

Genetic parameters and breeding values for feed intake and feed efficiency traits from the Staur performance test in Norwegian beef cattle

Furre Siri^[1], Wetten Marte^[2]

[1] TYR, [2] Aninova

The Staur performance test is a central component of the Norwegian beef cattle breeding program, providing individual records for roughage intake, concentrate intake and growth over a 147-day test period. The objectives of this study were to estimate genetic parameters for roughage intake (GFO), feed utilization potential (FUP) and growth, evaluate breeding values for tested bulls, and investigate whether field traits can be used for selection.

Data from 935 bulls tested from 2013 onwards in the Hereford (n=162), Charolais (n=303), Angus (n=165), Limousin (n=238) and Simmental (n=159) breeds were analyzed. A multivariate animal model including the fixed effects of breed and year and the random effects of pen within year and animal was applied. Heritability estimates were high for GFO (0.69) and FUP (0.68) and moderate for growth (0.41). The genetic correlation between GFO and FUP was strong and unfavorable (0.91). Correlations between GFO and growth (0.27) and between FUP and growth (-0.10) were favorable but associated with large standard errors. Phenotypic trends showed increasing roughage intake and decreasing (favorable) FUP from 2015 onwards, while genetic trends for GFO and FUP were close to zero. Breeding values were strongly associated with phenotypes within tests, confirming that previous selection based on phenotypes has been effective, however re-ranking of bulls occurred when systematic environmental effects were accounted for. Accuracy of breeding values was high for tested bulls but dropped markedly for relatives. Among 72,673 animals with a sire tested at Staur, only 288 had reliability >0.30 for GFO. Inclusion of 200-day weight increased the number of animals to approximately 3,800, whereas inclusion of carcass traits resulted in <500 animals. Genetic correlations between Staur traits and field traits were low to moderate (e.g. 0.25 between GFO and 200-day weight and 0.55 between growth and carcass weight).

The results show that selection of test bulls should be based on breeding values to increase accuracy. However, the lack of strongly correlated field traits limit selection for feed intake and efficiency outside the test population, highlighting the need for field phenotypes to achieve further genetic progress.