Genetic trends of feed efficiency and growth traits in Nellore cattle *

Lorena F. Benfica*[1], Leandro S. Sakamoto[2], Joslaine N.S.G. Cyrillo[2], Fábio M. Monteiro[1,2], Roberta C. Canesin[2], Maria Eugênia Z. Mercadante[2]

[1]São Paulo State University (Unesp), Jaboticabal/SP, Brazil; [2]Institute of Animal Science, Sertaozinho/SP, Brazil.

*Doctoral student – lorena.benfica@yahoo.com.br

Residual feed intake (RFI) has been used as a selection criterion for beef cattle to improve individual feed efficiency, without changing animal performance. The objective of the present study was to estimate the genetic trends for RFI (0 ± 0.615, kg DM day^{-1}), feed conversion rate (FC, 7.44 ± 2.08 kg DM kg gain^{-1}), average daily gain (ADG, 1.036 ± 0.252 kg day^{-1}), dry matter intake (DMI, 7.39 ± 1.50 kg day^{-1}) and metabolic body weight (BW$^{0.75}$, 70.0 ± 9.88 kg) in a Nellore herd (200 cows + 8 bulls) selected for higher postweaning weight adjusted to 378 days (W378) and for lower RFI. The selection started in 2008, when replacement bulls were selected based on their own performance, and then based on the breeding value estimates for each trait (> W378; <CAR). There was no female selection. Breeding values were estimated in a single-trait analysis by ssGBLUP method (BLUPF90 family) including phenotypes of 1,706 animals, genotypes of 1,719 animals and a pedigree file with 9,776 animals. In order to obtain the genetic trends, the breeding value annual means of animals born from 2009 to 2019 were regressed on the year of birth using SAS (SAS Inst., Inc., Cary, NC). The significance of regression coefficients was determined by t test. The selection for higher W378 and lower RFI promoted negative and significant annual genetic trends ($p<0.05$) for RFI and DMI (-0.0169 kg DM day year^{-1} and -0.0191 kg DM day year^{-1}, respectively), as well as a positive and significant annual genetic trend ($p<0.05$) for BW$^{0.75}$ (0.132 kg year^{-1}). However, genetic trends for ADG and FC were not significant ($p>0.05$). Considering that RFI is a measure of feed efficiency that allow selecting animals with lower feed intake without compromising the production level, a significant genetic trend decreasing for DMI together a non-significant genetic trend for ADG, are in agreement of the objective of selection for negative RFI. According to annual genetic trends estimated over 10 years of selection for higher W378 and lower RFI, there was a favorable reduction of -0.169 kg DM day^{-1} in the breeding value of animals for RFI and a reduction of -0.191 kg DM day^{-1} in the breeding value of animals for DMI, without reduction in the breeding value for ADG. However, there was also an increase of 1.32 kg in the breeding value for BW$^{0.75}$ of these animals. In conclusion, the selection of Nellore cattle based on postweaning weight and residual feed intake was effective for improving feed efficiency and decreasing feed intake, without changing average daily gain.

Keywords: average daily gain, postweaning weight selection, RFI

---

* Resumo destaque