Estimation of genetic and phenotypic parameters for meat and carcass traits in Nellore bulls

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Data on hot carcass weight (HCW), rib eye area (REA), backfat (BF), shear force (SF), total lipids (LIP) and cholesterol (CHOL) of 656 Nellore bulls were used to estimate genetic parameters. 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. The animal model included the fixed effects of contemporary groups, the effects of analysis date (LIP and CHOL), and, as covariates, age of animal at slaughter, backfat (LIP, CHOL and SF), pH measured 24 hours after slaughter (SF) and temperature of samples (SF). Random effects of direct additive genetics and residual were also considered. Descriptive statistics described HCW with an average of 290.21, with a range from 225.5 to 393.0 kg. Average for REA was 73.30 and a range from 56.0 to 101.0 cm^2. The measures of BF varied from 1.0 to 15.0 mm, with an average of 4.38 mm. SF with an average of 5.93, with a range from 1.82 to 9.99 kg. Average for LIP was 2.18 and a range from 0.96 to 4.52 g/100 g of meat. The measures of CHOL varied from 28.76 to 83.95, with an average of 56.28 mg/100 g of meat. 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). The results of this research indicate that selection can be effective to increase HCW, REA and BF and can also promote a moderate genetic gain for SF and LIP, but almost no gain for CHOL.

Kinship breeding in theory and practise

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Kinship breeding is a farm based breeding system and can be used as a basis of organic breeding. This system is used by a group of Dutch farmers that breed the native Dutch Friesian cow breed. There are 15 different breeding farms in the Netherlands and 3 in France. These breeding farms breed their cows mainly with bulls that are bred on the farm. In a total breeding population of about 800 cows at these farms, 47 breeding bulls from 50 different cow families were used for breeding in 2007. With this number of bulls genetic variation is kept at a high level, which is important for the survival of the breed of which in total 1500 animals are milked in the Netherlands and a few thousand in Germany, Ireland and Great Brittain. Baars and Endendyk described the kin breeding system at farm level and it is clear that not all breeding farms practice kinship breeding in the same way. The biggest bottle neck is the need to use 4 to 5 new breeding bulls per year. However it is important that the breeding farms use enough bulls to keep their inbreeding trend at the farm low and they should not use to many bulls from other farms to develop different lines within the breed. To find out about how farmers have managed to use this system over many decades, data of pedigrees and production and fertility records are collected from the Dutch and analysed. Primarily results show that inbreeding is used at farms but did not have impact on longevity of cows. Further investigations will show us how farmers deal with the kinship breeding system and the results can help organic farmers to set up a similar system to meet the principles of organic farming, also for selective breeding.

Book of Abstracts of the 60th Annual Meeting of the European Association for Animal Production

Book of abstracts No. 15 (2009)
Barcelona, Spain
24-27 August 2009