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ABSTRACT

Relationships of feeding behaviors with efficiency in RFI-divergent Japanese Black cattle

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New approaches to limit expenses associated with input, without compromising profit, are needed in the beef industry. Residual feed intake (RFI) is an efficiency trait that measures variation in feed intake beyond maintenance, growth, and body composition. The addition of feeding behavior analysis to standard RFI tests may provide an approach to more readily identify feed-efficient cattle. The current study analyzes 7 feeding behaviors (BVFREQ: bunk visit frequency, BVDUR: bunk visit duration, FBFREQ: feed bout frequency, FBDUR: feed bout duration, MFREQ: meal frequency, MDUR: meal duration, and AMINT: average meal intake) and their relationships with RFI, ADG, and DMI in Japanese Black (Wagyu) cattle. Three cohorts of yearling Wagyu animals were studied using a standard 70-d RFI test, and data from divergent (± 0.5 SD from population RFI mean) subsets of animals were analyzed for feeding behaviors [n = 58, bulls on high-concentrate diet (C1); n = 36, bulls on a lower-concentrate diet (C2); n = 34, heifers on a lower-concentrate diet (C3)]. The following behaviors were correlated with ADG: BVFREQ ($r = 0.32$, $P = 0.01$; C1 bulls), BVDUR ($r = 0.42$, $P = 0.01$, C2 bulls), FBFREQ ($r = 0.37$, $P < 0.01$; C1 bulls), FBDUR ($r = 0.46$, $P < 0.01$, C1 bulls), and MFREQ ($r = 0.42$, $P < 0.01$, C2 bulls). Behaviors were trending or significantly correlated with DMI for all cases except for MFREQ for C3 and AMINT for C2. Residual feed intake was positively correlated with MDUR across all cohorts ($r = 0.31$, $P = 0.02$; $r = 0.38$, $P = 0.02$; $r = 0.54$, $P \geq 0.01$, respectively). For C2 bulls and C3 heifers, RFI was positively correlated with behavior frequency categories (BVFREQ; $r = 0.44$, $P = 0.01$; $r = 0.60$, $P \leq 0.01$, respectively, and FBFREQ $r = 0.46$, $P \leq 0.01$; $r = 0.60$, $P \leq 0.01$, respectively). Bunk visit frequency and FBFREQ were highly correlated with RFI status (high or low) in C2 bulls and C3 heifers. Behavior duration categories (BVDUR, FBDUR, and MDUR) were most correlated with efficiency status in C1 bulls. However, behavior frequency categories (BVFREQ and FBFREQ), as well as MDUR, were most correlated with efficiency status in C2 bulls and C3 heifers. Inclusion of meal duration measurements when evaluating RFI provides an additional tool in understanding the drivers of variation in this important trait in Wagyu cattle. The present study provides new insights into feed intake patterns of a beef breed for which there are few reports of feeding behavior.