Genetic Parameters for Human-Directed Behavior and Intraspecific Social Aggression Traits in Growing Pigs
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Genetic Parameters for Human-Directed Behavior and Intraspecific Social Aggression Traits in Growing Pigs. Julia A. Calderon Diaz1, Suzanne Desire2, Craig Lewis1, Rainer Roehe3, Simon Turner Turner4; 1PIC Europe, 2SRUC (Scotland's Rural College)

Abstract: This study aimed to estimate heritabilities and genetic and phenotypic correlations for human-directed behavior and intraspecific social aggression traits in growing pigs, and to explore genetic and phenotypic correlations among them. Pigs (n = 2,314) were mixed into groups of 18 animals at 69 ± 5.2 d of age and skin lesions (SL) were counted 24 h (SL24h) and 5 weeks (SL5WK) post-mixing. Individual behavioral responses to isolation in a weighing crate (CRATE, 1 = pig performing exploratory behavior to 4 = pig performing serious, persistent attempts to escape) or when alone in an arena while a human directly approached them (IHAT) were assessed within 48 h post-mixing. During the IHAT, three separate scores were given for each pig based on the severity (0 = none to 3 = severe reaction) of their movement, vocalizations, and vigilance. Additionally, pigs were tested for behavioral responses to the presence of a single human observer walking in their home pen in a circular motion (WTP) within 1 and 4 weeks post-mixing recording pigs that followed, nosed or bit the observer. An animal model was used to estimate genetic parameters for all studied traits using the DMU software. Heritabilities (h²) for SL, CRATE and IHAT responses were low to moderate (0.17 to 0.29), with the greatest h² estimated for speed of moving away from the approaching observer in the IHAT. Low but significant h² were estimated for nosing (0.09) and biting (0.11) the observer at 4 weeks post-mixing in the WTP test. Positive high genetic correlations (r_g) were observed between CRATE and IHAT responses (0.55 to 0.90), and within SL traits (0.60 to 0.94) while positive low to high r_g were estimated within the WTP test (0.24 to 0.59) traits. Positive moderate r_g were observed between CRATE and central and posterior SL24h. Genetic correlations between CRATE and IHAT test responses and WTP test traits were low, mostly negative (-0.21 to 0.05) and not significant. Low positive r_g (0.06 to 0.24) were observed between SL and the WTP test traits except for the lack of r_g between posterior SL24h and pigs biting or following the observer during both tests. Phenotypic correlations between CRATE and IHAT responses and SL or WTP test traits were mostly low and not significant. Under the conditions of this study, h² estimates for all studied traits suggest they could be suitable as a method of phenotyping aggression and fear and/or boldness in pigs for genetic selection purposes. Additionally, there was evidence of genetic associations between aggression and fear indicators. These findings suggest applying selection pressure to reduce the accumulation of lesions is likely to make pigs more relaxed in a crate environment, but to alter the engagement with humans in other contexts that depends on the location of the lesions under selection.

Keywords: aggression, human-animal interactions, variance components
Effect of Ad Libitum Versus Limit-Feeding Program at Receiving on Morbidity and Performance of Feedlot Calves.

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Abstract: Despite advancements in both vaccine technology and antibiotic therapy, bovine respiratory disease complex (BRD) remains the primary health challenge for cattle feeding operations in the United States. The strategy of limit-feeding calves during the early receiving period (first 28 days) has been proposed as a method to mitigate BRD risk, but limited data are available despite this strategy becoming more common. The objective of this study was to evaluate limit-feeding as a receiving protocol to determine impact on pull rates, receiving performance, and subsequent (Post-receiving) finishing performance. Steers (initial BW = 262 kg; n = 704) were blocked by arrival day (7 blocks) and housed in 44 open-lot pens. Pens were assigned to either limit-fed at approximately 75% of ad libitum or fed ad libitum for the 28-day receiving period. A subset of 216 steers in 14 pens was followed through finishing to evaluate carry-over effects in the finish period (192 days). Dry matter intake (DMI; $P < 0.01$), average daily gain (ADG; $P < 0.01$) and ending body weight ($P < 0.01$) were less for the limit-fed treatment compared with ad libitum due to the limitation of intakes as designed. Intake averaged 70.1% for limit-fed versus ad libitum whereas ADG was 72.6% for limit-fed compared with ad libitum. Because both DMI and ADG were decreased by similar amounts, G:F was not affected ($P = 0.28$). Numerically better G:F was observed for limit-fed cattle versus ad libitum but this 3.4% difference was not significant ($P = 0.28$). Morbidity rates for BRD were not statistically different, with ad libitum morbidity of 16.3% compared with 14.3% for limit-fed steers ($P = 0.58$). Low mortality for the receiving period was observed with 0.84% (3 steers) on limit-fed treatment, and 0% for the ad libitum treatment. For the subset of pens that were followed through finishing, there were no differences ($P > 0.18$) in ADG or DMI. While not statistically different, there was a 2.2% increase in ADG for steers that were limit-fed during the receiving period, which allowed for similar HCW and final BW ($P = 0.39$) at slaughter. Other carcass characteristics were also similar ($P > 0.74$) between steers received with an ad libitum or limit-fed program. No statistical difference ($P = 0.29$) in the rate of liver abscess occurrence was noted. In conclusion, there was no statistical difference between treatments in early-period morbidity or finishing performance between ad libitum and limit-fed receiving management.

Keywords: feedlot, limit-feeding, morbidity