

## MATING IN BIGHORN SHEEP: FREQUENT MALE REPRODUCTION VIA A HIGH-RISK "UNCONVENTIONAL" TACTIC<sup>1</sup>

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**Abstract:** Rocky Mountain bighorn rams use three distinct tactics in competition for mates. Two tactics (tending and blocking) feature defense and cooperative breedings over a relatively prolonged consort period (up to 3 days). In the coursing tactic, subordinate rams fight dominants for temporary copulatory access (lasting seconds) with defended ewes. By combining population-wide genetic (microsatellite) exclusion of paternity, behavioral data and a model of bighorn reproductive competition, we estimated that coursing rams fathered 44% of 142 lambs assigned paternity in two natural populations. In one population, the probability of successful defense against coursing was lowest among rams that had many female consorts and held highest dominance rank. Even so, per-capita annual male reproductive success was positively associated with social rank in both herds when measured in terms of fall conceptions. The proportion of coursing versus defending ram breedings in each population (0.36 and 0.39) was similar to the corresponding fraction of lambs (0.43 and 0.47) fathered by coursing rams, suggesting that sperm competition approximated a fair lottery. Male traits important in gaining social status and obtaining cooperative consorts with ewes were different and potentially in conflict with those needed to defend against (and practice) coursing. Although the concussive weapons (horns) of rams are less dangerous than, for example, the piercing weapons of other bovids, injury from falls and horn blows during coursing brawls may cause death, handicap future mating competition or increase the risk of predation. Coursing is a rare example of an unconventional alternative mating tactic that is high-gain and high-risk. The high-gain, high-risk nature of coursing has likely had important ripple effects on many features of the bighorn life history including male survivorship and demography, mating system generated genetic bottlenecks and the evolutionary processes associated with small effective population size.

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