
MAPPING BRUCELLOSIS INCREASES RELATIVE TO ELK DENSITY USING HIERARCHICAL BAYESIAN MODELS

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The relationship between host density and parasite transmission is central to the effectiveness of many management strategies. We applied hierarchical Bayesian methods to an 18-yr dataset on elk (*Cervus elaphus*) brucellosis in the Greater Yellowstone Ecosystem (GYE) and found that increases in brucellosis seroprevalence were strongly correlated with elk densities. Elk that were densely aggregated on supplemental feeding grounds had higher seroprevalence in 1991, but by 2008 many areas distant from the feeding grounds were of comparable seroprevalence. Thus, brucellosis appears to be expanding its range into areas of higher elk density, which is likely to further complicate the United States brucellosis eradication program. The data could not differentiate among linear and non-linear effects of host density, which is a critical area where research can inform management actions. This study is an example of how the dynamics of host populations can affect their ability to serve as disease reservoirs.