SEPARATING COMPONENTS OF VARIATION IN SURVIVAL OF MULE DEER IN COLORADO

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Abstract: Survival is an important parameter for understanding population dynamics of mule deer (Odocoileus hemionus) and other large herbivores. To understand long-term dynamics it is important to separate sampling and biological process variation in survival. Moreover, correlations in survival across space and between young and adults can provide more informed predictions of survival in unsampled areas. We estimated survival of fawn, yearling and adult mule deer from 4 spatially separated regions of Colorado from 1997-2008. We also estimated process variance in survival across time for each age and site using Markov chain Monte Carlo (MCMC) methods. Finally, we estimated correlations in survival between sites and ages with MCMC methods. Average winter fawn survival was 0.721 (SD = 0.024) for the 4 regions. Average winter adult female survival was 0.935 (SD = 0.007). Annual adult female survival ranged from 0.803 (SD = 0.017) to 0.900 (SD = 0.028) for the 4 regions. The correlation between fawn and adult female survival was relatively high, 0.563 (SD = 0.253). Correlations in winter fawn survival were higher between populations at the same latitude than they were for populations to the north and south. We used the survival estimates from our analysis to inform prior distributions for a Bayesian population dynamics model from one population in Colorado and compared that model to one with non-informative prior distributions. Population models including informative prior distributions based on our results performed better than those non-informative prior distributions on survival, providing more biologically defensible results when data were sparse.

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