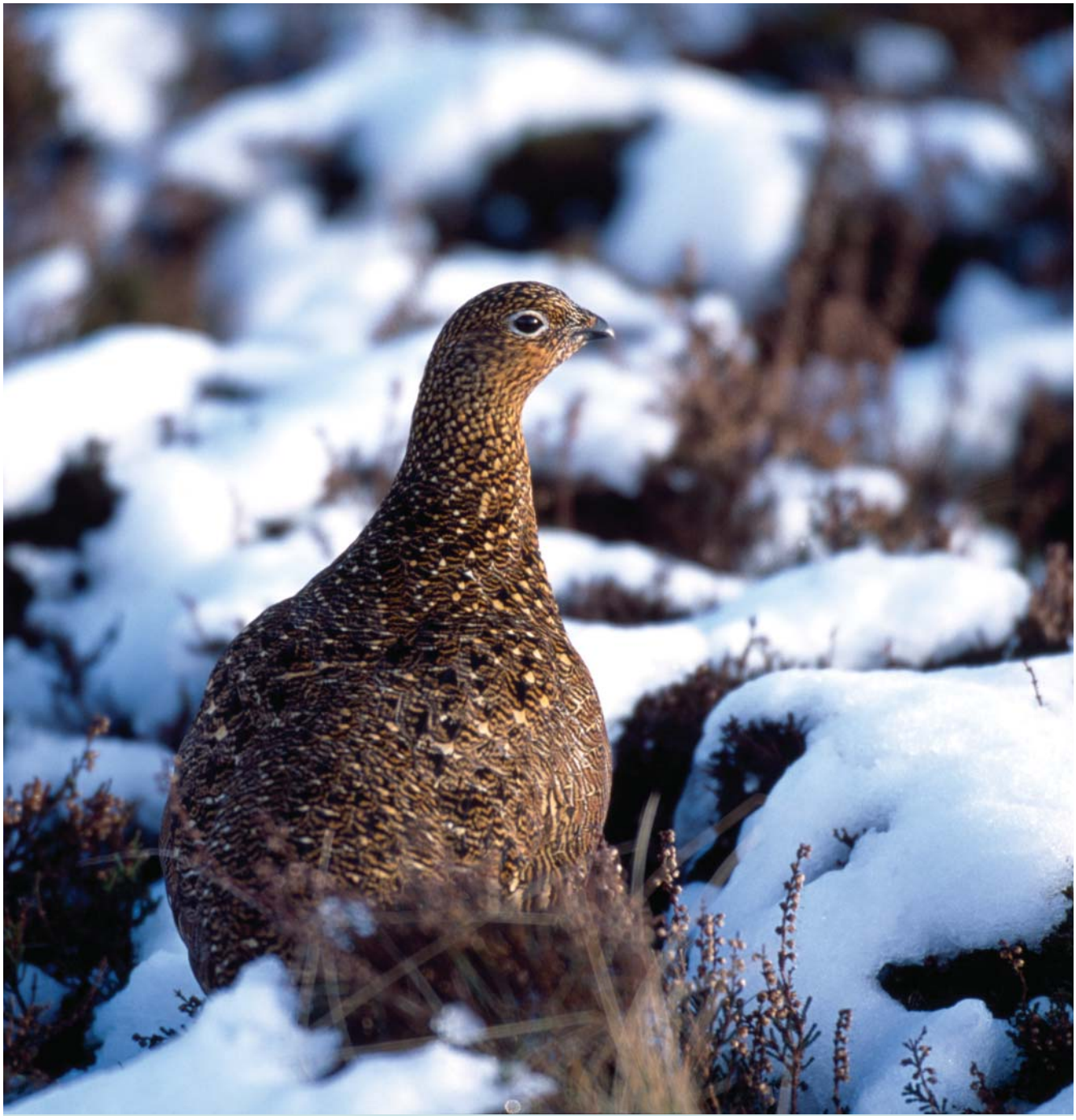
Predator control and ground-nesting waders

2005 was the sixth year in our Upland Predation Experiment based at Otterburn in Northumberland. This project, funded by the Uplands Appeal, aims to test whether predator removal by grouse moor gamekeepers (ie. killing foxes, crows, stoats and weasels) improves numbers or breeding success of moorland birds other than red grouse. Species of conservation concern in the UK, such as golden plover, curlew, lapwing, skylark and black grouse, are of particular interest in this debate. The project consists of four plots, each about 12 square kilometres (1,200 hectares), on which bird numbers and breeding success have been monitored since 2000. There are two long-term plots that remain under the same regime for the duration of the project: Ray Demesne has a full-time keeper, and Emblehope acts as an unkeepered comparison (see Figure 1). The other two plots were switched over so that Otterburn had a full-time keeper from autumn 2000 to autumn 2004, and Bellshiel was the unkeepered

