

GENETIC AND PHENOTYPIC PARAMETERS FOR VARIOUS BODY MEASUREMENT TRAITS IN THE CANCHIM BEEF CATTLE BREED IN BRAZIL

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INTRODUCTION

During the last two decades, several beef cattle breeding programs have been implemented in Brazil. These programs always use some growth traits as selection criteria. These traits, usually body weights, are easy to obtain and are highly heritable. According to Lanna and Packer (1998), the measures used as criteria to define size of an animal at maturity should be metric traits that do not change according to feed availability, stress, lactation, etc. Winkler (1993) stated that skeletal measurements are safer information of an animal's size, because they are less susceptible to environmental variations than body weight. However, if this kind of trait is to be used as selection criteria, it is necessary to estimate their genetic and phenotypic parameters. The objective of this work was to estimate both heritabilities and genetic and phenotypic correlations of some body measurement traits in the Canchim (5/8 Charolais + 3/8 Zebu) cattle breed, as an aid to selection decisions.

MATERIAL AND METHODS

Body length (Bl), height at the withers (Hw), height at the hip (Hh) and thoracic perimeter (Tp) were taken on 1273 adult (≥ 4 years old) females of the Canchim breed from several herds located in the Central region of Brazil. Each cow was measured just once in the year of 2000. Preliminary analyses of the data were done by the least squares method, using the GLM procedure (SAS, 2000), to evaluate the effects of herd, month of birth and age of cow on the traits studied. Genetic and phenotypic parameters were estimated by the derivative free restricted maximum likelihood method, using the MTDFREML program (Boldman et al., 1993), with models that included the fixed effects of herd and of age of cow (4, 5, 6, 7, 8, and ≥ 9 years old) and the additive direct random effect.

RESULTS AND DISCUSSION

The analyses of variance showed significant ($P < 0.01$) effects of herd and age of cow on all traits studied. In general, the animals became longer, taller and with higher Tp as they aged, up to six or eight years of age.

Estimates of heritability, obtained by the one-trait analyses, are presented on the diagonal of table 1. The estimates obtained for Bl, Hw, Hh and Tp are, in general, within the range, but below the average, of those reported for Zebu breeds in Brazil (Lima et al., 1989; Winkler et al., 1993; Agropecuária CFM, 2000; Silva et al., 2000; Cyrillo et al., 2001; Mercadante, 2001) and outside Brazil (Fernandes et al., 1996; Vargas et al., 1998).

Table 1. Estimates of heritabilities and genetic and phenotypic correlations of body length (Bl), height at the withers (Hw), height at the hip (Hh) and thoracic perimeter (Tp) of Canchim adult females

Trait	Trait			
	Bl	Hw	Hh	Tp
Bl	0.33	0.86	0.92	0.62
Hw	0.52	0.34	0.97	0.82
Hh	0.48	0.72	0.36	0.70
Tp	0.35	0.34	0.32	0.19

Heritabilities on the diagonal, and genetic and phenotypic correlations above and below the diagonal, respectively.

The genetic and phenotypic correlations, obtained by the two-trait analyses, are presented in table 1, above and below the diagonal, respectively. The genetic correlations are all very high, suggesting that most of the genes with additive gene action that affect one trait also affect the others. The correlations among the two measures of height indicate that the traits are essentially the same. These genetic correlations are, in general, higher than those (0.11 to 0.95) reported by Lima *et al.* (1989), Winkler *et al.* (1993) and Cyrillo *et al.* (2001) for Zebu cattle in Brazil, and those (0.64 to 0.99) obtained by Fernandes *et al.* (1996) for Brahman cattle in Mexico.

The phenotypic correlations obtained are much smaller than the genetic correlations, which agree, in general, with the results of Winkler *et al.* (1993) and Cyrillo *et al.* (2001).

CONCLUSION

The heritability estimates obtained in this study indicate that body length, height at the withers and height at the hip should respond to selection in the Canchim herds studied, while the genetic correlation estimates suggest that selection for anyone of these body measurement traits should result in correlated changes in the others.

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