

## ANIMAL WELFARE

**Title:** Impact of group size and diet on behavior and physiology of sows (07-105)

**Investigator:** Dr. Janeen Salak-Johnson

**Institution:** University of Illinois, Urbana Illinois

**Date Submitted:** 7/30/2010 (revised 2/25/2011)

### Abstract

A major public issue on a global scale is farm animal welfare with the most critical issue facing the swine industry is how the dry sow should be kept in commercial pork production. The public approval for sow housing has serious societal and economic implications for domestic and international pork production and trade. Currently, emotions and public opinion are driving potential legislation that will dictate which housing system provides optimum sow welfare. Unfortunately, public opinion and “potential” resulting legislation, is not based on scientifically-sound measures of animal welfare, thus resulting in unwittingly compromising sow welfare and negatively impacting the future of animal agriculture. Despite the successful passing of state-by-state referendum by HSUS and the misconception that keeping sows in groups is a welfare-friendly practice and state, the reality is that group-penned sows experience “new problems” that adversely affect their welfare. Therefore, the objectives of this study were to evaluate the effects of feeding dietary-fiber to gestating sows kept in group-pens of 10 sows at different floor-space allowances on sow performance, productivity, immune and endocrine status, and behavior. Two-hundred and forty sows over time were allotted to a dietary treatment [standard diet (control) or standard diet supplemented with high-fiber (treatment)] and floor-space allowance of either 1.7 m<sup>2</sup>/sow or 2.3 m<sup>2</sup>/sow while keeping group size constant. On days 34 (prior to group-pen) and 90 blood samples were collected to determine sow immune and endocrine statuses (N=40 sow/treatment). Immune traits assessed were: total white blood cell count (WBC), neutrophil and lymphocyte count, leukocyte cell type populations, induced lymphocyte proliferation, neutrophil phagocytosis and chemotaxis and cortisol. Sow behavior was recorded and registered using EZViewlog by Geovision for 24 h on d 44, 76, and 104 of gestation. Behavior was registered and analyzed using continuous-sampling included: drink, eat, lay (next to wall, next to con-specific, next to gate), stand, sit, oral-nasal-facial (ONF), sham-chew, and aggressive encounters. Both duration and frequency of each behavior were analyzed. Data were analyzed using Proc MIXED with repeated measures and Chi-square analysis (SAS). There were diet × floor-space interactions for several welfare measures. Lesion severity scores were less amongst sows fed a high-fiber diet and kept in group-pens at 2.3 m<sup>2</sup>/sow compared with all other treatment groups (P < 0.05). Live litter weight was greatest amongst those piglets that were born to sows kept at 2.3 m<sup>2</sup>/sow of floor-space and fed the control diet compared with sows kept in pens at 2.3 m<sup>2</sup>/sow and fed high-fiber diet (P < 0.05). Duration of eat bouts were greater amongst sows kept at 1.7 m<sup>2</sup> of floor-space than for those sows kept at 2.3 m<sup>2</sup>/sow. Dietary treatment impacted measures of well-being (P < 0.05); sows fed a high-fiber diet had greater BW, BCS (P < 0.05), and BW gain (P < 0.10) throughout gestation than did sows fed control diet. Number of piglets retained tended to be greater amongst sows fed

---

These research results were submitted in fulfillment of checkoff-funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer-reviewed.

---

For more information contact:

National Pork Board • PO Box 9114 • Des Moines, IA 50306 USA • 800-456-7675 • Fax: 515-223-2646 • pork.org

---

control diet compared with sows fed high-fiber diet ( $P < 0.10$ ). Lymphocyte proliferation was greater ( $P < 0.05$ ) amongst sows fed high-fiber diet than for those sows fed control diet; however, neutrophil phagocytosis was greater ( $P < 0.05$ ) amongst sows fed control diet. Stand and ONF behaviors were greatest ( $P < 0.05$ ) amongst sows fed control diet and these sows were more active than sows fed high-fiber diet. Frequencies of eat and drink bouts were greater ( $P < 0.05$ ) amongst sows fed high-fiber diet than sows fed control diet. Floor-space allowance had an impact on sow lesion scores and behavior. Lesion severity scores were greater ( $P < 0.05$ ) amongst sows kept in group-pens at 1.7 m<sup>2</sup> floor-space allowance compared with sows kept at 2.3 m<sup>2</sup> of floor-space. Sows kept in pens at 1.7 m<sup>2</sup> of floor-space were more ( $P < 0.05$ ) active than were sows kept in group-pens at 2.3 m<sup>2</sup>. Sham-chew, drink, and aggression bouts were greater ( $P < 0.05$ ) amongst sows kept in pens at 2.3 m<sup>2</sup> floor-space than for sows kept at 1.7 m<sup>2</sup>. Results reported herein indicate that supplementing a standard gestation diet with high-fiber can improve sow performance and natural sequence of eat-drink-eat, while floor-space allowance did not negatively impact measures of sow well-being. Therefore, these data strongly support that individual components within a housing system can influence sow well-being and should be used to determine an optimal alternative housing system.