

Genetic consequences of population decline in the Danish population of the little owl (*Athene noctua*)

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ABSTRACT

Background: Danish populations of the little owl (*Athene noctua*) have experienced dramatic declines in size over the past century. Before 1960 the little owl population was abundant in Denmark (estimated $N > 2000$), but between 1960 and 1980 the population declined rapidly, and since 1980 the little owl population has survived only in small and fragmented areas.

Question: Is the decline in population size associated with reduced genetic variation in these Danish populations of the little owl? Are the populations genetically fragmented?

Field site: Samples were collected from birds in Denmark (from 57°45'7"N to 54°33'35"N).

Methods: We extracted DNA from the feathers of museum specimens of Danish little owls collected between 1918 and 1980. We also extracted DNA from feathers collected between 1984 and 2010. We performed a genetic analysis of 15 microsatellites on these samples.

Conclusions: Older samples showed relatively little genetic variability, with more recent ones showing even less. In addition, pairwise F_{ST} values showed evidence for genetic substructuring with small but significant genetic differences between the extant population and the extinct owl populations on the Danish isle of Funen. The modest loss of genetic variability observed since the 1960s and 1970s may be associated with a diminished distributional range and population bottlenecks.

Keywords: conservation, microsatellites, old DNA, population bottlenecks, temporal and spatial variation.

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