Survival in a Swedish population of Siberian jays

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The Siberian jay (*Perisoreus infaustus*) is a long-lived group living bird species in northern taiga forests. It can survive extreme cold winter (-40 °C). Family groups consist of a socially dominant breeding pair, retained offspring and unrelated immigrants. Retained offspring benefit from preferential treatment of nepotistic parents while immigrants suffer from being frequently chased off by dominant breeders. This would result in a difference in energy consumption as well as in survival in the birds.

Population dynamics studies the changes in size and structure in a population and how the changes are influenced by different factors. Long-term datasets allow examination of temporal variation in survival estimates and the driving factors of it. We did a population dynamics study based on a 20-year dataset of mark-recapture (i.e. individual is given a mark the first time it is caught and can be re-observed several times in later studies) records in a natural population of Siberian jays in northern Sweden and asked two questions:

1. How has the population changed in the past 20 years?
2. Why has the population changed in this way?

Mark-recapture analysis is a widely used ecological method to study population dynamics. Monitoring of specific individuals can be difficult as they are easily missed during an inventory event. The missing individuals could either have died or left the territory. We estimated the probability of the individual being missed rather than being dead by using a mark-recapture software, MARK. Based on whether the individual has been re-observed or not each time, MARK calculates the survival rates. We then investigated how age, sex, season, population density, temperature and predation affected the survival rate. These factors were used to make different survival models in MARK. The best model was selected based on both precision (large likelihood) and parsimony (few parameters).

We found that Siberian jays experienced higher winter mortality during their first year of life and they survived better in winter than in summer as adults. Females and males survived equally well regardless of age. Annual variation in the winter survival of first year birds was strongly correlated to the predation pressure from goshawks (*Accipiter gentilis*). Survival in adult jays was not found to be affected by environmental factors. Our study increases the knowledge concerning the population dynamics and has implications for the projection of the future status of the Swedish population of Siberian jays.

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