

ABSTRACT

Genetic relationships between growth and carcass traits and profitability in Japanese Brown cattle¹

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The objectives of this study were 1) to examine the genetic relationship between growth and carcass traits and carcass price (CaP) and profitability in Japanese Brown cattle, 2) to estimate economic values of carcass and growth traits as regression coefficients of price and profit traits on growth and carcass traits using a multiple regression model, and 3) to compare direct and indirect predictions of the genetic merit of profit obtained from multitrait analysis and selection index, respectively. Growth and carcass traits considered in this study were ADG during the feedlot period, CWT, LM area (LMA), rib thickness (RT), subcutaneous fat thickness (SFT), and marbling score (MS). Carcass price was evaluated as a price trait independent of its influence on profit. Profit traits were defined as 1) net income per year (PROF1), 2) net income per year/energy requirement (PROF2), and 3) net income per year minus feed costs (PROF3). Correlations between direct and indirect predictions were estimated based on EBV of sires and dams with progeny records. The heritability estimate for CaP was 0.41. The heritability estimates for profit traits were high and were 0.62, 0.66, and 0.60 for PROF1, PROF2, and PROF3, respectively. The genetic correlations between CaP and ADG, CWT, LMA, RT, SFT, and MS were 0.19, 0.14, 0.30, 0.38, -0.11, and 0.98, respectively. Among the profit traits, PROF1 had the greatest genetic correlations with growth and carcass traits. The correlations with ADG, CWT, LMA, RT, SFT, and MS were 0.30, 0.21, 0.24, 0.39, -0.01, and 0.69, respectively. These estimates indicate that use of profit traits as a selection criterion may promote desirable correlated responses in growth and carcass traits. The economic values for growth and carcass traits estimated relative to CaP and each profit trait differed because of the apparent differences in the description of these traits. The correlations between EBV for the same profit traits from direct and indirect predictions were high and ranged from 0.818 to 0.846 based on EBV of sires and from 0.786 to 0.798 based on EBV of dams. The strong correlations between direct and indirect predictions for profit indicate that there is no advantage to selecting directly for profit compared with an index with all of the component traits.

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