The effect of environmental enrichment on measures of disease resilience in pigs

M.K. Pedersen-Macnab[1], Y.M. Seddon[1], J.C.S. Harding[1], F. Fortin[2], G. Miguel Pacheco[1], J. Dekkers[3] M.K. Dyck[4], G.S. Plastow[4], and PigGen Canada[5]

[1]University of Saskatchewan, 52 Campus Dr., Saskatoon, SK, Canada S7N 5B4, [2]Centre de développement du porc du Québec Inc., Deschambault, QC; [3]Iowa State University, Ames, IA, USA; [4]University of Alberta, Edmonton, AB; [5]PigGen Canada, Guelph, ON. Correspondence: mkp357@usask.ca

Environmental enrichment is proposed as a strategy to enhance disease resilience and reduce stress in pigs, improving their welfare and productivity. This study explored the effect of a rotation of inedible, manipulable enrichment items suitable for use in fully-slatted grow-finish systems on measures of disease resilience in swine. Nineteen batches of weaned barrows (n=1200) were randomly assigned to a treatment of either enrichment (E) or control (barren pens: C) in a quarantine facility before transfer to a Natural Disease Challenge (NDC) nursery, remaining in their assigned treatment groups. At the NDC pigs were exposed to polymicrobial pathogens including porcine reproductive and respiratory syndrome virus. Batches of 60-75 pigs entered the NDC every 3 weeks, staying for 4 weeks before transfer to the onsite grow-finisher unit, allowing 1 week of contact between naïve and infected pigs. Behaviour, immune response, growth, morbidity and mortality data were collected to evaluate disease resilience. Results of two measures are presented: mortality and growth rate collected from 14 batches. Future analysis will include behavioural measures from 8 batches, and ADG, mortality and immunological measures from all 19 batches. Data was analyzed to determine whether differences exist between pigs raised in enriched or barren pens in the NDC. Under the disease pressure of the NDC, compared to control pens (n=63), pens of enriched pigs (n= 57) tended to have a lower average daily gain (ADG, kg/day), (E: 0.24 ± 0.17 vs C: 0.26 ± 0.17 mean ± SEM, P=0.05), and a higher mortality (E: 12% ± 2.4 vs 9% ± 1.8, P = 0.09). In the finisher, compared to control pens (n=27), pens of enriched pigs (n=22) maintained a higher mortality (E: 18% ± 3.3 vs C: 12% ± 2.4, P=0.02), but ADG was not significantly different between treatments (P=0.95).

Implications: Preliminary results suggest that the provision of inedible, manipulable enrichment during a polymicrobial disease challenge does not enhance disease resilience but instead made them more susceptible. This has implications for the use of inedible enrichment in swine barns. The final conclusions on the mechanism by which inedible enrichment reduces resilience under a natural disease challenge requires further analysis of the full dataset.