



An assessment of breeding success in the Dark-bellied Brent Goose *Branta b. bernicla* in 1996

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SUMMARY

84,404 Dark-bellied Brent Geese were aged at 16 estuaries in Britain between September and December 1996. The overall proportion of juvenile Brent Geese present was a.3%. Of 1237 broods recorded, the mean brood size was 2.27 young per successful pair. In December, the proportion of young recorded in flocks was 12.9% (n = 3721 geese aged),

INTRODUCTION AND METHODS

Britain has long been a major wintering area for the Dark-bellied race of the Brent Goose *Branta b. bernicla* and the UK Government therefore has a special responsibility for these geese under international legislation (Stroud *et al.* 1990) and as a Red Data Book Species (Batten *et al.* 1990). Information is gathered not only about the abundance and distribution of Brent wintering in Britain (*e.g.* Mitchell & Cranswick 1994, Waters *et al.* 1996) but also on age-ratios (*e.g.* Mitchell & King 1996), through which estimations of the annual recruitment and survival can be made.

For the twelfth consecutive autumn, the breeding performance of Brent Geese was assessed by experienced voluntary observers. First year (young) Brent Geese have white edges on the wing coverts which is lacking in older birds. With a telescope and under good light conditions ageing is feasible from 400m. Sample sizes are variable, being determined by flock size and field situations. To determine brood size, distinct groups, composed of two or sometimes one adult plus one or more juveniles, recognised, for example, by spatial separation from other birds or a common activity such as walking or swimming together, have been regarded as a family. Counts were made between 22 September and 19 December. Observers were asked to note the location, date, time, and habitat for all observations and the sizes of flocks, number aged, total number of juveniles and brood sizes.

RESULTS

Summaries of the counts where birds were aged are given overleaf on a site by site basis (Table 1). Of 351 counts made, 3% were in September, the majority in October (42%) and November (44%) and 10% in December. Including multiple observations (*e.g.* double counts), a total of 124,584 geese were counted and, of these, 84,404 were aged (a decrease of 26% compared with 1995). These contained 7013 young, a proportion of 8.3%. Brent Geese were aged at 93 coastal localities within 16 estuaries from Humberside to Devon (Figure 1). The largest numbers of birds aged were on the Thames Estuary (20,020), The Wash, (11,144), the Blackwater Estuary (11,038), the Exe Estuary (10,945) and Langstone Harbour (10,504). Sample sizes at all other estuaries were less than 10,000 birds.

The average proportion of young present in flocks increased between September (0.2% young), October (5.9%), November (10.3%) to December (12.9%) (Figure 2) as would be expected - nonbreeding geese and failed breeding pairs tend to arrive in Britain a little ahead of the successful breeders and their young.

Table 1. Numbers of Dark-bellied Brent Geese counted and aged at 16 British estuaries in autumn 1996 and the distribution of flocks across habitats.

