

FAT BUT NOT HAPPY: THE EFFECTS OF SUPPLEMENTAL FEEDING ON STRESS HORMONE LEVELS OF WYOMING ELK

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On 23 feed grounds in Wyoming, elk (*Cervus elaphus*) were provided with supplemental feed throughout the winter. Brucellosis seroprevalence of feed ground elk is 26 percent whereas other elk in the Greater Yellowstone Ecosystem have a brucellosis seroprevalence of 2-3 percent. The aggregation of elk during peak transmission allows brucellosis to persist in the fed populations. In addition to creating the opportunity for disease transmission, the aggregation of elk on feed grounds may have detrimental physiological effects. Other studies have shown that chronically high stress hormone concentrations can suppress the immune system and lead to increased disease susceptibility. Potential stressors on the feed grounds include high densities, large group sizes and aggressive social interactions. In this study we investigated how supplemental feeding and environmental variables affect stress hormone levels in fed and unfed populations of elk. We also manipulated resource distribution on the feed grounds to examine how feeding density affects stress hormone levels and aggression rates. Results show that elk on feed grounds have stress hormone levels significantly higher than unfed elk. Experimental reduction of feed density did not have an effect on stress hormone levels or aggression rates. Group size and density during feeding were important predictors of stress hormone levels. This study indicates that feed grounds are not only creating an epidemiological setting for disease transmission, but also creating a physiological state that may increase susceptibility to disease. The impact of these stress hormone concentrations on disease susceptibility remains unknown, but may potentially be an important driver of disease dynamics in feedground elk populations.