ANIMAL BEHAVIOR AND WELL-BEING III

0047 Breeding may simultaneously reduce pig aggressiveness at regrouping and in stable social groups, but management may not.
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Aggression between pigs compromises welfare and productivity. Individual sow stalls are now banned in the European Union after wk 4 of gestation and are being phased out in some parts of North America. Better control of both acute regrouping aggression and chronic aggression in stable social groups is required at all ages. This paper examines whether efforts to control these 2 forms of aggression may be complementary or antagonistic, and whether optimal aggression phenotypes can be identified to target in management or breeding. Acute regrouping and subsequent chronic aggressiveness are stable traits of the individual but highly variable among animals and groups. Delivery of aggressive behavior at regrouping is heritable (h^2 > 0.31 SE 0.04) as is the number of skin lesions from regrouping or chronic aggression (h^2 = 0.19 SE 0.02 to 0.43 SE 0.04). The lesion count is genetically correlated to reciprocal fighting or receipt of non-reciprocal bullying, and is therefore an indicator of aggressive propensity (e.g., r_g between reciprocal fighting duration at regrouping and lesions to the anterior of the body = 0.67 SE 0.04). The lesion count shows a low but positive genetic correlation between 24-h and 3-wk post-regrouping (r_g 0.28 SE 0.07 to 0.50 SE 0.09), suggesting that breeding to reduce regrouping lesions would also reduce lesions from chronic aggression. However, at the phenotypic level, individual pigs or entire social groups that fight greatly at regrouping, even if this is often unsuccessful, show few injuries from chronic aggression (group level, r = -0.28 to -0.38, $P < 0.05$). Furthermore, pigs with a beneficial effect on the growth of penmates can be more aggressive at regrouping but receive fewer lesions 3 wk later. Acute aggression may therefore reduce the costs of chronic aggression at the phenotypic level. Fight quantity appears to primarily drive this association as fight outcome at regrouping had less impact on later lesions. However, some pigs show few injuries from both acute and chronic aggression. The behavior of these pigs will be discussed to highlight whether optimal phenotypes can be targeted in management or breeding. Currently, breeding for reduced regrouping aggressiveness is likely to simultaneously reduce subsequent chronic aggression, but phenotypically reducing regrouping aggression through management change may lead to long-term increases in aggression unless controlled.

Key Words: aggression, breeding, pig

0048 Effect of concentrate feeder design on performance, animal behavior, and ruminal health in Holstein bulls fed high-concentrate diets.
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A total of 240 Holstein bulls (121 ± 2.0 kg BW and 99 ± 1.0 d of age), in a replicated factorial study, were randomly allocated in 1 of 6 pens and assigned to 1 of 3 treatments, according to the feeder design: conventional feeder with 4 feeding spaces (CF), conventional feeder with less concentrate capacity (CFL), and a single space feeder with lateral protections (SF) forming a chute (1.4 × 0.8 m). Also, each pen had 1 straw feeder and 1 drinker. Concentrate intake was recorded daily, straw consumption weekly, and BW every 14 d. On d 7, 119 to 120, and 215 to 216, rumen fluid and blood samples were collected to determine rumen pH and VFA, and serum NEFA. Animal behavior was registered on d 1, 3, 5, 8, 14 and every 28 d by scan sampling. Animals were slaughtered after 221 d and HCW, rumen wall, and liver lesions were recorded. Data were analyzed using a mixed-effects model with repeated measures. Bulls on CF tended (P = 0.07) to have greater ADG than CFL and SF bulls (1.54, 1.50, and 1.49 ± 0.017 kg/d, respectively). However, no differences among treatments were observed in concentrate intake (7.6 ± 0.16 kg/d), straw intake (0.8 ± 0.03 kg/d), FE (0.2 ± 0.01 kg/kg), HCW (247.2 ± 2.09 kg), dressing percentage (53.6 ± 0.23%), and rumen and liver lesions. Mean rumen pH was always > 5.6; at 7 and 215 to 216 d, SF bulls had greater ($P < 0.05$) rumen pH compared with CF and CFL bulls. Acetate to propionate ratio was greater ($P < 0.05$) in SF compared with CFL and CF. At d7, NEFA of SF was greater ($P < 0.05$) compared with CF and CFL, although at 119 to 120 d in SF bulls serum NEFA concentration was less ($P < 0.01$) than in CF and CFL bulls. Bulls on SF spent more time ($P < 0.05$) eating straw, exhibited fewer ($P < 0.05$) displacements at feeders and drinker, and expressed more oral behaviors ($P < 0.05$) than CF and CFL bulls. The CFL bulls tended (P = 0.10) to perform more mounts than SF and CF. In conclusion, the different feeder designs evaluated did not affect overall performance, although some behavior traits differed among them. Serum NEFA concentrations at the beginning suggest that animals at the SF may have adaptation problems and SF does not negatively affect rumen wall health and pH.

