

Scotland's Rural College

Genetic Parameters for Human-Directed Behavior and Intraspecific Social Aggression Traits in Growing Pigs

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184 Genetic Parameters for Human-Directed Behavior and Intraspecific Social Aggression

Traits in Growing Pigs. Julia A. Calderon Diaz¹, Suzanne Desire², Craig Lewis¹, Rainer Roehe², Simon Turner Turner², 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 (h^2) for SL, CRATE and IHAT responses were low to moderate (0.17 to 0.29), with the greatest h^2 estimated for speed of moving away from the approaching observer in the IHAT. Low but significant h^2 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, h^2 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

