Does predator control work for Curlew?

Dave Parish
Long-term Curlew declines are caused by changes in land use

- Field drainage
- Sward improvement
- Earlier mowing
- Conversion of grass to arable
- Change in livestock densities
- Forestry plantations
The proximate driver of decline is reduced productivity

Annual adult survival = 75-90%
First-year survival = 47%

For a stable population, average of 0.48-0.62 young per pair/year

Average estimated productivity across Europe is 0.34 chick/pair (Roodbergen et al. 2012 J. Ornithol. 153, 53-74)

Decline driven by reduced breeding success
Predation is the main cause of poor breeding success

Curlew, Northern Ireland, 1990s:
85-97% of nest failure, 74% of chick mortality due to predation, mainly by foxes and crows
(Grant et al. 1999 *J. Appl. Ecol.* 36, 59-74)

Curlew nest predation has increased across Europe:
16% pre-1980 to 65% 1996-2006
(Roodbergen et al. 2012 *J. Ornithol.* 153, 53-74)

High levels of predation (+ loss/degradation of breeding habitat) reduced breeding success
Untagged foxes

**Figure 3.** Relationships between Curlew population change and significant environmental predictors in the final minimum adequate GAM. The 1 km squares included in the analysis (n = 241) were those surveyed in both periods and where Curlew increased, remained stable, declined or went extinct. Population change values from 1995–99 to 2007–11 are given as a ratio where a value of 1.0 = stability between the two periods. Solid lines show the significant predicted relationship between population change and covariates, while dashed lines show the 95% confidence intervals. Rug plots along the x-axis show the distribution of the original values of the predictor variable which were used in the model.
Meta-analysis of 40 cases investigating predator impacts on prey in the UK


Figure 1. Plot of effect sizes (ln R) ± SE for each of the forty cases in the meta-data set. Overall mean effect size 0.47, df = 39, 95% CI = 0.39–0.55 (fixed effects model).
Review of 35 studies; 13 investigating effect of predator control on non-target species, UK

Experimental predator control, moorland: wader breeding success

Mean (se) predicted prop. pairs fledging young

\[ P = 0.005 \quad P = 0.02 \quad P = 0.04 \]

Fletcher et al. 2010
J. Appl. Ecol. 47, 263-272

Predator control
No predator control
Annual change in breeding pairs

Fletcher et al. 2010
J. Appl. Ecol. 47, 263-272
Predicted population trends

Predicted effect on curlew population

% Population Change

Year

With pc
No pc
Effects may depend on predator density

Experimental predator control, lapwings on 13 nature reserves

Bolton et al. 2007
J. Appl. Ecol. 44, 534-544
Routes to success will be different in each situation

- Predator exclusion may be a valuable addition
- High public access will make predator control difficult
Curlew population recovery

Addressing predation is likely to be necessary

- Predator control must be legal
- Focus on February-July
- Appropriate scale; collaboration with neighbours
- Competent practitioners, following best practice