AVERAGE INBREEDING AND GENETIC GAIN IN SIMULATED POPULATIONS OF DUAL-PURPOSE CATTLE UNDER DIFFERENT METHODS OF SELECTION

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INTRODUCTION

The development of breeding programs that meet two goals (dairy and beef) can be important for improving the dual-purpose breeds, thus contributing to greater profitability and satisfaction of dual-purpose cattle producers. This study aimed to evaluate the variation of average inbreeding and genetic gain in simulated dual-purpose populations using different selection methods.

MATERIAL AND METHODS

Was used the GENESYS simulation program developed by Euclydes (1996) to simulate data selected for this study. The base population was created by mating 100 females and 100 males. The zero population was thus simulated, marking the beginning of relationship among individuals. Over the generations, we calculated the effect of the average inbreeding and genetic gain for the different selection methods: random mating (shows no selection), Best Linear Unbiased Prediction (BLUP), molecular markers (MAS), genotypic selection, individual selection, selection index, markers plus selection index (MAS + selection index), markers plus individual selection (MAS + individual selection), and selection for family over 10 generations. The entire process was repeated 10 times, always beginning in the same initial population to reduce effects of genetic drift (CARNEIRO, 2007). The traits observed were milk production, body weight at 378 days, and birth interval, with heritability values (h^2) of 0.30, 0.37, and 0.10, respectively. The correlations between traits were: null between milk production and birth interval; negative between milk production and body weight at 378 days;

and positive between the birth interval and body weight at 378 days.

Results and discussion

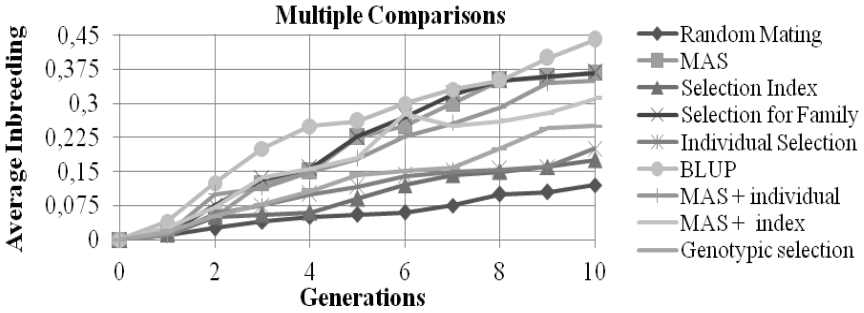

Figure 1 - Average inbreeding coefficient (%) in a dual-purpose population among different selection methods over the course of 10 generations.

The population selected by the BLUP classic method showed higher inbreeding coefficients (Figure 1), confirming the results observed by Cunha et al. (2003). This method selects a larger number of individuals of the same family because of the high correlation of performance between them over the generations (EUCLYDES, 1996). The family selection method also showed higher average inbreeding levels than other selection methods evaluated.

The selection index method presented the lowest coefficient of inbreeding during the ten generations observed, followed by the individual selection method and genotypic selection. According to Breda et al. (2003), the effect of inbreeding depression is relatively smaller at low levels of inbreeding. Therefore, a monitored relationship between the animals selected for breeding is indicated for upkeep or reduction of population inbreeding.

Aiming to increase the genetic value of dual-purpose populations on the evaluated traits, the individual selection methods (BLUP Classic and MAS + index) were the main contributors to raise the genetic value of traits body weight at 378 days and interval between births. The BLUP was the method that most closely approximates the expected results, as it provides high genetic gain in the shortest time due to increase in selection accuracy (correlation between the selection criteria and genetic

values of individuals), acquired through relative information, which shows greater importance in low-heritability traits (Queiroz et al., 2005).

Usually, selection for a larger number of traits leads to increased interaction between different genes, and satisfying results are not easily obtained. This interaction is more evident in dual-purpose animals selected for intensive production of milk and meat, and the epistatic effect is more apparent than in specialized-production populations.

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