# ESTIMATION OF GENETIC AND PHENOTYPIC PARAMETERS FOR MEAT AND CARCASS TRAITS IN NELLORE BULLS


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Poster Session 1

## Objectives

The objectives of this study was to estimate genetic and phenotypic parameters for hot carcass weight, rib eye area, backfat, shear force, total lipids and cholesterol level measured in a Nellore beef cattle population raised in Brazil.

## Conclusions

The results of this research indicate that selection can be effective to modify hot carcass weight, rib eye area and backfat and can also promote a moderate genetic gain for shear force and total lipids, but almost no gain for cholesterol level.

## Introduction

Genetic parameters are important tools for animal breeding programs, in order to define selection criteria and evaluate selection program applied to populations, helping to better guide those programs.

Traits related to carcass and meat quality, as hot carcass weight , rib eye area, backfat, tenderness and marbling, which are becoming of major concern to consumers, are not being intensively worked in beef breeding programs, because they are labor intensive and expensive to measure in large scale, besides they require standardization of measurement methodology.

However, the knowledge of variance components and genetic parameters for those carcass and meat traits, even in experimental populations, can be very useful to define selection programs.

Nellore is the most representative breed in the Brazilian beef cattle population. However, (co)variance components and genetic parameters for carcass traits in that breed are rare in the literature, and even worse in *Bos indicus* cattle. So, it is very important to study (co)variance components of carcass and meat quality traits in that breed, to define breeding strategies for that breed reared in tropical and subtropical areas of Brazil.

## Methods

*A. Data description*

Data on 656 Nellore cattle, reared under pasture conditions in southwestern Brazil until around 20 months, finished in a feedlot with medium energy level diet, composed mostly by corn silage and soybean meal, and slaughtered at age from 21 to 29 months were analyzed.

*B. Analyzed traits*

Carcass and meat quality traits analyzed were hot carcass weight (HCW), rib eye area (REA), backfat (BF), shear force measured after 7 days of ageing (SF), total lipids (LIP) and cholesterol (CHOL).

*C. Statistic model*

The animal model included the fixed effects of contemporary groups, the effects of analysis date (for LIP and CHOL), and, as covariates, age of animal at slaughter, backfat (for LIP, CHOL and SF), pH measured 24 hours after slaughter (for SF) and temperature of samples (for SF). Random effects of direct additive genetics and residual were also considered.

*D. Genetic analysis*

The full relationship matrix had 4,734 animals. Estimation of (co)variance components was performed by REML, using VCE 6.0 software in two three-trait analysis. One of the analysis was carried out with SF, LIP and CHOL, and the other one with last three traits (HCW, REA and BF).

## Results

Descriptive statistics of analyzed traits measured on Nellore beef cattle are described on Table 1.

**Table 1.** Number of observations and descriptive statistics for analyzed carcass and meat quality traits

| Característica | N | MED | DP | CV | MIN | MAX |
|---|---|---|---|---|---|---|
| HCW, kg | 674 | 290.51 | 17.68 | 6.08 | 255.50 | 393.00 |
| REA, $cm^2$ | 668 | 73.35 | 7.03 | 9.59 | 56.00 | 101.00 |
| BF, mm | 666 | 4.39 | 2.00 | 45.65 | 1.00 | 15.00 |
| SF, kg | 671 | 5.93 | 1.45 | 24.37 | 1.82 | 9.99 |
| LIPIDS, g/100g | 589 | 2.19 | 0.65 | 29.59 | 0.96 | 4.60 |
| CHOLESTEROL, mg/100g | 627 | 56.42 | 8.26 | 14.64 | 28.76 | 83.95 |

Phenotypic correlations estimates were 0.35 (HCW x REA), 0.05 (HCW x BF), -0.13 (REA x BF), 0.004 (SF x LIP), 0.01 (SF x CHOL) and 0.23 (LIP x CHOL). Estimates of heritability and their standard errors for HCW, REA, BF, SF, LIP and CHOL were 0.38 (0.106), 0.35 (0.088), 0.52 (0.117), 0.18 (0.120), 0.23 (0.114) and 0.002 (0.011), respectively.

Genetic correlations estimates and their standard errors were -0.07 (0.185, HCW x REA), 0.36 (0.178, HCW x BF), -0.40 (0.150, REA x BF), -0.32 (0.089, SF x LIP), -0.77 (0.069, SF x CHOL) and -0.35 (0.070, LIP x CHOL).


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