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ABSTRACT

Genetic parameters for measures of energetic efficiency of bulls and their relationships with carcass traits of field progeny in Japanese Black cattle[1]

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Records on 514 bulls from the sire population born from 1978 to 2004, and on 22,099 of their field progeny born from 1997 to 2003 with available pedigree information (total number = 124,458) were used to estimate genetic parameters for feed intake and energy efficiency traits of bulls and their relationships with carcass traits of field progeny. Feed intake and energetic efficiency traits were daily feed intake, TDN intake, feed conversion ratio (FCR), TDN conversion ratio (TDNCR), residual feed intake (RFI), partial efficiency of growth, relative growth rate, and Kleiber ratio. Progeny carcass traits were carcass weight (CWT), yield estimate, ribeye area, rib thickness, subcutaneous fat thickness (SFT), marbling score (MSR), meat color standard (MCS), fat color standard (FCS), and meat quality grade. All measures of feed intake and energetic efficiency were moderately heritable (ranged from 0.24 to 0.49), except for partial efficiency of growth and relative growth rate, which were high (0.58) and low (0.14), respectively. The phenotypic and genetic correlations between FCR and TDNCR were >or=0.93. Selection for Kleiber ratio will improve all of the energetic efficiency traits with no effect on feed intake measures (daily feed intake and TDN intake). The genetic correlations of FCR, TDNCR, and RFI of bulls with most of the carcass traits of their field progeny were favorable (ranged from -0.24 to -0.72), except with fat color standard (no correlation), MCS, and SFT. Positive (unfavorable) genetic correlations of MCS with FCR, TDNCR, and RFI (0.79, 0.70, and 0.51, respectively) were found. The SFT was negatively genetically correlated with FCR and TDNCR (-0.32 and -0.20, respectively); however, the genetic correlation between RFI and SFT was not significantly different from zero (r(g) = -0.08 +/- 0.12). Favorable correlated responses in CWT, yield estimate, ribeye area, rib thickness, MSR, and meat quality grade would be predicted for selection against any measure of energetic efficiency. The correlated responses in CWT and MSR of progeny were greater for selection against RFI than for selection against any other energetic efficiency trait. Results of this study indicate that RFI should be preferred over other measures of energetic efficiency to include in selection programs

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