Production, Management and the Environment: Swine

M332 Animal weight gain in a pastured hog production system. S. Pietroeseomi*1,2, J. C. Guevara2, J. Cardona3, W. Maradiaga3, A. Lobo3, and J. T. Green4,1, 1Animal Science Dept., North Carolina State University, Raleigh, 2Alternative Swine Research and Extension Project, Raleigh, NC, 3Universidad Nacional de Agricultura, Catacamas, Olancho, Honduras, 4Crop Science Dept., North Carolina State University, Raleigh.

At the Center for Environmental Farming Systems (CEFS) located in Goldsboro NC, 60 crossbred (Yorkshire, Landrace, Hampshire and Duroc) commercial hogs (35.7 ± 2.1 kg and 125.7 ± 2.3 kg initial and final live weight, respectively) were used in a 98-d trial (May–August 2009) to evaluate the effect of stocking rate (SR; 37, 74, 111, and 148 heads/ha) and sexual condition (SC; castrated male [CM] or female [F]) on average daily weight gain (ADG). Animals were managed under a continuous grazing system on bermudagrass (Cynodon dactylon) plots sized to match the SR, and had ad libitum access to a concentrate feed (16% CP). The average pig concentrate intake (ACI) was estimated for each plot. Five hogs were allotted to each one of 12 plots, but data from only 4 (2 CM and 2 F) animals were included in the statistical analysis. The experimental design was a randomized complete block, with 4 × 2 factorial arrangement of treatments and 3 field replicates. ANCOVA was performed using the PROC GLM procedure of SAS, v. 9.1 with initial live weight as a covariate. Differences were observed for ADG between replicates (P = 0.0009); SR (P = 0.0566) and SC (P < 0.0001). Animals in the lowest SR (37 heads/ha) had the lowest ADG (0.85 kg) whereas the other treatments were similar (0.94, 0.96 and 0.90 kg ADG, respectively, for 74, 111 and 148 heads/ha). ADG of CM was 17.9% higher than of F (0.99 vs 0.84 kg, respectively). ACI differed between replicates (P = 0.0027) and SR (P = 0.0182). The lowest intake was recorded for pigs in the lowest SR (37 heads/ha, 2.90 kg/head/d) compared with the other SR (2.96; 2.96; 2.94 kg/head/d, for 74, 111 and 148 heads/ha, respectively). Results indicated that performance of pasture-finishing pigs was influenced by SR and SC.

Key Words: outdoor swine, bermudagrass, weight gain

M333 Analysis of the effect of complexed trace minerals on the prevalence of lameness and severity of claw lesions in stall-housed sows. S. S. Anil*1, L. Anil2, J. Deen1, S. K. Baidoo2, M. E. Wilson1, and C. Rapp3, 1Veterinary Population Medicine, University of Minnesota, St Paul, 2Southern Research and Outreach Center, University of Minnesota, Waseca, 3Zinpro Corporation, Eden Prairie, MN, 4Zinpro Performance Minerals, Boxmeer, the Netherlands.

When considering the development of claw lesions, mineral nutrition is an important factor to examine. Trace minerals such as Cu, Zn and Mn are reported to be critical in the keratinization process. Both the quantity and form (organic or inorganic) determine the bioavailability of the trace minerals. The objective of the present study involving 229 sows was to evaluate the effect of supplementing complexed trace minerals on the prevalence of lameness and lesions in different claw areas (side wall, heel, including overgrown heel, sole, heel-sole junction, white line, and overgrown dew claw and toe) of stall-housed gestating sows. The sows were randomly allocated to 2 groups and fed either a control diet (ITM, inorganic sulfate minerals, n = 113; Zn–125 ppm, Mn–40 ppm and Cu–15 ppm) or a diet containing complexed trace minerals (CTM, n = 116) as a partial substitution of inorganic minerals (Zn–50 ppm, Mn–20 ppm and Cu–10 ppm) fed at isolevels of total trace mineral supplementation. The lesions in different claw areas of these sows were scored by a trained person in one or 2 consecutive parities at mid-gestation. The total score for each claw area was obtained by adding the scores for that area in different claws. The sows were assessed for lameness while they were moved for lesion scoring. The scores for lesions in different claw areas among the sows fed ITM or CTM were compared using Kruskal-Wallis Test. The proportions of lame sows among the groups were compared using 2-sample proportion test. The results indicated that total claw lesion score and total lateral claw lesion score were lower (P ≤ 0.05 for both) in the sows fed CTM. The total score for horizontal side wall cracks was higher (P ≤ 0.05) for the sows fed CTM. The proportion of lame sows was lower (P ≤ 0.05) in the sows fed CTM (34.5% vs. 51.0%). The results show a protective effect of complexed trace mineral supplementation on claw lesions and lameness in stall-housed sows.

