The use of models to influence the grazing sites chosen by Barnacle Geese on Islay, Scotland

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Introduction

A large proportion of the East Greenland population of Barnacle Geese *Branta leucopsis* overwinter on the Scottish island of Islay. This site is therefore of international conservation importance. The geese graze mainly on improved grassland, which causes considerable conflict with local farming interests (Paton and Frame 1981). A 1,500 hectare reserve has been purchased by the Royal Society for the Protection of Birds (RSPB), one aim being to provide safe sites which should help to reduce the grazing pressure on neighbouring farmland. At present shooting, under licence from the Department of Agriculture, is the only method used to deter the geese from feeding on agricultural land. Any alternative method which caused less general disturbance to the goose flocks would obviously be valuable. Studies by Inglis and Isaacson (1978) and Drent and Swierstra (1977) have shown that models of geese can be used to influence the feeding sites chosen by the flocks. This paper reports on some trials which were made to investigate whether such decoy models of Barnacle Geese in feeding or alert positions could be used either to encourage birds to feed in the reserve, or to deter them from moving to farmland.

Methods

Three types of plastic model were used, of birds in head down (HD), head up (HU) and extreme head up (EHU) positions, representing feeding, looking around and alert stances respectively (see Inglis and Isaacson 1978). Models of Barnacle Geese were not available commercially, and so Canada Geese models were used and painted appropriately. The models were therefore somewhat larger than life size Barnacle Geese.

The study was undertaken during January and March 1986 at the RSPB Gruinart reserve on Islay. The study area covered 38.2 acres of open grassland and was roughly 1,000 metres from the beach where the geese roosted overnight. For these trials pegs were used to divide the area into five equal sectors, each containing similar feeding conditions. A road passed along one edge of the study area, although this was infrequently used and created little disturbance. Four different groups of 10 models were used, 10 with head down (10 HD), 5 head down plus 5 head up (5 HD + 5 HU), 10 head up (10 HU) and 10 extreme head up (10 EHU). Two of the five sectors were selected at random on each day of observations. In one of these a group of 10 HD models were placed, and in the other a group picked at random from one of the other three categories of groups containing some alert postures. Model groups were a minimum of 100 metres apart. The models were placed out in late afternoon, after the geese had quit the field for the roost, and left overnight so they were in position at dawn. The study sectors were watched through binoculars from a hide about 100 metres from the field edge. Observations were continued from the time birds first arrived after leaving the overnight roost, at about 7.30 in the morning, until they returned to the roost at night. We recorded the time of landing, time of departure, size of skeins which landed in or flew over the field, the estimated distance between the models and geese, and the direction of movement of the geese relative to the models when they landed.

Results

It is well known that flying geese, when prospecting for a site to land, will prefer to join flocks of birds which are already on the ground. To test whether birds would accept model geese on the ground in the same way, we recorded the sector selected by the first flock of birds to land on 23 days. The observations thus concerned totals of 69 empty sectors and 46 occupied sectors. The results in Table 1 show that birds did not have an equal preference for all categories of sector.

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Table 1. Frequency with which wild birds flew low over, or landed near, study sectors.

Model type	10 HD	5 HD + 5 HU	10 HU	10 EHU	NONE
Number of sectors observed	23	7	9	7	69
Number of low passes made by geese	78	31	28	7	80
Number of first landings	23(100%)	6(86%)	5(56%)	2(29%)	8(12%)

When flying low over the field before selecting a sector in which to land the wild birds passed 3 to 4 times more often over a sector containing a group of models in head down or head up postures than over sectors with either models in extreme head up posture or with none. Models in certain postures in a sector caused birds to land there significantly more frequently than at sites which had no models present. This was most marked for models of birds in head down posture (χ=60.34, P<0.001); it also applied to those with half or all the models in head up posture (5 HD + 5 HU, Fisher Exact Probability test, P<0.001; 10 HU, Fisher Test P<0.001); and even to models of birds all in extreme head up position (Fisher Test P<0.005). Models of birds in feeding positions can therefore attract geese to a site, but there was no evidence that even models of geese in extremely alert positions deterred them from landing, for these models still attracted wild birds more frequently than sites with no models at all.

