

Multilevel analysis to evaluate the association between environmental thermal parameters and *Salmonella* shedding in finishing pigs

Pires, A.¹, Funk, J.¹, Manuzon, R.² and Zhao, L.², ¹College of Veterinary Medicine, Michigan State University, Large Animal Clinical Sciences, USA, ²The Ohio State University, Department of Food, Agricultural and Biological Engineering, USA; piresald@cvm.msu.edu

The objectives of this study were to evaluate the association between the thermal environment at the barn and *Salmonella* status in finishing pigs and estimate the proportion of total model variance attributable to cohort, pig and individual sample level effects. For these purposes, individual fecal samples from 800 finishing pigs (8 collections per pig) were collected from 16 cohorts (50 pigs per cohort) in 3 sites of a multi-site farrow-to-finish production system in a longitudinal study. Pen temperature and humidity were measured every 2 minutes during the study period. The thermal parameters of interest were: hourly average, highest lagged, hourly variation and lowest lagged temperatures at the pen level prior the sampling for 6 time periods (12 h, 24 h, 48 h, 72 h, 1 week and 1 month). Additional potential risk factors at the individual (e.g. gender, health events, mortality), cohort (e.g. production) and pen level were also evaluated. Multilevel logistic models using generalized linear models, with random intercepts at pig and cohort levels to account for clustering (individual samples nested within pigs, pigs nested within cohorts) were constructed. The outcome variable was *Salmonella* status of the individual sample. *Salmonella* was isolated from 431 (7.12%) of 6054 individual fecal samples. Overall incidence of *Salmonella* was 22% (176/800). Hourly average, high lagged and lowest lagged temperatures prior the sampling period, pig health status, pen category and age were associated with *Salmonella* pig status in the univariable analysis ($P < 0.25$). The largest proportion of variance was associated with individual fecal sample (45.43%) followed by cohort (28.8%) and pig level (25.77%). Multivariable analyses are being conducted at this time. These preliminary results suggest thermal environment is associated with *Salmonella* shedding in finishing pigs.