BRENT GEESE IN ESSEX

The Proportion of First-winter Birds in Flocks of Brent Geese in Essex

by P. J. K. Burton

DURING the past three winters (1954–55, 1955–56, 1956–57), regular counts have been made of the number of first-winter birds in flocks of Dark-bellied Brent Geese (*Branta b. bernicla*) on the Essex coast. In this way it is hoped to keep a check on breeding success from year to year. Such a check is particularly desirable for this species. The reported diminution of its numbers has aroused much concern, and at present it is enjoying a trial period of full protection. The counts have also yielded information on the behaviour and movements of feeding flocks.

The counts are carried out at high tide and just after, when the geese are comparatively close to the sea-wall. The flock is scrutinised by telescope, working from front to back (judged by the direction in which most of the birds are walking). The status—adult or first-winter—of each successive bird is called out and noted down by a second person. First-winter birds are distinguished by the presence of white edgings to the wing-coverts. This character remains clear-cut even in abraded birds in spring. The absence of a white neck patch is a juvenile character, lost in early winter and therefore of no use. Where conditions of light or distance make the identification of first-winter geese difficult, the count is abandoned.

During the winter of 1954–55 the counts showed considerable variation in the percentage of first-winter birds present. Accordingly, during the two following winters an effort to obtain more and larger counts has been made. In addition, a method of sampling has been used, based on the work of Boyd (1954). From the counts, the numbers of first-winter birds in samples of 50 have been extracted and arranged in frequency distributions. Only continuous

samples are used—no attempt has been made to create extra ones by combining groups of less than 50 from flocks seen at different times or places. Samples of 50, rather than of 100 (which would give percentage figures), are used because many more can be obtained without lessening the usefulness of the figures. The distribution of frequencies from the samples approximates quite closely to the normal, although extreme values occur rather too often. This is due to a tendency for family parties to move to the front of a feeding flock. This often leads to the birds in adult plumage but without the young splitting off as a separate flock behind, usually after about two hours of feeding. The two reunite, however, if flushed. Counts are therefore made immediately after the flock has landed, whenever possible.

The data for the three winters fall into two groups—the raw counts and the figures based on sampling. These are given in Table I below.

TABLE I

Season	Totals of Counts			Sample Data Mean number of first-winter birds in a unit of 50 geese	S.D.	S.E. of Mean	No. Samples
	ad.	1st W.	Total				
1954–55	462 (60%)	314 (40%)	776	—	—	—	—
1955–56	1498 (74%)	522 (26%)	2020	13·26	6·40	1·19	29
1956–57	1387 (93%)	97 (7%)	1484	3·52	3·90	0·78	25

The maximum Essex totals (from wildfowl counts) for the three successive winters have been about 6000, 5000 and 3700.

The figure for 1954–55 in Table I, though not as accurate as could be desired, is probably fairly near the truth. The proportions of first-winter birds in the first two winters (40% and 26%) correspond to the two classes into which Boyd's figures for White-fronted Geese have fallen—about 35% in some winters and about 21% in others. The figure for 1956–57, however, indicates a large-scale breeding failure. This phenomenon is seen also in the records of the Monomoy Brant Club (see below). It has been frequently attributed to storms on the Arctic breeding grounds. Gillham (in Cottam, Lynch and Nelson 1944) has described the effect of such a storm on breeding Snow Geese; these arrive to breed earlier than the Brent, and the birds he studied had time to lay second clutches. Had this happened to Brent their breeding season would have been ruined, as they have no time to raise a second brood.

The summer of 1956 was, in fact, late in the Arctic, and this may have a connection with the breeding failure of Brent, though this cannot be shown with certainty. Pinkfeet and Barnacle had a bad season in Greenland. However, British-wintering Whitefronts, which breed in the same area as Dark-bellied Brent, were apparently not affected.

The figures for the winter of 1955–56 exclude counts from Foulness on two dates in February. These gave a total of 717, of which only 32 (4·5%) were first-winter birds. They fall into a separate distribution from the Dengie counts, with much lower mode and mean. The rest of the counts of this winter came

from the Dengie area and cover the period December–April. The two possible explanations are that the Foulness birds were either of different origin to the Dengie birds, or a flock predominantly of birds in adult plumage without families which had separated off from the other birds wintering in Essex. Evidence favours the latter view; a visit to Foulness in January showed many first-winter birds, though no count was made, due to poor light. The total number of geese present at Foulness in February was about 350–400, more than 2000 less than in January, the remainder having presumably gone north to the Blackwater estuary (by inference from the fact that numbers here rose by 2000). Possibly those left at Foulness were the predominantly adult flock watched in February. The counts for 1956–57 are from both Foulness and Dengie. no significant difference having been found between the two.

If these figures are to be used as an indication of the status of Dark-bellied Brent, they must either be representative of the whole population or of a large part of it. There is no doubt that the latter condition is fulfilled; the Essex population amounts in some winters to 5000–6000. The whole European population has been estimated at somewhere in the region of 15,000. There is evidence, however, that Dark-bellied Brent in other British-wintering areas may come from different breeding grounds. In the winter of 1956–57, corresponding with the very low proportion of first-winter birds, the Essex population was substantially less than in the previous winter. Locally the mild winter was blamed. Numbers in the Wash, too, were much reduced, but the Brent wintering in North Norfolk, mainly Dark-bellied, showed no reduction in numbers. It may be that they came from places in which breeding had been successful. This could only be determined by adult/first-winter counts from these other areas.

