Paper summary

Introduction

1. Families are important components of animal groups (families form groups, families are dominant).
2. Wintering goose populations have been studied in relation to summer predation and Arctic predators are hypothesised to reduce the breeding success of birds in lemming poor years (alternate prey hypothesis).
3. The effect of summer predation at the level of the family is not known, and the pattern of family bonds is not well known over space and time (problem statement).
4. Whitefronted geese in Europe have been under long term observation and trends in family and flock sizes have been hypothesised (introduce whitefronts, benefits of whitefronts as a study system, list hypotheses).
5. We investigate how family size interacts with group size, space, time, and summer predation in the most important migratory waterfowl in western Europe (what we do).

Methods

1. We collected observations of flocks, family frequencies within flocks, individually marked geese and goose flight activity from the main geese wintering grounds (spatial extent here), and deployed (n) loggers on 13 families.
2. We excluded data that may have biased the results (single marked geese, roost - field flights) and data outside the spatio-temporal extent, and calculated the number of days between each observation and the start and end of the goose winter (defined by start and end of autumn and spring migration).
3. We estimated a pooled mean summer predation index from lemming surveys in the breeding grounds for each year.
4. We tested the effect of predictors on family size, number of families, flock size and juvenile proportion (models used and Ω_0^2 metric one line explanation), and calculated the daily family size of tracked families.

Results

1. Families get smaller over winter, longitude and flock size have no significant effect (model output and χ^2 in all cases).
2. Flocks are smaller in the west and larger in late winter, and larger flocks have more, but not significantly smaller families.
3. The proportion of juveniles in flocks increases through the winter and decreases with flock size.
4. Predation reduces the number of successful families in flocks and the size of broods, but does not affect flock size or juvenile proportion.

Discussion

1. Counting more unsuccessful pairs is important to determine spatial and flock size trends in family size.
2. Summer predation pooled over large spatial extents may not be a good predictor of breeding success.
3. Family bonds may differ between subspecies of whitefront.