



## **Heterogeneity in male horn growth and longevity in a highly sexually dimorphic ungulate**

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In sexually dimorphic ungulates, sexual selection favoring rapid horn growth in males may be counterbalanced by a decrease in longevity if horns are costly to produce and maintain. Alternatively, if early horn growth varied with individual quality, it may be positively correlated with longevity. We studied Alpine ibex (*Capra ibex*) in the Gran Paradiso National Park, Italy, to test these alternatives by comparing early horn growth and longevity of 383 males that died from natural causes. After accounting for age at death, total horn length after age 5 was positively correlated with horn growth from two to four years. Individuals with the fastest horn growth as young adults also had the longest horns later in life. Annual horn growth increments between two and six years of age were independent of longevity for ibex whose age at death ranged from 8 to 16 years. Our results suggest that growing long horns does not constrain longevity. Of the variability in horn length, 22% could be explained by individual heterogeneity, suggesting persistent differences in phenotypic quality among males. Research on un hunted populations of sexually dimorphic ungulates documents how natural mortality varies according to horn or antler size, and can help reduce the impact of sport hunting on natural processes.

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