

Heritability of feeding behaviour traits and the genetic relationships with dry matter intake in growing dairy bulls

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The objective was to estimate the heritability of six feeding behaviour traits and evaluate their genetic and phenotypic relationships with dry matter intake (DMI) in growing dairy bulls. The study aimed to determine whether feeding behaviour traits could provide meaningful genetic predictors of how much bulls eat.

Data included five years of DMI and methane records from 1,284 growing dairy bulls measured at two facilities (LIC and CRV). Feeding behaviour and individual feed intakes were measured using Hokofarm RIC2Discover Feed Intake bins. Traits evaluated were daily number of meals (NM), feeding duration (FD), feeding rate (FR), meal size (MS), meal duration (MD), and inter-meal interval (IMI). Variance components, heritability, repeatability, and genetic and phenotypic correlations were estimated using pedigree-based univariate and bivariate REML analyses.

All six traits had greater heritability, and repeatability than DMI (0.08 ± 0.02 and 0.38 ± 0.01 , respectively). Dry matter intake had a strong positive genetic correlation with FR (0.76 ± 0.15) and a moderate positive genetic correlation with NM (0.36 ± 0.13). The remaining feeding behaviour traits had genetic correlations with DMI that were near zero. Phenotypically, DMI was positively correlated with NM, FD, MS, and FR (0.16 – 0.35), near zero association with MD (0.01 ± 0.01), and negatively correlated with IMI (-0.23 ± 0.01). The strong antagonism between NM and the MS/MD/IMI block reflects expected feeding-behaviour patterns: bulls that eat more frequently do so in smaller, shorter meals with shorter inter-meal intervals. The strong genetic correlation between DMI and FR, and near zero between DMI and FD suggest that bulls genetically predisposed to eat more tend to achieve this through eating faster, rather than by spending more time eating. Together, these results indicate that although feeding behaviour traits were heritable, only FR strongly related genetically to DMI, showing that most behaviour traits describe how bulls eat rather than providing genetic prediction of how much they eat.