

**** Interspecific Competition and Seasonality Correlate With Determinants of Hantavirus Transmission in Deer mice**

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Infectious wildlife diseases are becoming more common, causing population declines and species extinctions. Ecological and environmental factors can influence disease spread in wildlife, through effects on parasite transmissibility (regulated by host immunity), and contact rates. These factors can induce chronic stress, which can depress host immunity, and thus influence disease spread. Glucocorticoids are hormones, which are called fecal corticosterone metabolites (FCMs) when excreted in feces, and are typically used to measure chronic stress. Sin Nombre virus (SNV) is carried by deermice (*Peromyscus maniculatus*), and in western Montana grasslands, deermice compete with voles (*Microtus* spp.) and shrews (*Sorex* spp.). Because voles are dominant over deermice, they could increase SNV prevalence in deermice via stress-induced immunosuppression and/or alteration in contact rates, while shrews may have a lesser effect. Seasonal changes in these same measures may explain higher SNV transmission typically observed in spring/summer. We live-trapped small mammals over 2 years in western Montana grasslands and evaluated deermice for scar numbers (proxy for contact rates), demography, and body condition scores (BCSs; another measure of chronic stress). Deermouse blood was evaluated for white blood cell (WBC) counts/differentials, and SNV antibodies, and feces for FCMs to measure stress (baseline and stress-induced). Using mixed effect regression trees, we found that higher vole density was correlated with lower BCSs and scar numbers. Higher shrew density was correlated with lower stress-induced FCMs, lower BCSs, and higher scar numbers. Neutrophil/lymphocyte (N/L) ratios (another measure of chronic stress) were highest in spring/summer and WBC counts (a measure of immunity) were lowest during the summer. Due to low SNV prevalence, we could not evaluate effects on infection. Interspecific competition may influence SNV spread via effects on chronic stress (i.e. lower stress-induced FCMs and BCSs), and scar numbers. Higher N/L ratios in spring/summer, suggestive of chronic stress, and lower WBC counts in summer, suggestive of immunosuppression, may provide an ideal time for SNV transmission. Our findings may extend to other directly-transmitted wildlife diseases.