CAHFSE will also provide an epidemiological description of *Lawsonia intracellularis* associated ileitis in multiple age groups of weaned market pigs. Prevalence of *Lawsonia intracellularis* and resulting morbidity and mortality rates shall be correlated with management practices and operation facilities.

**References:**


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### PE 10 REPEATED OBSERVATIONS ON THE SALMONELLA CULTURE STATUS OF MIDWEST U.S. HERDS

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**Summary:** Mesenteric lymph nodes were collected from pigs from 115 Midwest U.S. swine herds at slaughter on two occasions separated by 6-9 months. These herds were sampled up to three additional times during a three-year period, with 30 herds sampled five times. Thirty pigs were sampled at each collection. Herds were categorized positive if one or more samples revealed *Salmonella* spp. While culture status at collection one was associated with the second sampling collection (p < 0.01), the association was only moderate in strength (OR = 2.6). Herds with three consecutive positive tests (9 of 38) were all positive on sample four. Prevalence estimates were weakly or not correlated between samplings. In conclusion, *Salmonella* culture status of these swine herds was weakly predictive of future culture results. Accurate description of *Salmonella* status based on bacterial culture appears to require repeated or ongoing testing.

**Keywords:** swine, predictability, *Salmonella* shedding, slaughter

**Introduction:** *Salmonella* carriage among pigs at slaughter poses a potential public health threat, if hygiene practices at the time of slaughter may fail to prevent the transmission of the bacteria through the food chain. Although pigs have been shown to shed *Salmonella* on the farm and after transport and time in lairage (Hurd, et al) the bacteria can be brought forward from the farm. Therefore, it may be useful to categorize herds by *Salmonella* status prior to shipment. For this to be most effective, the *Salmonella* status or prevalence should be predictable over time. However, little has
been reported on the on-farm shedding or culture positive status of herds at slaughter over extended periods. We designed this study to assess the repeatability of Salmonella culture status of commercial pig herds over a three year period.

**Methods and Materials:** Herds were solicited to participate in this study as a follow-up to an assessment of Salmonella prevalence among 141 Midwest herds marketing to one of two major slaughter plants. (Damman, et al.) All herds selected for study were eligible for up to five follow-up observations over a three-year period. Sampling was delayed a minimum of six months. Samples were then collected on the next available marketing, laboratory resources permitting. Where laboratory resources were overcommitted, the farm was sampled again at the next marketing to the plant.

Ten-gram samples of caudal mesenteric lymph nodes were aseptically collected after evisceration by dissection of overlying mesentery. Conventional bacterial culture methods were used to isolate Salmonella, using a slight modification of a previously described procedure. (Fedorka-Cray, et al.) For the first sampling collected from each farm five samples were pooled, combining two grams from each pig. Samples were blended and incubated in tetrathionate broth at 37°C for 48 hrs. One ml of this broth was transferred to R-10 broth and incubated 24 hrs at 37°C. XLT-4 plates were streaked for isolation, followed by culture on Brilliant Green agar, and finally suspect colonies were tested for agglutination with polyvalent anti-Salmonella sera. From positive pools, retained frozen tissue was cultured individually using two-gram samples in 20 ml of tetrathionate. This same individual procedure was used for collections two through five, with no pooling of samples.

Prevalence estimates were compared between collections using pair wise Spearman’s Rank correlation. Herds were also categorized positive / negative if one or more sample was positive. Categorical tests of association were pair wise agreement, kappa statistic, and the examination of repeated consistent test results as a predictor of the subsequent test.

**Results:** The number of herds sampled declined over the period as farms marketed to other plants, or stopped delivering pigs for other reasons (Table 1).

<table>
<thead>
<tr>
<th>Collection</th>
<th>n. herds</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>144</td>
</tr>
<tr>
<td>2</td>
<td>116</td>
</tr>
<tr>
<td>3</td>
<td>56</td>
</tr>
<tr>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>34</td>
</tr>
</tbody>
</table>

Positive classification at the first collection was positively associated with positive classification at the second observation, $\kappa = 0.23, p < 0.01, OR = 2.6$. However, classification at the first observation was not associated with the fifth observation ($p>0.2$). Of thirty herds with five observations, none was negative on all five collections. The proportion of herds positive on collections two through five was similar between collection one positive herds ($n = 15$) and stage one negative herds ($n=15$). The mean proportion of positive herd tests in the second through the fifth collections was 37% among herds positive for collection one, and was 42% for herds negative on collection one. Of herds with four sequential observations (collections 1-4), the nine that were positive on all of the first three sequential samples were all positive on collection four. In contrast, on collection four, 18 of 29 herds were positive among those that were negative on one or more of the first three collections. Among the pair-wise comparisons, the Spearman Rank coefficients for paired comparisons which had $p < 0.05$ and the values of the coefficients were collections 1 and 2 (0.32), 1 and 4 (-0.52), 1 and 5 (0.58) and 2 and 5 (0.61).
**Discussion:** The odds ratio linking collection one status vs. collection two status of 2.6 suggests that herds positive for collection one were more than two times more likely to be positive on the subsequent shipment. However, this association was demonstrated when examining other pairs of results. The limited correlations between prevalence of samples one and two suggests that there is some repeatability. However, this relationship was moderate in strength, and also was not seen in other pairings.

Since these samples were collected at the slaughter plant, it is possible that *Salmonella* isolates originated from trucks or from the lairage at the plant. If this were the case, associations between sequential collections would be weakened, since the exposure after the farm gate might not be associated with the shedding status of the farm. Another study of these same farms, however, has demonstrated a strong correlation between the *Salmonella* spp. prevalence among fecal samples collected immediately before shipment and prevalence detected in caudal mesenteric lymph nodes from the same pigs at slaughter. (Kim, et al.) Thus, it seems probable that the poor correlations and associations observed between sequential samples reflects changes on the farm in addition to variation caused by bacteria acquired after leaving the farm.

We conclude that single time bacterial culture of mesenteric lymph nodes at slaughter is relatively poor predictor of subsequent test results of a farm. Accurate description of *Salmonella* bacterial culture status requires repeated or ongoing sampling, particularly at the farm level.

**References:**


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**PE 11**

*Salmonella* infection in a multiple-site swine production system in Brazil

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**Summary:** A longitudinal study was conducted in a multiple-site swine production system. Individually identified piglets were sampled for *Salmonella* fecal excretion and serology. Furthermore, intestinal content, mesenteric lymph nodes and blood samples were taken from these animals at slaughter. In addition, feed samples were taken throughout the study period. Piglets were fecal-culture and serology negative until the nursery phase, but became *Salmonella* positive in the early finishing phase. On this sampling day, 28.6% of finishers were seropositive and 75% were shedding *Salmonella* in feces. At slaughter, the seroprevalence (76.9%) was higher than in the early finishing, but *Salmonella* was isolated from intestinal content or mesenteric lymph nodes in only 19.2% of the sampled pigs. *Salmonella* was isolated from three out of 26 feed samples, being all positive samples collected during the finishing period. In spite of being isolated from different system sites, 89.56% of all *Salmonella* strains belong to serovar Typhimurium.