Key Words: beef, feeder, performance

0049 Impact of using an electrified crowd gate on milk yield and milk flow. I. Guasch[1], A. Pinto[2], and A. Bach[*3,4], *[1]Blanca, Hostalets de Tost, Spain, [2]Department of Ruminant Production, IRTA, Barcelona, Spain, [3]Department of Ruminant Production, IRTA, Caldes de Montbui, Spain, [4]ICREA, Barcelona, Spain.*

Many dairy enterprises use automatic crowd gates in the milking parlor's waiting area to assist and expedite the entrance of cows into the parlor. Some of these systems include electrified gates. We hypothesized that the use of an electrified crowd gate may impose an alert response in the cows, which in turn may negatively affect milk let down and production. One hundred fifty dairy cows (71 primiparous, 79 multiparous; days in milk = 225 ± 109 d) were split into 2 groups and milked in a 32-stall rotary parlor, using a crowd gate that was either not electrified (NEG) or electrified (EG). The experiment followed a 2 × 2 Latin square design with 2 periods of 9 d each. The waiting area was 200 m^2 and equipped with rubber flooring. The crowd gate was 13 m long. Cows were milked at 0600 and 1800 h. At each milking, milk production, milk fat content, milk protein content, average milk flow, maximum milk flow, and time to peak milk flow were recorded on an individual basis. The first 4 d of each period were discarded and data from the last 5 d were averaged by cow and analyzed using a 2-level mixed-effects model that accounted for the random effect of cow and period, and the fixed effects of type of crowd gate, parity, their 2-way interaction, and days in milk as a covariate. Time elapsed between the initiation of milking and peak milk flow (1.61 ± 0.05 min). Peak milk flow did not differ ($P = 0.67$) between treatments. However, peak milk flow tended to be greater ($P = 0.10$) in NEG (5.8 ± 0.16 kg/min) than in EG (5.6 ± 0.16 kg/min) cows. Similarly, average milk flow tended to be greater ($P = 0.06$) in NEG (3.00 ± 0.07 kg/min) than in EG (2.96 ± 0.07 kg/min) cows. Milk yield was greater ($P < 0.01$) when cows were milked with NEG (14.0 ± 0.25 kg/milking) than when milked with EG (13.6 ± 0.25 kg/milking). Treatment had no effect on milk protein ($P = 0.33$) or fat ($P = 0.77$) content. It is concluded that using an electrified crowd gate may compromise milk flow and results in decreased milk yield.

Key Words: let down, parlor, stress

0050 Using designer diets to reduce aggression in pregnant sows. A. Sapkota[*1], J. N. Marchant-Forde[2], B. T. Richert[1], and D. C. Lay Jr.[2], *[1]Purdue University, West Lafayette, IN, [2]USDA-ARS, West Lafayette, IN.*

