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A Four-Season Longitudinal Study of Enterohaemorrhagic *Escherichia Coli* in Beef Cow-Calf Herds in Mississippi and Nebraska

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Abstract

Our objective was to describe the probability of detecting seven serogroups of enterohaemorrhagic *Escherichia coli* (EHEC-7) of public health importance in fecal samples from beef cow-calf herds and to test for factors associated with their detection. Fresh fecal samples (n = 85) from two Mississippi and two Nebraska herds were collected in each of four seasons. Samples were tested for each EHEC-7 serogroup by a molecular screening assay. Separate management groups within herds were sampled, and group-level factors were recorded. To measure the effects of factors on fecal shedding of EHEC-7, separate multivariable logistic regression models were used, accounting for the random effect of clustering by group within farm. Statistical significance was set $\alpha = 0.05$. Fifty-nine samples (4.3%) were positive for EHEC O26, and Nebraska samples were more likely to be positive than Mississippi samples (OR = 12.4, 95% CI: 1.1, 139.2). Forty-four samples (3.2%) were positive for EHEC O45. Odds for detection were greater in the summer than all other seasons combined (OR = 4.2, 95% CI: 1.3, 14.0), and odds decreased if a precipitation event occurred (OR = 0.07, 95% CI: 0.006, 0.8). EHEC O103 was detected in 66 samples (4.9%) with increased probability to be detected at increased temperature. EHEC O111 was detected in 71 samples (5.2%), and 43 samples (3.2%) were positive for EHEC O145. Both EHEC O111 and O145 were associated separately with season, with greater probability for detection in the summer. Eighteen (1.3%) and 68 (5.0%) samples were positive for EHEC O121 and EHEC O157, respectively. We failed to detect significant explanatory factors associated with probability to detect EHEC O121 or O157. Factors that vary by time and place, such as precipitation, ambient temperature, region and season, are uniquely associated with the probability to detect EHEC-7 in fresh feces collected from cow-calf herds.

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