Secondary sexual characters signal fighting ability and determine social rank in Alpine ibex (Capra ibex)

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Abstract

Social dominance is a fundamental aspect of male evolutionary ecology in polygynous mammals because it determines access to estrous females. As it is rarely possible to monitor marked individuals of known morphology, little is known about the determinants of male dominance. We studied the social structure of Alpine ibex males in Gran Paradiso National Park, Italy in 2003, 2006, and 2007. Dominance interactions produced a linear social hierarchy. In ibex males, body mass and horn length are key traits in male-male combat, and both increase with age. We explored the links between age, body mass, horn length, and social rank. Ibex males showed much age-independent phenotypic heterogeneity and rapidly growing males reached high rank at a younger age than slow-growing males. Because there is no trade-off between horn growth and longevity, fast-growing males may face weak potential costs of rapid growth and high fitness benefit of achieving high rank. Violent interactions were more likely to occur between males similar in both mass and horn length, independently of age. We suggest that only high-quality individuals can afford a strategy of rapid growth for both secondary sexual characters, and likely reap substantial fitness benefits.

BEHAVIORAL ECOLOGY AND SOCIOBIOLOGY: Volume 64, Issue 8 (2010), 1299-1307, DOI:10.1007/s00265-010-0944-x
http://www.springerlink.com/content/e80166t86271t121/