

Microsatellite analysis of multiple paternity and reproductive success in Arctic grizzly bears

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Abstract

We report data from analyses of microsatellite loci of 30 grizzly bear family groups which demonstrate that each cub in a litter can be sired independently and we derive estimates of maximum reproductive success for males, from an Arctic population in northwestern Alaska that is minimally affected by human activities. These analyses were made possible by the use of single-locus primers which amplified both of an individual's alleles at 8 loci, and by detailed knowledge of maternal/offspring relationships which allowed the identification of paternal alleles. No single male was responsible for more than about 11% of known offspring, and no more than 45% of breeding-age males successfully bred. Litter-mates were demonstrated to have been sired by different fathers thus providing the first evidence of multiple paternity in grizzly bears. Males begin breeding behavior at age 5, but no males younger than 9 were successful. Of 57 offspring with known mothers, 36 cases of paternity were established, but 21 others were sired by males that had not been sampled within the study area. This supports movement data which indicate that males travel widely and interact with females over a large area. They indicate that high levels of genetic diversity in grizzly bear populations are maintained by the male segment of the population. Estimates of N_e and other population genetics parameters are discussed. These data contribute to an understanding of the genetic and demographic basis of male reproductive success which is of vital importance in the maintenance of small, isolated grizzly bear populations.

ABSTRACTS

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