Salmonellae species have been associated with illness among many species of animals, including man. There has been concern that shedding of Salmonella bacteria may serve as a source for foodborne infection of people. However, data from the USDA’s Cattle on Feed Evaluation indicate that Salmonella spp. isolates from cattle do not correspond well with serotypes most commonly associated with human illness.

The USDA:APHIS:VS conducted a study of health and management of cattle in feedlots as part of the National Animal Health Monitoring System’s (NAHMS) Cattle on Feed Evaluation (COFE). One objective of the study was to determine the prevalence of Salmonellae in fecal samples collected in feedlot pens. A stratified random sample of feedlots from the 13 major cattle feeding states\(^1\) was selected for the COFE. Four hundred ninety-eight (498) feedlots with at least 1,000 head capacity responded to the survey. Of those, 100 volunteer feedlots were enlisted for collection of feces to be evaluated for the presence of Salmonella spp. and Escherichia coli O157:H7.\(^2\) In each feedlot, 25 fecal samples were collected from fresh feces on the floor of two pens of cattle. The two pens identified for sampling were those cattle that had been on feed the shortest and longest periods of time. The following details findings from these sampling activities.

Overall, Salmonella spp. were recovered from 5.5 percent of the samples collected (Table 1). Table 1 and Figure 1 show that twice as many samples collected from pens of cattle that had been on feed the longer period of time were positive for Salmonella spp. This finding may indicate that more animals become infected with, or shed, the organism as the animals are housed together over time. Further analysis could determine if management factors in the late feeding period are more conducive to shedding of the organism. The positive samples came from

Table 1

<table>
<thead>
<tr>
<th>Feedlots</th>
<th>Time on Feed</th>
<th>Number Positive</th>
<th>Percent Positive</th>
<th>Samples</th>
<th>Number Collected</th>
<th>Number Positive</th>
<th>Percent Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Shortest</td>
<td>25</td>
<td>25.0</td>
<td></td>
<td>2,482</td>
<td>88</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Longest</td>
<td>27</td>
<td>27.3</td>
<td></td>
<td>2,495</td>
<td>185</td>
<td>7.4</td>
</tr>
<tr>
<td></td>
<td>All</td>
<td>38</td>
<td>38.0</td>
<td></td>
<td>4,977</td>
<td>273</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Figure 1

Frequency of Recovery of Salmonella spp. From Samples Collected from 100 Feedlots

1 Arizona, California, Colorado, Idaho, Illinois, Iowa, Kansas, Minnesota, Nebraska, Oklahoma, South Dakota, Texas, and Washington. These states account for over 85 percent of the cattle on feed in the United States.

2 Results of sampling for E. coli O157:H7 are available in a separate report from the address shown at the end of this article.

May 1995
38 of the 100 feedlots with no apparent geographic clustering of positive feedlots. A single serotype of *Salmonella* spp. was identified in 16 feedlots. Multiple serotypes were isolated in 22 feedlots. Overall, 26 serotypes were identified.

Table 2 and Figure 2 show the five most common serotypes of *Salmonella* recovered from samples. The most common isolates associated with cattle illness for October 1990 through September 1991 were *S. typhimurium*, *S. dublin*, *S. typhimurium var. copenhagen*, *S. cerro*, and *S. newport*. The lack of agreement between these results should not be surprising since the isolates from the COFE were not preferentially collected from animals that were ill. According to the Centers for Disease Control and Prevention (CDC) 1991 *Salmonella* Surveillance System annual summary, the five most common *Salmonella* spp. isolates associated with human illness were *S. typhimurium*, *S. enteritidis*, *S. heidelberg*, *S. hadar*, and *S. newport*. Again, these isolates are not in agreement with the isolates recovered from the COFE.

In summary, cattle that have been on feed longer appear more likely to shed *Salmonella* spp. The sample prevalence of *Salmonellae* within feedlots appears to be highly variable and was very low or zero in about two-thirds of feedlots, such that it was not detectable based on 50 fecal samples in those feedlots. Shedding of *Salmonella* spp. serotypes commonly associated with human illness by cattle in this study occurred infrequently.

Future analyses of these data will focus on management factors associated with increased shedding of *Salmonella* organisms.

### Table 2

<table>
<thead>
<tr>
<th>Serotype</th>
<th>Number of Isolates</th>
<th>Percent of All Positive Isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anatum</td>
<td>78</td>
<td>27.9</td>
</tr>
<tr>
<td>Montevideo</td>
<td>36</td>
<td>12.9</td>
</tr>
<tr>
<td>Muenster</td>
<td>33</td>
<td>11.8</td>
</tr>
<tr>
<td>Kentucky</td>
<td>23</td>
<td>8.2</td>
</tr>
<tr>
<td>Newington</td>
<td>12</td>
<td>4.3</td>
</tr>
</tbody>
</table>

### Figure 2

Five Most Common Serotypes of *Salmonella* spp. Recovered from 100 Feedlots

Serotype (# of Isolates) नीचे के सर्टिफिकेट का एक नमूना है।

- S. Anatum (78) 27.9
- S. Montevideo (36) 12.9
- S. Muenster (33) 11.8
- S. Kentucky (23) 8.2
- S. Newington (12) 4.3

Federal Veterinary Medical Officers, the National Veterinary Services Laboratories (USDA:APHIS:VS), and the National Animal Disease Center (USDA:ARS).

Other information from the COFE is available on feedlot quality assurance measures, environmental monitoring, injection practices, and vaccination practices. For more information on these topics or the study in general contact:

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Fort Collins, CO 80526-8117
(970) 494-7000
NAHMSweb@aphis.usda.gov

1 Isolates were from the on-going *Salmonella* serotyping service provided by the National Veterinary Services Laboratories. The isolates were from cattle with clinical disease.

2 These isolates were from all human *Salmonella* cases reported, regardless of suspected source of infection.