12 months of age group was 99.89 ± 0.51 cm which is in agreement with Pawar et al. (2002) in Khillar cattle. The overall Least Squares mean for height at wither of Red Kandhari cattle at 4-12 months of age group was 102.32 ± 0.43 cm which is in agreement with Pawar et al. (2002) in Khillar cattle. The overall Least Squares mean for height at elbow of Red Kandhari cattle at 4-12 months of age group was 60.49 ± 0.59 cm. The overall Least Squares mean for height at hip bone of Red Kandhari cattle at 4-12 months of age group was 103.71 ± 0.44 cm. The overall Least Squares mean for height at pin bone of Red Kandhari cattle at 4-12 months of age group was 97.51 ± 0.38 cm. The overall Least Squares mean for length of ear of Red Kandhari cattle at 4-12 months of age group was 18.38 ± 0.16 cm which is in agreement with Singh et al. (2007); Pundir et al. (2007) in Kenkatha cattle and Gangatiri cattle, respectively. The overall Least Squares mean for width of ear of Red Kandhari cattle at 4-12 months of age group was 10.28 ± 0.24 cm. The overall Least Squares means for length of face, width of fore head, length of neck, width of fore head, and width between hook bone and width between pin bone of Red Kandhari cattle at 4-12 months of age group were 35.55 ± 0.24, 18.11 ± 0.08, 38.93 ± 0.15 and 14.83 ± 0.39 cm, respectively.
The overall Least Squares mean for body weight of Red Kandhari cattle at 4-12 months of age group was 127.93 ± 2.42 kg which is in agreement with Nikam (2013) in Red Kandhari cattle.

The overall picture of body measurements and body weight of Red Kandhari calves at 4-12 months of age has revealed that all the LSMs are on higher side as compared to their counter parts of Red Kandhari as reported earlier by different scientists in the same age group. The overall higher body measurements and body weight at 4-12 months of age may be attributed to the fact that inclusion of maximum number of higher age animal in this age group resulting into the comparably higher morphometric performance.

The highly significant to non-significant effect (Table 3) of sex on almost all body measurement and body weight parameters is indicative of the fact that male surpass in all these traits as compared to female counter parts, however the non-significant effect (Table 3) of district indicated that this non-genetic factor doesn’t play any role in exhibiting/expressing these traits.

Table 3: Least Squares Analysis of Variance (ANOVA) for body measurement and body weight of Red Kandhari cattle at 0-3 and 4-12 months of age.

<table>
<thead>
<tr>
<th>Sources</th>
<th>d.f.</th>
<th>CG</th>
<th>AG</th>
<th>BL</th>
<th>HW</th>
<th>HE</th>
<th>HH</th>
<th>HP</th>
<th>LE</th>
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<tr>
<td></td>
<td></td>
<td>F-value</td>
<td>F-value</td>
<td>F-value</td>
<td>F-value</td>
<td>F-value</td>
<td>F-value</td>
<td>F-value</td>
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</tr>
<tr>
<td>0-3 months of age</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>District</td>
<td>2</td>
<td>2.90</td>
<td>2.527</td>
<td>2.622</td>
<td>3.992*</td>
<td>2.339</td>
<td>4.54*</td>
<td>4.19*</td>
<td>3.877*</td>
</tr>
<tr>
<td>Error</td>
<td>139</td>
<td>4.808</td>
<td>2.87</td>
<td>2.622</td>
<td>3.992*</td>
<td>2.339</td>
<td>4.54*</td>
<td>4.19*</td>
<td>3.877*</td>
</tr>
<tr>
<td>4-12 months of age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>0.008</td>
<td>0.288</td>
<td>5.917*</td>
<td>3.634</td>
<td>0.367</td>
<td>3.159</td>
<td>2.291</td>
<td>3.60</td>
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<tr>
<td>District</td>
<td>2</td>
<td>0.341</td>
<td>0.398</td>
<td>0.074</td>
<td>0.018</td>
<td>0.266</td>
<td>1.011</td>
<td>0.228</td>
<td>0.168</td>
</tr>
<tr>
<td>Error</td>
<td>388</td>
<td>0.341</td>
<td>0.398</td>
<td>0.074</td>
<td>0.018</td>
<td>0.266</td>
<td>1.011</td>
<td>0.228</td>
<td>0.168</td>
</tr>
</tbody>
</table>

The percentage of colour variation (Table 4) in Red Kandhari cattle at 0-3 months of age was Dark Red (64.34) followed by Brick Red (35.66), at 4-12 months of age it was Dark Red (46.68) and Brick Red (53.32). The percentage of colour variation in Red Kandhari cattle in D1 district at 0-3 months of age was Dark Red (60.38) followed by Brick Red (39.62) and at 4-12 months of age it was Dark Red (51.91) followed by Brick Red (48.09), respectively. The percentage of colour variation in Red Kandhari cattle in D2 district at 0-3 months of age was Dark Red (71.43) followed by Brick Red (28.57) and at 4-12 months of age it was Dark Red (46.4) followed by Brick Red (53.6), respectively. The percentage of colour variation in Red Kandhari cattle in D3 district at 0-3 months of age was Dark Red (63.64) followed by Brick Red (36.36) and at 4-12 months of age it was Dark Red (41.91) followed by Brick Red (58.09), respectively. The overall colour variation observed in Red Kandhari cattle at both age group of 0-3 and 4-12 months of age in breeding tract was dark red in early age followed by Brick red in later age. The similar trend were also reported by Pundir and Singh (2008) in Red Kandhari cattle.

Table 4: Percent variation of Colour pattern of Red Kandhari cattle at 0-3 and 4-12 months of age in the breeding tract.

<table>
<thead>
<tr>
<th>Category</th>
<th>N</th>
<th>Dark Red(%)</th>
<th>Brick Red(%)</th>
<th>Category</th>
<th>N</th>
<th>Dark Red(%)</th>
<th>Brick Red(%)</th>
</tr>
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<tbody>
<tr>
<td>0-3 months of age</td>
<td></td>
<td>0-24 months</td>
<td>13-24 months</td>
<td>0-3 months of age</td>
<td></td>
<td>0-24 months</td>
<td>13-24 months</td>
</tr>
<tr>
<td>District</td>
<td></td>
<td>0-24 months</td>
<td>13-24 months</td>
<td>District</td>
<td></td>
<td>0-24 months</td>
<td>13-24 months</td>
</tr>
<tr>
<td>Latur (D1)</td>
<td>143</td>
<td>64.34(92)</td>
<td>35.66(51)</td>
<td>Latur (D1)</td>
<td>392</td>
<td>46.68(183)</td>
<td>53.32(209)</td>
</tr>
<tr>
<td>Parbhani (D2)</td>
<td>35</td>
<td>60.38(32)</td>
<td>39.62(21)</td>
<td>Parbhani (D2)</td>
<td>125</td>
<td>46.40(58)</td>
<td>53.60(67)</td>
</tr>
<tr>
<td>Nanded (D3)</td>
<td>55</td>
<td>63.64(35)</td>
<td>36.36(20)</td>
<td>Nanded (D3)</td>
<td>136</td>
<td>41.91(57)</td>
<td>58.09(79)</td>
</tr>
</tbody>
</table>

Note: Figures in parenthesis indicate the number of observation.

CONCLUSION

The significant to highly significant effect of sex on almost all body measurements and body weight of Red Kandhari cattle may conclude superior performance of males over females. The non-significant district effect on all traits under study may conclude the stabilized population of this breed in the breeding tract.

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