

A MORPHOMETRIC ANALYSIS OF INDIGENOUS WHITE CATTLE (THAMANKADUWA BREED) IN THE EASTERN PROVINCE OF SRILANKA WITH A DESCRIPTION OF A NOVEL CHARACTER

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ABSTRACT

A good understanding of breed characteristics is necessary to guide decision-making in livestock development and breeding programmes. White cattle or Thamankaduwa breed is a unique type of local cattle found predominantly in the Eastern coast and in the North Central Province of Sri Lanka. In the present study, we followed the Food and Agriculture Organization (FAO) guideline to characterize the eastern white cattle populations in the Trincomalee district using both qualitative and quantitative characters. Our study sample consisted of 60 (male=09, female=51) adult animals of the Thamankaduwa breed, randomly selected from 15 farms. The qualitative characters measured include coat color pattern, hoof pigmentation and shape of the horns while the quantitative measurements included height of withers, body length, chest girth, and ear length and muzzle circumference. All measurements were recorded after humanely restraining the selected animals. We also compared our morphometric measurements with previously published measurements for the same breed and provided the measurement for a novel character (muzzle circumference) that was not available previously. Coat colour was pure white and the hoof was black in all measured animals. We could not find any difference between the male and female coat coloration and hoof color. Two types of horn morphologies could be observed. The predominant type was curved type (n=41) while the other was straight (parallel) type (n=19). Following measurements were obtained for withers height (mean=112.5cm, range=120-89cm, SD=□5.1), body length (mean =113.0cm, range=131-89 cm, SD=□6.9), chest girth (mean=138.2 cm, range=118-149 cm SD=□6.4), ear length (mean=18.6cm, range=14-23 SD=□1.8) and muzzle circumference (mean=37.5 cm, range =44-27 SD=□2.5). Our morphometric measurements for withers height, body length, chest girth and ear length were not significantly different ($p<0.05$) from the previously published values.

Keywords: White cattle, morphometric, muzzle circumference

INTRODUCTION

A good understanding of breed characteristics is necessary to guide decision-making in livestock development and breeding programmes. Genetic and phenotypic characterizations are widely used to define breeds and are thus important tools to identify the genetic diversity among animals in a production population. Phenotypic characterization is the systematical documenting of observed characters, geographical distribution and production environment [FAO, 2012]. This research study is planned for phenotypic characterization of a group of important local cattle called "White cattle" or Thamankaduwa breed available mostly in the eastern and the North Central Province of Sri Lanka, using recommendation of the Food and Agriculture Organization of the United Nations (FAO). Among available farm animals, 1 genetic resources (FAnGR) in Sri Lanka cattle are very much less discussed for their genetic value. According to the available literature, only few studies [e.g. Mahadevan, 1952; Abeygunawardena and Abayawansa, 1995; Silva et al., 2005, 2008 & 2010b;

Tilakaratne, 1980 & 1984) have been carried out for characterization of local cattle varieties in Sri Lanka. These few studies focused mainly on phenotypic characterization with special emphasis on reproductive parameters. White cattle are mostly described as a local zebu cattle variety originated from crossbreeding between local Lankan cattle with imported Indian breeds [DAD-IS, 2012]. Less reliable information is available about white cattle. Some believe that they are another indigenous type of cattle variety in Sri Lanka. Most of the indigenous cattle varieties are arid zone adaptable and very much resistant to several diseases including parasitism.

MATERIALS AND METHOD

This study was carried out according to the recommendations of the FAO for phenotypic characterization of animals. Qualitative (sex, age group, coat color pattern, hoof pigmentation and shape of the horns) and quantitative (height of withers, body length, chest girth, ear length and muzzle circumference) traits were characterized in 60 (male=09, female=51) animals randomly selected from 15 farms in Trincomalee district. All measurements were recorded after humanely restraining the selected animals. Statistical analysis of data was carried out using analysis of variance (ANOVA) and chi-squared test (Minitab 14 statistical analysis software).

RESULTS AND DISCUSSION

Coat colour was pure white and the hoof was black in all measured animals. We could not find any difference between the male and female coat coloration and hoof color. Two types of horn morphologies could be observed. The predominant type was curved type (n=41) while the other was straight (parallel) type (n=19). Following measurements were obtained

Table 1: Morphological character measurements

Morphological characters	Mean (cm)	Range (cm)	Standard deviations (cm)
Withers height	112.5	120-89	+/-5.1
Body length	113.0	131-89	+/-6.9
Chest girth	138.2	118-149	+/-6.4
Ear length	18.6	14-32	+/-1.8
Muzzle circumference	37.5	44-27	+/-2.5

The studies conducted by Silva (Silva et al, 2005 2008) have reported the same three characters (withers height, body length and chest girth) for white cattle in their study and there is no significant difference between the results of the two studies ($p < 0.05$). Other than the previously described three characters, in the present study we are reporting a novel character (muzzle circumference) for phenotypic characterization of white cattle in Sri Lanka.

CONCLUSION

In the present study we are reporting a novel character for phenotypic characterization of white cattle in Sri Lanka, which is the muzzle circumference. Four other quantitative characters (withers height, body length, chest girth and ear length) measured for white cattle in this study were not significantly different ($p < 0.05$) from the previously reported values.

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