Records of adult/first-winter counts are given by four other authorities. The best of such records are to be found in the log of the Monomoy Brant Club (Phillips 1932), a wildfowlers' society at Cape Cod, Massachusetts. In the nineteenth and early twentieth centuries, spring shooting of migrating American Brant (Pale-bellied—*B. b. hrota*) took place in this area. For many of the years the log has a note on the proportion of young birds, obtained apparently both

from field counts and examination of shot birds. Abundance is correlated with high proportions of young and scarcity with low proportions. In some years figures as low as 1% first-winter birds are given, in others as high as 60%. These latter figures are doubtless higher than the mean for the whole population, either by chance or through greater vulnerability of young birds to shooting, but must indicate a very good breeding year. The most notable feature is the ability to recover after periods of great scarcity. Cottam, Lynch and Nelson (*loc. cit.*) state that in the three years following the *Zostera* disaster in 1931–32, only 3%–7% first-winter birds were observed, and production of young was subnormal from 1932 to 1938. This raises the interesting possibility that the failure of the *Zostera* supply affected the population largely by an adverse effect on breeding capacity.

The remaining sets of counts come from Holland in more recent years. One is mentioned by the Netherlands Wildfowl Inquiry Committee—a set of counts from Zeeland in February and March 1948, totalling 238, including 50 first-winter birds (21%). Possibly some of the counts of Lebret (1956) were used in compiling this. Lebret's own counts from the Zandkreek, Zeeland, extend over several winters. They are summarised in Table II below.

TABLE II

Season	Total	% 1st W.	No. of Counts
1947–48	341	20	5
1948–49	528	0	2
1949–50	239	35	3
1950–51	251	3	2
19/1/54	51	10·2	1

Probably these birds were mostly Dark-bellied, though this is not mentioned. The sample for 1947–48 is best; if the further record quoted above is separate from these, it reinforces Lebret's figures. The absence of first-winter birds in the flocks of 1948–49 and 1950–51 may indicate poor breeding seasons, though not necessarily as bad as the figures suggest. The figure of 35% for 1949–50 may be fairly reliable, but no conclusion can be drawn from the remaining count.

Attempts have been made to obtain counts of brood sizes. If extensive enough, these can be used to calculate other important parameters of the population (Boyd 1957). So far, however, these efforts have been poorly rewarded. Brood-size counts are far less easy to obtain in Brent than in grey geese, which tend to spread out over a field, so that family parties are more easily picked out. Brent typically crowd in jostling masses at the tideline or on the water, and the confusion makes the distinction of family groups nearly impossible. Most of the brood-size counts obtained are from parties isolated from the main flock (there is perhaps some possibility that they are therefore atypical). Another disadvantage is that the geese usually do not arrive until high tide, and they disperse after the tide has ebbed past the *Enteromorpha* or *Zostera* zones. Hence, a party can only be watched for about three hours at the most, generally much less. It is therefore difficult to be quite certain about groups which appear anomalous (e.g. with one or three parents).

Table III summarises the results of the counts so far. Of these 54 parties, four (7·4%) were only accompanied by one adult and one was accompanied by

three adults. For the reasons given above, the permanence of these combinations is not known, except in the case of a single lame adult with one first-winter bird, probably the survivors of a party which had been shot at.

TABLE III

Season	No. of Broods	Mean Brood Size
1954–55	12	3·9
1955–56*	31	3·2
1956–57	11	3·1
Combined data of the three seasons ..	54	3·33 ± 0·19

* Mean size of 8 broods on the North Norfolk coast—2·6 (H. Boyd).

The clutch size of *B. b. bernicla* is 3–6, according to Russian sources. If the mean is taken to be 4·5, the reduction to the mean midwinter brood size of 3·33 suggests losses of about a quarter from those broods of which some at least survive, a rather smaller proportion of losses than might have been expected.

Finally, some suggestions as to how the scope of this study could be extended. First, still more counts. These should be reinforced by parallel counts from other areas, both in Britain and on the Continent. Brood-size counts of sufficiently large size are also needed. This would require a good deal of time. A further essential is extensive ringing, to provide information on flock mixing and on adult mortality. Lastly, information from the breeding grounds is wanted to shed light on such topics as non-breeding, age of breeding, reshuffling, etc. British expeditions can at best hope to obtain such information for *B. b. hrota*; similar facts about *B. b. bernicla* could only be obtained by a Russian expedition, since its breeding grounds are entirely within the Soviet Arctic.

REFERENCES

Boyd, H. (1954). White-fronted Goose statistics, 1952–1953. *Wildfowl Tr. 6th Ann. Rept.*: 73–79.

Boyd, H. (1957). Mortality and Fertility of the White-fronted Goose. *Bird Study*, **4** (2): 80–93.

Cottam, Lynch and Nelson (1944). Food Habits and Management of the Sea Brant. *Jour. Wildlife Mgt.*, **8**: 36–46.

Lebret, T. (1956). Are group-size counts of wild geese an index of productivity? *Ardea*, **44** (4): 284–288.

Phillips, J. C. (1932). Fluctuations in numbers of the Eastern Brant Goose. *Auk*, **49**: 445–453.