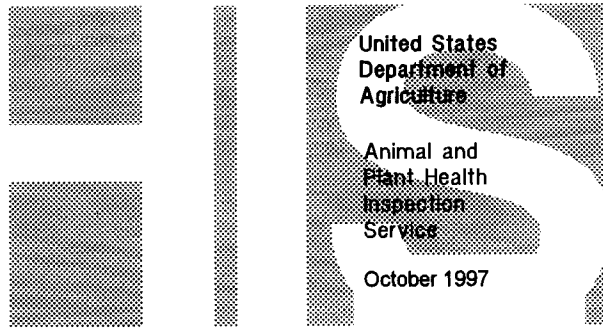


INFO SHEET

Veterinary Services



Factors Associated with Escherichia coli 0157 in Feces of Feedlot Cattle

The 1994 National Animal Health Monitoring System's (NAHMS) Cattle on Feed Evaluation (COFE) identified factors associated with shedding of Escherichia coli 0157. Length of time cattle are on feed and feeding barley in the cattle's ration were among the associated factors.

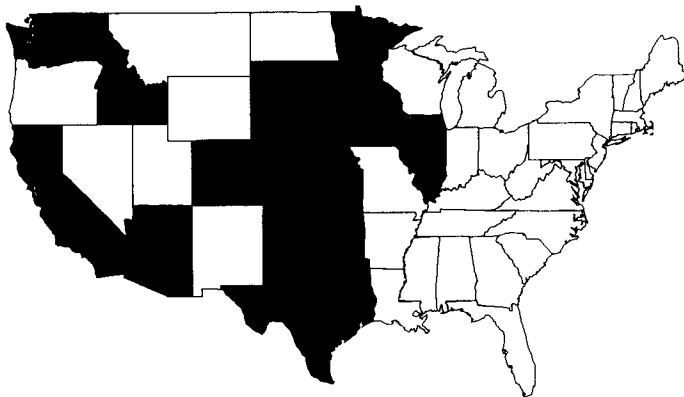
The COFE was the largest study of E. coli 0157 in feedlot cattle to date. While the number of positive fecal samples found was low (1.8 percent of 11,881), 63 of the 100 COFE feedlots had at least one positive sample, indicating the organism occurs in animal populations at low frequency, but with wide distribution. Feedlots participating in the E. coli 0157 subsampling portion of the COFE had at least a 1,000 head, one-time capacity and were

from 13¹ broadly distributed states (see map below). These states contained more than 85 percent of the feedlot cattle population in the country.

NAHMS collected information on cattle health and management from each COFE operation. Results of fecal specimen tests by the USDA's National Veterinary Services Laboratories and Washington State University and the questionnaire results were used to identify management factors associated with the presence of E. coli 0157 in feces of feedlot cattle.

For the COFE, four pens were selected for sampling at each feedlot, including those that had been on feed the shortest and longest amount of time. Thirty swab samples were taken from fresh feces throughout each pen to prevent taking multiple samples from the same animal as much as possible.

States Participating in the NAHMS Cattle on Feed Evaluation (COFE)



Total = 85.8 percent of U.S. inventory.

#2650

Pens of cattle that had been on feed for less than 20 days were 3.4 times more likely to have had a positive sample than those on feed for longer periods of time. Several reasons may be considered for the increased likelihood of shedding E. coli 0157 in short-fed cattle. Stresses and short periods when cattle are off feed during transportation are two possible contributing factors. Commingling on arrival at the feedlot could introduce naive cattle to the organism, resulting in a higher level of shedding. Also, the COFE information did not account for feed and feeding practices prior to arrival at the feedlot.

¹Arizona, California, Colorado, Idaho, Illinois, Iowa, Kansas, Minnesota, Nebraska, Oklahoma, South Dakota, Texas, and Washington.

Pens receiving barley in the ration were 2.75 times more likely to have a positive sample than pens not receiving barley. Associations between feeding barley and increased levels of E. coli 0157 shedding may be due to some aspect of the grain's digestion in cattle or, since feeding barley is a strongly regional practice, it may reflect a regional distribution of positive pens rather than an effect of diet. In this study, barley was fed in 40 pens of cattle in 11 different feedlots. These feedlots were located in Arizona, California, Idaho, Texas, and Washington. Positive pens of cattle were found in each of the five states. More investigation is needed to declare a firm association between positive laboratory results and barley feeding.

Pens of cattle with entry weights of 700 lbs. or more were less likely to have had positive samples. Older, heavier animals may be better able to handle stresses of transportation and a new environment or younger animals may be more vulnerable to new organisms.

Pens of at least 85 percent heifers were less likely to have a positive sample. More research may show what, if any, variations in management of heifers and steers influences E. coli 0157 shedding.

COFE analyses showed no association between positive fecal samples and ionophore use, a factor that has shown mixed results in other studies. Additional factors not associated with E. coli 0157 recovery in this study were feeding antibiotics, coccidiostats, probiotics, urea, and other feed additives evaluated. Animal density within pens or previous health status of cattle were not significantly associated with E. coli 0157 recovery from feces.

Based on this study, more research needs to be done to better understand the ecology of E. coli 0157. This study will serve as a basis to design experiments to test these associations more extensively. Ultimately, some of this information may become part of a management system to further improve food safety.

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