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SOCIAL STRESS INCREASES FECAL SHEDDING OF *SALMONELLA TYPHIMURIUM* BY EARLY WEANED PIGS

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**Introduction** Pigs are a natural reservoir for *Salmonella* and other potential foodborne pathogenic bacteria. Weaned pigs are often transported to grower facilities in groups and may be co-mingled without regard to farm of origin. Thus, during transport and while on the grower floor pigs can be exposed to other swine containing novel pathogens. Additionally, because swine have a social structure, mixing strange pigs together causes a social stress while pigs sort out their dominance hierarchy. Unfortunately, little information is available on the effects of social stresses on shedding and colonization of swine by pathogenic bacteria. Therefore, the aim of this study was to determine the effect of mixing and social stress on populations of *Salmonella typhimurium* (ST) in early weaned pigs.

**Materials and Methods** A trial was conducted using pigs (7 d-old; n = 56; 2 replicates) that were separated into 2 groups (control and mixed groups; n = 7 pigs each group). One “seeders” pig from each group was removed and inoculated via oral gavage with 10⁹ CFU of ST that was antibiotic resistant to nalidixic acid and novobiocin. Each “seeders” pig (n = 8) was placed into a pen containing (n = 6) non-ST-inoculated piglets. Each day, one piglet was swapped between both “mixed” groups, to simulate constant mixing/social stress; control pigs were not swapped. Pigs were mixed daily for 5 d, and behavior was recorded continuously. Pigs were rectally swabbed daily to determine ST shedding of each animal. On d 5, pigs were humanely sacrificed and cecal and rectal contents were collected and ST populations were determined quantitatively by serial dilution and direct plating on Brilliant Green Agar (BGA) supplemented with novobiocin and nalidixic acid. Qualitative recovery of ST from swabs and intestinal tissues as well as lymph nodes and tonsils was accomplished by a sequential enrichment in tetrathionate broth (24 h) followed and a secondary enrichment in Rappaport-Vassilard’s broth (24 h) followed by plating on BGA (Nov/Nal). Total coliforms in rectal and cecal contents were enumerated via serial dilution and direct plating on MacConkey’s agar. Data were analyzed using the general linear model of SAS.

**Results and Discussion** Groups indicated significant behavioral differences; mixed pigs devoted significantly (P< 0.05) less time to eating (P< 0.05), to rooting (P< 0.05) and performed less agonistic (defensive) behavior (P< 0.05), indicating that they were under a form of social stress. More mixed pigs shed ST in their feces each day than did control groups. More pigs (P < 0.05) in the mixed group shed ST 5 d after inoculation. Upon slaughter, rectal ST populations in mixed pigs were greater (P < 0.05) than in control pigs but cecal ST populations were not altered by mixing. When tissues from the tonsils, ileo-cecal lymph node, cecum and rectum were enriched for ST, mixed pigs had more positive tonsils and lymph nodes than did control pigs. Cecal total coliform populations were greater (P < 0.05) in mixed groups than in controls. These results indicate that social stress induced by mixing groups of weaned pigs may increase susceptibility to and/or fecal shedding of foodborne pathogenic bacteria.