The red grouse is flourishing on plots where predators are controlled. (Laurie Campbell)



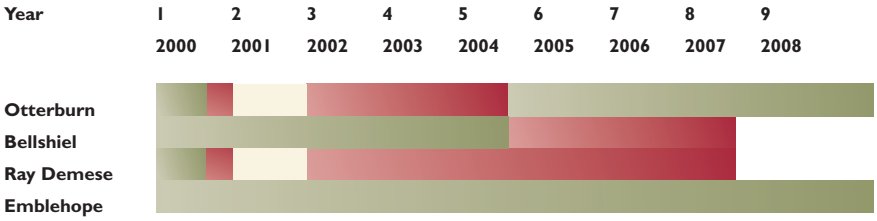


Figure 1

Diagram of the experimental design of the Upland Predation Experiment

Keepered

Unkeepered

Break in keepering and data collection in 2001 owing to Foot & Mouth Disease

comparison; in the autumn of 2004, predator control started on Bellshiel and stopped on Otterburn. The switch-over allows us to look at breeding success and abundance on the same plot with and without predator removal.

Table 1

Spring pair counts in the Upland Predation Experiment, 2000-2005

a. Otterburn plot (keepered autumn 2000-2004, unkeepered since)

	Curlew	Golden plover	Lapwing	Red grouse
2000	17	5	3	26
2001	No data collected owing to Foot and Mouth Disease			
2002	14	11	6	40
2003	9	11	8	81
2004	11	10	6	143
2005	10	13	8	111

b. Ray Demesne plot (keepered autumn 2000-2005)

	Curlew	Golden plover	Lapwing	Red grouse
2000	21	6	12	50
2001	No data collected owing to Foot and Mouth Disease			
2002	18	9	14	55
2003	22	8	18	92
2004	18	7	19	159
2005	17	7	17	165

c. Bellshiel plot (unkeepered 2000-2004, keepered since)

	Curlew	Golden plover	Lapwing	Red grouse
2000	14	4	7	13
2001	No data collected owing to Foot and Mouth Disease			
2002	10	2	4	18
2003	7	0	1	14
2004	4	1	2	9
2005	3	0	0	14

d. Emblehope plot (unkeepered 2000-2005)

	Curlew	Golden plover	Lapwing	Red grouse
2000	4	7	2	26
2001	No data collected owing to Foot and Mouth Disease			
2002	4	7	1	22
2003	3	4	1	16
2004	3	3	1	19
2005	3	4	0	16

Key findings

- The Upland Predation Experiment has passed the half-way stage so we are starting to see trends in the data, but no firm conclusions can be drawn until the end of the project.
- Gamekeepers continue to appreciably reduce abundance of foxes and crows on the long-term keepered site and on the newly keepered site. Fox and crow abundance on the newly unkeepered site have increased but have not yet returned to pre-keepering levels.
- Waders and meadow pipits show a trend for greater breeding success on sites with predator removal. However, the trend in numbers is not yet clear.
- Red grouse breeding success was poor in 2005, possibly owing to the presence of strongylosis. However, on the new keepered plot a three-fold increase in young per hen was recorded.

Kathy Fletcher

Figure 2

Otterburn plot: percentage of pairs that fledged young for curlew, golden plover, lapwing, meadow pipit and red grouse, 2000-2005 (no data for 2001 owing to Foot & Mouth Disease)