The U.S. Swine industry is under pressure to switch from individual to group housing for pregnant sows. The study objective was to evaluate effects of increased dietary fibrous ingredients to reduce aggression during mixing by increasing satiety. Five isocaloric (NE basis) treatment diets (CONTROL, Resistant-STARCH, BEET pulp, soy hulls INCREASED INTAKE, and SOY Hulls + FAT diets) were fed to 5 sows (parity 1 to 6) per treatment per replicate. One hundred fifty sows (25 sows/replication × 6 replications) were used for the study. Sows were bred and moved into individual crates (0.61 × 2.13 m) on d 7 to 14 post-breeding. Sows remained in crates for 21 d while fed assigned diets. Data on weight, backfat, and BCS for each sow were collected on first and last days in crates. On d 22, sows were moved into mixing pens (2.13 × 3.05 m mixing area and five 0.61 × 2.13 m crates). As a measure of aggressiveness, lesions on left and right in front, mid, and rear parts of each sow were counted before mixing, and on d 1, 2, and 3 of mixing. After 72 h of mixing, sows were switched to regular diets and management. Production data (piglets born, percent alive, average birth weight, average wean weight, percent weaned, farrowing rate) were collected from 75 sows (3 replications). The effects of diets on skin lesions, backfat, weight, BCS, and production data were compared using PROC GLM and least squares means in SAS 9.3. Chi-square test was performed to compare farrowing rates. Skin lesions in the front left portion of sows were 6.7 ± 0.9^{ab}, 6.8 ± 0.9^{a}, 7.4 ± 1.0^{ac}, 4.0 ± 1.0^{b} and 9.9 ± 1.0^{c} for CONTROL, Resistant-STARCH, BEET, INCREASED INTAKE, and SOY Hulls + FAT diets, respectively, on d 1 ($P = 0.002$). Skin lesions in the front left portion of sows were 11.2 ± 1.6^{a}, 11.5 ± 1.6^{a}, 10.3 ± 1.6^{a}, 9.7 ± 1.6^{a}, and 16.5 ± 1.7^{b} for CONTROL, Resistant-STARCH, BEET, INCREASED INTAKE and SOY + FAT diets, respectively, on d 3 ($P = 0.038$). Diets did not affect ($P > 0.05$) other skin lesion scores, number of piglets born, percent alive, average birth weight, average wean weight, percent weaned, and farrowing rate. Change in weight, backfat, and BCS did not differ with treatments ($P > 0.05$). There were fewer skin lesions in INCREASED INTAKE treatment on d 1 indicating less aggression and higher skin lesions in left front parts of the sows fed SOY Hulls + FAT diet, indicating more aggression compared with other diets.

Key Words: aggression, group housing, sow

0051 Selection and breeding for improved feed efficiency alter gilt behavioral responsiveness to a novel object. J. D. Colpoys[*1], N. K. Gabler[1], C. E. Abell[2], A. F. Keating[1], S. T. Millman[1], J. M. Siegford[3], and A. K. Johnson[1], *[1]Iowa State University, Ames, [2]DNA Genetics, Columbus, NE, [3]Michigan State University, East Lansing.*

As feed efficiency is becoming more of a priority, our objective was to determine if divergent selection for residual feed intake (RFI) altered gilt approach and fear behavior. Twenty low-RFI (more feed efficient) and 20 high-RFI (less feed efficient) gilts (36 ± 5.7 kg BW) from the ninth generation Iowa State University Yorkshire RFI selection lines were randomly selected. Gilts were evaluated once over a 2-wk period, using a

novel object test (NOT). Individual gilts were moved from the home pen into a weigh scale for 1 min. Gilts then entered the NOT arena (4.9 long × 2.4 m wide with black corrugated plastic walls 1.2 m high) and their behavior was video recorded for 10 min. All testing occurred between 1300 and 1900 h. The video was watched continuously by 1 trained observer for latency, frequency, and duration of novel object touches (defined as oral, nasal, and/or facial interaction with the novel object, an orange traffic cone), frequency of escape attempts (defined as 2 front legs off the ground, possibly including a jump), and frequency and duration of freezing postures (defined as the whole body remaining still for $\geq$ 3 sec). Data were analyzed using the GLIMMIX procedure of SAS and the model included the fixed effect of genetic line, covariate of gilt age, and pig as the experimental unit. Compared with high-RFI gilts, low-RFI gilts tended to take longer to first touch the object ($P = 0.06$) and touched the object fewer times ($P = 0.0001$); however, there was no observed differences between lines in duration of time spent touching the object ($P = 0.14$). Low-RFI gilts attempted to escape fewer total times compared with high-RFI gilts ($P = 0.001$). No difference was observed in frequency or duration of freezing ($P \geq 0.14$). In conclusion, low-RFI gilts interacted with the novel object fewer times but engaged in fewer total escape attempts compared with high-RFI gilts. These data suggest that while there are differences in approach behaviors to a novel object between low- and high-RFI selection lines, selecting for improved feed efficiency (low-RFI) may have resulted in calmer, less fearful gilts.

Key Words: approach, fear, residual feed intake