

Estimating the Arabian leopard (*Panthera pardus nimr*) population size in Israel using fecal DNA

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The Arabian leopard (*Panthera pardus nimr*), one of the world's most endangered leopard subspecies, occurs in the Arabian Peninsula and Israel. Using molecular techniques applied on fecal samples, we estimated the leopard population size and composition in Israel. Feces were collected over the entire range of the Arabian leopard in Israel. Fecal DNA was typed for several microsatellite loci to deduce the number of unique multilocus genotypes. Assuming that each unique genotype represents one leopard, the population size was projected as the asymptote of a rarefaction curve describing the cumulative number of unique multilocus genotypes as a function of the number of feces typed. Sex was determined using specific markers of both sex chromosomes. During this study we obtained 54 leopard DNA samples. The microsatellite typing results revealed very low genetic variability, and many loci were found to be monomorphic, implying close inbreeding and genetic drift. Integrating the molecular analysis data with the spatial distribution of the feces locations enabled discrimination of eight different individuals: three females and five males. While these findings highlight the critical status of the leopards in Israel, the existence of individuals of both genders indicates that conservation efforts are not hopeless.