The posture of the models seemed, therefore, to influence the likelihood that wild birds would land. There were significant differences between the attractiveness of 10 HD and 10 EHU models (Fisher Test P<0.001), between 10 HD and 10 HU models (Fisher Test P<0.001), but not between 10 HD and 5 HD + 5 HU models (Fisher Test P>0.02).

These results suggest that the birds could clearly discriminate between the postures of the models. The type of model did not, however, influence how close the birds came to the decoys. Table 2 shows the distance at which the first group of wild birds landed, relative to the model positions, and there is no significant difference between models in feeding postures or models in alert postures.

Table 2. Distance at which the first group of wild geese landed.

	Joined models	<15m	>15m
10 HD	6	6	11
5 HD + 5 HU	2	1	3
10 UH	0	2	3
10 EHU	0	2	0

Models had little effect on the second and subsequent skeins of wild geese which arrived. Of second landings, 83% were adjacent to the first group of wild geese, and live, feeding birds were obviously a far stronger attraction than any of the models.

When geese landed near to other wild geese, they usually moved to join the feeding flock. However, out of 23 groups of birds which landed in sectors with models in head down positions, only 2 moved towards the models before starting to graze, 6 grazed in the area they landed and 15 moved away before feeding. When geese landed near to the models, therefore, even those in head down positions, they tended to move away from them significantly more often than towards them (χ^2=4.97, P<0.05). Birds usually continued to move away from the models as they grazed, and towards empty sectors. The result of this steady movement away from the models after the birds had landed was that the time that the birds spent feeding in the various sectors was influenced by whether models were present or not. Table 3 shows the amount of time spent by birds in sectors containing the models and in empty sectors: these are expressed as goose hours, obtained by multiplying the time in hours spent by a flock in a sector with the number of birds in the flock.

For all the sectors containing models, the birds spent less time than we might expect from the preferences that the birds showed in landing. For example, although birds were eight times more likely to land in a sector containing head down models than in an empty sector (Table 1), they used the former only twice as intensively. Models in head up positions had a deterrent effect, this being particularly marked for birds in extreme head up postures, which resulted in birds spending only about 1% of the time in sectors with such models compared to empty sectors.

Table 3. Time spent by wild geese on study sectors.

Model type	10 HD	5 HD + 5 HU	10 HU	10 EHU	NONE
Number of observations	23	7	9	7	69
Number of goose hours	6528.8	1814.0	943.3	10.3	9609.2
Relative intensity of usage	283.9	259.1	104.8	1.5	139.3

Discussion

Drent and Swierstra (1977) showed that when Barnacle Geese are choosing a site to land they monitor the proportion of alert to grazing birds in the flocks already on the ground, and prefer those groups containing a low proportion of alert birds. Inglis and Isaacson (1978) conducted studies on models of Brent Geese *Branta bernicla* and showed that models of birds in different postures could influence the site at which birds landed, and they concluded that this could be a useful method to manipulate the feeding sites selected by birds. The results presented here for Barnacle Geese also suggest that decoys may have only a limited role in manipulating the selection of feeding sites by flocks. Models of birds in feeding positions will attract flying birds to land in empty fields more frequently than if no models were present. They could therefore be used to encourage birds to use reserve areas, particularly soon after the birds arrive from migration and before they have established familiarity with feeding sites. Even models in alert positions did not deter birds from landing, but there was always an attractive group of decoys not far away.

Once they have landed the geese obviously recognise that the decoys are unnatural, and steadily move away from them while they graze. They were substantially more likely to avoid grazing in areas with models in an alert posture than in areas with models in feeding postures. These models may, therefore, have some value in reducing grazing pressure on agricultural land. This may, however, be a "scarecrow" effect and the birds would eventually learn to ignore them.

In a situation where there is an abundance of grazing, the results presented suggest that decoys could be a useful technique for manipulating the grazing impact of geese. On small islands such as Islay, however, where there is only limited grazing available for a large number of geese, we consider that their effect over the whole winter would be at best slightly to modify the grazing intensity in those areas where they are used.

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Summary

Models of Barnacle Geese *Branta leucopsis* were used to determine whether they could manipulate the grazing impact of the geese. Models in a feeding posture were clearly more attractive than those in alert postures. However, feeding geese tended to move away from models and to spend less time in sectors with models than in empty sectors. In a situation where there is limited grazing there would be little overall effect of using models.

References

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