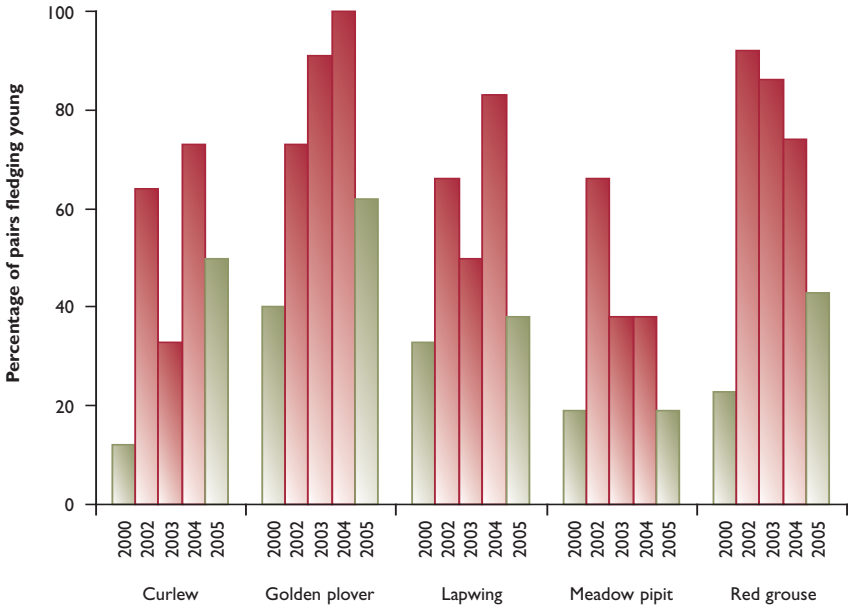
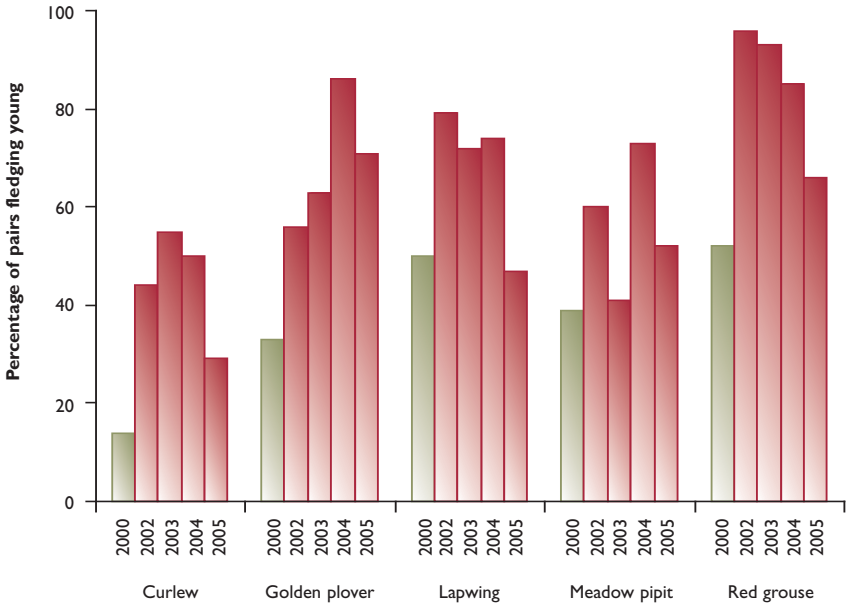


Figure 3

Ray Demesne plot: percentage of pairs that fledged young for curlew, golden plover, lapwing, meadow pipit and red grouse, 2000-2005 (no data for 2001 owing to Foot & Mouth Disease)



Predator indices from 2005 on Ray Demesne continue to suggest low numbers of all the main predators. The start of keepering on Bellshiel in September led to 80% fewer foxes and 60% fewer crows by the following spring compared with the average during unkeepered years. The stopping of predator control on Otterburn was linked to an increase in foxes (70%) and crows (50%). However, abundance is still at least 40% lower than recorded in 2000 before keepering started. Although stoats and weasels are also culled on the predator removal plots, the abundance indices are not showing consistent trends. The abundance of large birds of prey (peregrine, hen harrier, goshawk and buzzard) has increased four-fold on all plots except Emblehope. However, most of the increases are in buzzards, which seem to feed mostly on rabbits.

In the years with predator control on Ray Demesne, out of the 174 pairs of curlew, golden plover and lapwing, 58% fledged chicks compared with 28% fledging chicks of 39 pairs in 2000 without predator control (see Figure 3). On the unkeepered Emblehope plot, only 11 pairs out of 47 pairs of waders fledged young over the same period (23%, see Figure 5). In 2005, there was a small reduction in breeding success on Otterburn after predator control stopped (see Figure 2), but success was still better than in 2000. It seems that predator numbers have not yet returned to control levels. The numbers of breeding pairs of waders in 2005 were similar to previous years (see Table 1). Compared with numbers of breeding pairs in the baseline year, there is a suggestion of a small increase in golden plovers on Otterburn and lapwings

