Ecotypic Variation in Population Dynamics of Reintroduced Bighorn Sheep

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ABSTRACT: Selection of bighorn sheep (*Ovis canadensis*) for translocation historically has been motivated by preservation of subspecific purity rather than by adaptation of source stocks to similar environments. Our objective was to estimate cause-specific, annual, and age-specific mortality of introduced bighorn sheep that originated at low elevations in southern British Columbia, Canada (BC ecotype), or in the Missouri River Breaks region of central Montana, USA (MT ecotype). In North Dakota, USA, mortality was similar and typically low for adult female bighorn sheep from MT (0.09 ± 0.029 [SE]) and BC (0.08 ± 0.017) during 2000-2016. Median life expectancy was 11 years for females that reached adulthood (2 yrs old); however, mortality accelerated with age and reached 86% by age 16. Mortalities resulted primarily from low rates of predation, disease, accidents, and unknown natural causes (<0.04 [upper 90% confidence limit]). Similar survival rates of female bighorn sheep from BC and MT, coupled with greater recruitment of bighorn sheep from MT, resulted in a greater projected rate of increase for the MT ecotype ($\lambda = 1.21$) than for the BC ecotype (1.02), and a more youthful age structure. These results support translocation of bighorn sheep from areas that are environmentally similar to areas that will be stocked. Potential benefits include more rapid population growth, greater resilience to and more rapid recovery from density-independent losses, an increased possibility that rapidly growing populations will expand into adjacent habitat, increased hunter opportunity, increased connectivity among herds, and a more complete restoration of ecosystem processes.

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