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ABSTRACT

Relationship of Fatty Acid Composition to Intramuscular Fat Content in Beef from Crossbred Wagyu Cattle[1]

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In Japan, the degree of marbling in ribeye (M. longissimus thoracis) is evaluated in the beef meat grading process. However, other muscles (e.g., M. trapezius) are also important in determining the meat quality and carcass market prices. The purpose of this study was to estimate genetic parameters for M. longissimus thoracis (M-LONG) and M. trapezius (M-TRAP) of carcass cross section of Japanese Black steers by computer image analysis. The number of records of Japanese Black steers and the number of pedigree records were 2,925 and 10,889, respectively. Digital images of the carcass cross section were taken between the sixth and seventh ribs by photographing equipment. Muscle area (MA), fat area ratio (FAR), overall coarseness of marbling particles (OCM), and coarseness of maximum marbling particle (MMC) in M-LONG and M-TRAP were calculated by image analysis. Genetic parameters for these traits were estimated using the AIREMLF90 program with an animal model. Fixed effects that were included in the model were dates of arrival at the carcass market and slaughter age (mo), and random effects of fattening farms, additive genetic effects and residuals were included in the model. For M-LONG, heritability estimates (+/-SE) were 0.46 +/- 0.06, 0.59 +/- 0.06, 0.47 +/- 0.06, and 0.20 +/- 0.05 for MA, FAR, OCM, and MMC, respectively. Heritability estimates (+/-SE) in M-TRAP were 0.47 +/- 0.06, 0.57 +/- 0.07, 0.49 +/- 0.07, and 0.13 +/- 0.04 for the same traits. Genetic correlations between subcutaneous fat thickness and FAR for M-LONG and M-TRAP were negative (-0.21 and -0.19, respectively). Those correlations between M-LONG and M-TRAP were moderate to high for MA, FAR, OCM, and MMC (0.38, 0.52, 0.39, and 0.60, respectively). These results indicate that other muscles including M-LONG should be evaluated for more efficient genetic improvement.

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