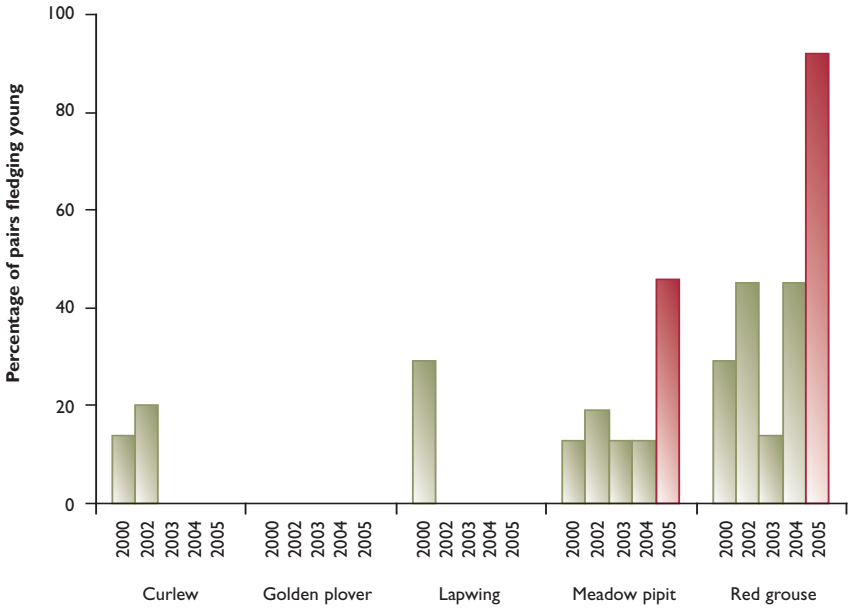


Figure 4

Belshiel plot: percentage of pairs that fledged young for curlew, golden plover, lapwing, meadow pipit and red grouse, 2000-2005 (no data for 2001 owing to Foot & Mouth Disease)

Keepered

Unkeepered

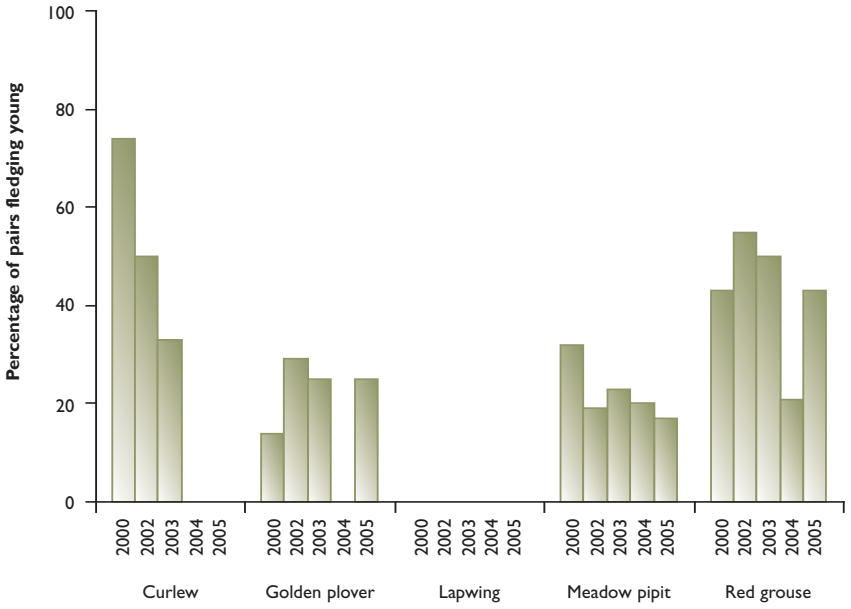


Figure 5

Emblehope plot: percentage of pairs that fledged young for curlew, golden plover, lapwing, meadow pipit and red grouse, 2000-2005 (no data for 2001 owing to Foot & Mouth Disease)

Keepered

Unkeepered

on Ray Demesne, but curlews have declined on all plots (see Table 1). Meadow pipits continue to breed better with predator control, but the small number of nests that we find in each year (on average 60 nests across the four plots) means this trend will only become clear with more data (see Figures 2-5). Trends in meadow pipit abundance are not yet clear with respect to predator control.

For red grouse, breeding success in 2005 was low, particularly on the plots with high spring densities. The average young per hen was just 2.5 on Ray Demesne (see Figure 3) compared with an average of 4.3 in the previous years. On Otterburn there were half as many hens with broods, and a reduction of 60% in young per hen, compared with years with predator control (see Figure 2). It is difficult to know yet how much of this reduction was due to strongylosis as well as increased predation. In contrast, on Bellshiel 92% of hens had broods (compared with a previous average of 40%) and there were almost three times as many young per hen as in the year with no predator control (see Figure 4). There were no grouse shot in 2005 and medicated grit will be used to reduce strongyle worm burdens on all four plots in 2005/06.

At this point in the project, the trends in breeding success suggest that predator removal may benefit at least some species of ground-nesting birds in addition to red grouse. The numbers of pairs of most species on the sites are small and therefore firm conclusions are not possible until the experiment has finished.