Effect of family on body weight and ultrasound carcass traits in Santa Ines breed

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Family is a random effect few studied in animal science, except for animal breeding purpose. However, this can be a serious mistake, because the F-test in analysis of variance depends on residual variance, which may be poorly estimated if family effect is important, but no inserted in the statistical model. Thus, this study aimed to test family effect on weights at birth, at weaning, and at 240 days of age; weight daily gain from birth to weaning and from weaning to 240 days; ultrasound images of Longissimus muscle area and fat thickness in this muscle at weaning and at 240 days; and morphometric measures of withers and hip heights; body and hip lengths; chest and hip girths; body depth; toracic, thigh, and scrotal perimeters. The statistical model included the fixed effects of gender (male or female) and birth type (one, two or three lambs), the covariates animal's age and dam's weight, and the random effect of family (sire nested dam). There is effect of famly ($P<0.05$) on weights and weights daily gains, except for weaning weight ($P = 0.0707$). For this group of traits, the minor residual variance percentage explained by the family was 59%, for birth weight. For morphometric measures, the family effect also was signifcant ($P<0,05$) for several trait, except for body depth and toracic perimeter at weaning and at 240 days, body and hip lenghts and scrotal permimeter at 240 days of age ($P>0.05$). In this case, the minor residual variance percentage explained by family was 59% for toracic permiter at weaning. By ultrasound images, family effect was signifcant only for Longissimus muscle area at 240 days and the minor residual variance percentage explained by family was 77% for Longissimus muscle area at weaning. In the present study, the determination coefficient (R^2) of the analysis of variance was higher than 0.80, for all traits, when family effect was inserted in the model, but fewer than 0.30 when no inserted. Therefore, the flock studied here has large residual variance percentage for weight, weight daily gain, morphometric measures, and ultrasound carcass images explained by the sires and dams. This source of variation is not fit in several studies in animal science and the consequence are biased estimates of residual variance in ANOVA, which may leads to errors in the F-test. Furthmore, the least square means and effects may be biased too.

Keywords: ANOVA, dam, fit, ovine, random, sire