

Helgoland, not merely as representatives of Belgium and Germany but for contributing notably to such success as was achieved.

References

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Nests and eggs of Greylag Geese in Galloway

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Summary

Sixty eggs in 10 nests of Greylag Geese in Galloway in 1964 were measured. Their dimensions (average length 84.5 mm., breadth 59.2 mm.) were similar to those published for other British eggs which tend to be smaller than eggs from continental Europe. All 10 nests were successful, though 5 eggs failed to hatch. In a second group of nests, 6 out of 8 clutches were successful. At least 42 goslings were reared in the first group and 28 in the second. The sites and dimensions of the nests are described.

Introduction

In recent years Greylag Geese *Anser anser* have been increasing and spreading as breeding birds in south-west Scotland. The increase is probably due largely, though perhaps not wholly, to 'overspill' from the flourishing feral colony on the estate of the Earl of Stair near Stranraer, Wigtownshire. The study area, a loch and its environs, was first used by a single pair in 1951. In 1952 seven adults and five goslings were seen on 29th June. In 1953 31 geese were counted, of which only ten or twelve were adults. In 1957 there were 20 adults with seven broods. The breeding stock does not seem to have increased beyond this point, ten nests having been found in 1963 and again in 1964. The area is also used as a moulting place, counts of over 150 geese in early June being not uncommon.

This paper is concerned with the ten nests of 1964, with the dimensions of the 60 eggs they contained, and with the success of this and another group of nests elsewhere in Galloway.

Nests

All the nests were built on islands. They were built on the ground, of large twigs, withered grasses and moss, and contained considerable amounts of down. In two nests examined twig by twig on different islands there was no evidence of material having been carried to the nest. Most of the nests were near the water's edge. Five were at the bases of large trees, three beside

large rocks, two in dense secondary growth and one on open ground. In a group of four on one island, the nearest nests were six feet apart and the furthest forty-five feet. The average diameter of the nests was 26 inches, with a rim of 3½ inches and a cup 2¼ inches deep.

Clutch-size

Three single eggs were found deposited in positions where there was obviously no nest. The clutches in the ten nests were distributed as follows:

clutch-size	4	5	6	7	9
number of clutches	2	2	2	3	1

The mean clutch-size, excluding the single eggs, was 6.0. This is rather larger than would be expected from the note by F. C. R. Jourdain (in Witherby, Jourdain, Ticehurst and Tucker, *The Handbook of British Birds*, III, 1939) 'Eggs:—Number variable; usually 4 to 6, occasionally 7 or 3 only, rarely 8'. Two pure white eggs were seen in different clutches, in which the rest of the eggs were stained. The white eggs hatched at the same time as the other eggs so must presumably have been incubated for the same period.

Hatching success

All the nests were successful in producing young. 55 of the 60 eggs (91.7%) hatched, the five that failed to do so occurring in five different nests. The clutch of nine in nest VI all hatched and a brood of nine was later seen on the loch.

There were eight nests in another group in Galloway. These were not studied in detail but it is known that two clutches failed to hatch, at least one being deserted.

Fledging success

The exact number of goslings that lived to fly is not known but in the principal study at least 42 were still alive on 28th June. On the same day there were at least 28 survivors from the six successful nests in the second group.

Eggs

The eggs were measured on 25th April, ten days before the peak of hatching. The linear measurements are summarised in Tables I and II. The mean length and breadth agree very closely with those of the collection of British eggs measured by Jourdain (Witherby, *et al.*, 1939). From published data it seems as if British eggs tend to be smaller than those found in Europe but indistinguishable from those collected in Iceland.

The egg weights are summarised in Table II. Eggs with well-incubated embryos weigh substantially less than those of freshly-laid eggs. It seems likely that much of the relatively large differences in egg weights between clutches can be attributed to differences in the elapsed times of incubation, rather than to differences in egg volume.

Moult

A total of 286 birds moulted in these two areas, 75 on the main study and 211 at the second locality.

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Table I. Length and breadth of Greylag eggs from Galloway compared with those from elsewhere

locality	number of eggs	length (mm)		breadth (mm)		source
		mean	range	mean	range	
Galloway	60	84.5	78-92	59.2	54-64	
other British	100	85.32	77.0-94.4	58.04	49.5-62.5	(1)
Iceland	18+	84.9	76-92	58.7	53-63	(2, 3)
Norway	?		80-92	58 mode	53-62	(3)
Denmark	29	90.7	85-95	61.1	57-64	(3)
Russia	51	88.2	79.5-95.5	60.3	53.5-68.5	(4)

Sources:

- (1) F. C. R. Jourdain, in Witherby *et al.*, 1939.
- (2) G. Timmermann, 1938, *Die Vögel Islands*; P. Nielsen, 1919, *Ornith Tids.* 13: 33-79.
- (3) E. L. Schiøler, 1925, *Danmarks Fugle*, I.
- (4) S. Alpheraky, 1905, *The Geese of Europe and Asia*.

Table II. Differences between clutches in the dimensions and weights of Greylag eggs

nest	no. of eggs	mean length mm	mean breadth mm	mean weight gm
I	7	87.3	60.7	145.9
II	7	84.4	57.1	148.7
III	6	80.8	60.3	133.0
IV	6	83.8	58.8	147.7
V	5	84.4	55.6	149.6
VI	9	84.1	57.8	147.6
VII	4	86.0	62.3	168.5
VIII	7	87.9	60.7	161.0
IX†	5	84.2	59.4	153.6
X	4	81.8	59.5	133.0
Total	60	84.5	59.2	148.9

range of individual egg weights 122-172 gms.