The Influence of Early Reproductive Success on Longevity and Late Reproductive Success in an Alpine Ungulate

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ABSTRACT: The life-history theories of aging predict lifetime trade-offs between early reproductive allocation and late-life survival, reproduction, or both components of fitness. Recent studies in wild populations have found evidence for these early-late life trade-offs, but rarely across multiple traits while exploring the additional effects of variation in environmental conditions and individual quality. Benefiting from longitudinal data on adult female mountain goats (*Oreamnos americanus*), we investigated the influence of age at first reproduction (AFR) and early reproductive success (ERS) on longevity, late reproductive success, and senescence rates, while accounting for the influence of natal environmental conditions and individual quality. Contrary to predictions, we did not find evidence for early-late life trade-offs. Instead, an earlier AFR and a greater ERS had positive but weak direct effects on late reproductive success. Natal population density, however, was the strongest determinant of all life-history traits, having a direct negative effect on female longevity, late reproductive success, AFR, and ERS. Although natal density reduced the probability of annual reproduction and annual survival during adulthood, higher allocation to reproduction in early life and poorer natal conditions did not lead to accelerated rates of senescence during adulthood. The results of this investigation provide an integrated picture of early-late life trade-offs, underscoring the importance of accounting for environmental conditions due to their potentially strong implications for population dynamics.

Biennial Symposium of the Northern Wild Sheep and Goat Council 21:78; 2018

KEYWORDS Mountain goats; *Oreamnos americanus*; natal population density; reproductive success; Alberta; Canada.