Key Words: claw lesions, lameness, trace mineral supplementation

M334 Comparison of the production performance of group-housed sows receiving complexed trace minerals. S. S. Anil*4, L. Anil2, J. Deen1, S. K. Baidoo2, M. E. Wilson1, and T. L. Ward3, 1Veterinary Population Medicine, University of Minnesota, St Paul, 2Southern Research and Outreach Center, University of Minnesota, Waseca, 3Zinpro Corporation, Eden Prairie, MN,

Trace minerals are important to maintain the high production performance of the modern sow. The bioavailability of trace minerals depends on both the quantity and form (organic or inorganic). The objective of the present study, involving 386 sows housed in group pens with electronic sow feeders was to compare the production performance of sows fed diets containing complexed trace minerals (CTM) with sows fed diets containing trace minerals in inorganic form (ITM). The CTM diet contained trace minerals as a partial substitution of inorganic minerals (Zn, 50 ppm, Mn, 20 ppm and Cu, 10 ppm) fed at isolevels of total trace mineral supplementation. The ITM diet contained inorganic sulfate minerals, Zn 125 ppm, Mn, 40 ppm and Cu, 15 ppm). The sows were allocated randomly to CTM (n = 197) and ITM (n = 189) diet groups. 1056 parity records (ITM, n = 527, CTM, n = 529) of these sows pertaining to 1, 2, 3 or 4 farrowings were obtained during the study period. Information on farrowing and weaning performances and lactation feed intake were collected from the PigCHAMP database of the research unit and sow cards, and compared using 2 sample t-test (SAS v. 9.1). Results indicated differences (P < 0.05 for all) between the sows fed ITM and CTM in terms of still born (1.3 in ITM vs. 1.1 in CTM), average piglet weight at weaning (14.0 in ITM vs. 14.3 lbs in CTM) and weight of the sow at weaning (543.4 in ITM vs. 531.6 lbs in CTM). The groups did not differ (P > 0.05) in terms of piglets born alive, mummies, average birth weight of pigs and average lactation feed intake.

Key Words: complexed trace minerals, production performance, sows

M335 Risk factors associated with frequency of abortion in swine farms. N. M. Rainho1, M. Aparicio1, M. A. de Andrés1, J. Morales1, R. Pallás1, V. Rodriguez-Estévez1, and C. Piñeiro*1, 1PigCHAMP Pro Europa, Segovia, Spain, 2Kubus, SA, Madrid, Spain, 3Universidad de Córdoba, Spain.

Current swine production is linked to a proper analysis and monitoring of results. Literature has described references for most of the reproductive factors, but interactions between them have not been studied in depth.

The objectives of the present study were to investigate the relationship between the relative frequency of abortion (percentage; AP) and number of parity (NP), weaning to first mating interval (WMI), number of services (NS), and day of weaning for service (DWS). More than 87,000 mating records through 4 years (2005–2008) corresponding to about 80,000 sows in 161 farms from Spain, Portugal and Italy registered with PigCHAMP software were used. Each factor was categorized in different groups: NP in 1, 2, 3–6 and ≥ 7 parities; NS in first-service (FS), first re-service (FRS) and second-reserved (SRS); WMI in ≤ 3, 4–7, 8–11 and ≥ 12 d; and DWS in weekday and weekend. Data were analyzed using the MIXED procedure of SAS (v 9.00). Mean value of AP was 0.78 ± 0.03%. Among NP, mean AP in parities 1 and ≥ 7 was higher than those in parities 2 and 3 > 0.001 by showing a quadratic effect that explains the higher risks in both gilt and old sows. A linear effect was found for WMI, when AP in WMI ≥ 7 was lower than those of WMI ≥ 8 (P < 0.001). AP also depended on DWS, and it was higher for matings during the weekend (P < 0.001). Finally, mean AP for NS increased with the number of estrus repetition, showing 0.45, 2.87, 4.26% for FS, FRS, SRS respectively (P < 0.001). Some interactions between the main factors studied were found, being the most interesting one between WMI and DWS: sows with ≤ 3 WMI showed no differences between DWS; sows with normal WMI (4–7 d) showed a higher risk during weekends (0.63 vs 1.29%; P < 0.001); AP in later mated sows served 8–11 d post weaning was lower in matings during weekend (1.24 vs 0.75%; P < 0.001). These results add more information about the relative information of some classical factors as NP, NS or WMI, and show a new factor as it is DW.

Key Words: abortion risk factors, swine, abortion


Evidence was found that local Caribbean pigs (Creole) are better adapted to seasonal climatic changes of tropical climate than exotic breeds imported from Europe. We evaluated the effect of heat challenge on peripheral mononuclear blood cells (PBMC) isolated from Creole (CR) and Large White (LW) pigs, on cell viability, concanavalin A–induced proliferation and heat shock proteins (HSPs) mRNA expression. PBMC from Creole (CR) and LW growing pigs of 7 to 12 weeks of age were isolated, cultured for 9 h at 37°C, and thereafter subjected to one of the 3 treatments (S or M; F or CM) and 3 field replicates. ANOVA was performed using PROC GLM of SAS v 9.1. Initial weight (IW) was used as a covariate for ADG. Weekly movements of structures influenced CI (P = 0.0572) (2.37 vs 2.25 kg/head/d for S and M, respectively). Sexual condition (P < 0.0001) and IW affected ADG (0.71 vs 0.84 kg/day for F and CM, respectively). According to the results of this study, weekly movements of shade and drinking structures did not affect pig average daily weight gain.

Key Words: outdoor pigs, sudangrass, weight gain
time interactions was observed. The decrease in viability caused by heat challenge was greater for LW than for CR pigs. For mitogen-stimulated PBMC, incubation at 45°C reduced lymphoblastogenesis ($P < 0.001$). However, this reduction was not influenced by breed ($P > 0.05$). When compared with PBMC cultured at 37°C, the mRNA expression of HSP70.2 and HSP90 increased at 45°C. After 9 h exposure at 45°C, PBMC from CR pigs showed a decreased expression of HSP90 mRNA when compared with the LW pigs. In contrast, the temperature × breed interaction was not significant for HSP70 mRNA expression. In conclusion, breed differences in resistance to heat challenge at the whole organism scale is also reflected at the cellular level. Neither HSP70.2 nor HSP90 mRNA expression level could explain this effect.

**Key Words:** pig, breed, heat stress