Estuary (see Figure 1)	Counts			No. Locs lities	Total Count	Total aged	% Young	Mean Brood size	Total count % distribution across habitats				
	First	Last	No.						Water	Mud	Marsh	Grass	Cereal
Blackwater	1 Oct	29 Nov	26	11	1 8,143	11,038	10.9	2.34	1.63	10.3	4.4	75.9	7.8
Chichester	7 Oct	29 Nov	40	19	10,203	9297	7.4	2.16	34.7	7.1	3.4	50.3	4.4
Colne	27 Oct	5 Nov	2	2	911	861	12.9	2.82			6.7	93.3	
Crouch	4 Nov	14 Nov	5	5	1894	1531	16.0	2.37	13.5		15.8	36.3	34.4
Exe	2 Oct	1 9 Dec	69	1	14,512	10,945	9.3	2.06		54.2		45.8	
Hamford Water	23 Oct	24 Nov	5	2	278	278	(31.3)	2.42	39.9	13.3			46.8
Langstone	24 Sep	24 Nov	76	13	14,569	10,504	10.3	2.27	6.7	55.0	4.7	33.6	
Medway	26 Nov	4 Dec	2	2	1020	750	17.0				60.8		39.2
North Norfolk	24 Oct	24 Oct	1	1	221	221	(4.5)		100				
Outer Humber	13 Nov	1 3 Nov	1	1	283	283	(16.9)						
Poole	1 2 Oct	17 Nov	3	2	134	134	(4.5)	3.00					
Portsmouth	10 Nov	1 3 Dec	2	1	106	106	(49.0)	2.21				100	
Solent	23 Sep	30 Nov	14	4	3973	3950	7.2	2.50	6.6	42.3		51.1	
Stour	22 Sep	24 Nov	36	8	4594	3342	5.7	2.67	74.1	25.9			
Thames	25 Sep	1 Dec	31	6	38,857	20,020	5.2	2.48	3.8	90.8	0.4	4.4	0.6
Wash	22 Sep	1 5 Dec	38	15	14,886	11, 1 44	7.3	1.92	0.2	1.8	97.3		0.8
Totals	22 Sep	1 9 Dec	351	93	124,584	84,404	8.3	2.27	8.5	45.8	14.2	28.2	2.7

Note: % young in parentheses () are based on small sample sizes (less than 500 birds aged)



Figure 1. The distribution of 93 coastal localities in 16 estuaries (shown) where Brent Geese were aged in 1996.

There was wide variation in the frequency of the proportion of young recorded - thus, 1.9% of the age counts contained no young, 41% contained less than 5% young (excluding no young), 17% contained 5-10% young, 28% contained 10-25% young, 11% contained 25-50% young, and 4% of the age counts showed greater than 50% young (Figure 3). Note, however, that these values ignore the *number* of geese aged within each sample.

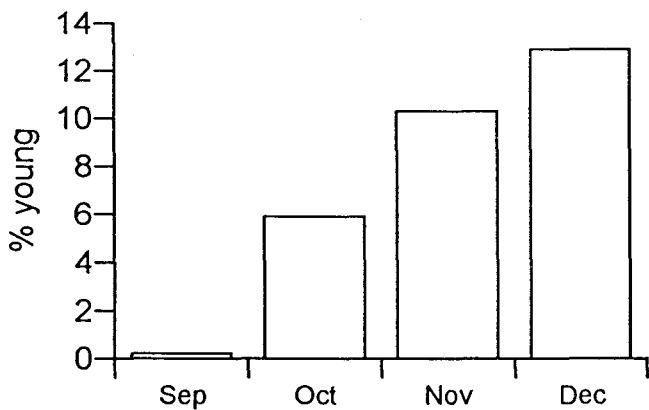


Figure 2. The proportion of young recorded each month

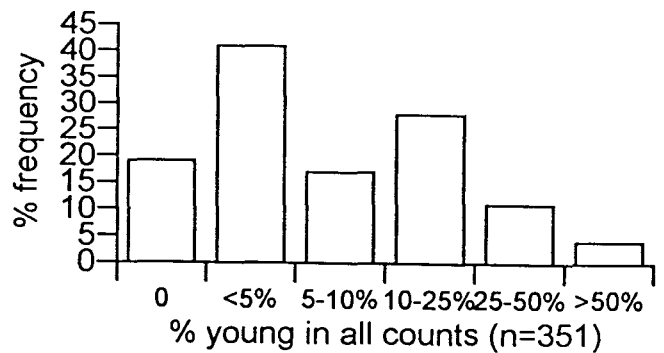


Figure 3. The frequency of the proportion of young recorded in Brent Goose age counts

Geese were recorded in one of six habitat types - either water/sea, intertidal mud, *Zostera* beds, marsh, grass fields, or cereal fields. Sample sizes and locations varied, however, 69% were found on the first four categories (representing tidal estuary areas; note that water and mud often represent the same location but are tide dependent). A further 28 % of Brent Geese were recorded on grass fields, and 3% ,on cereal/winter wheat fields.

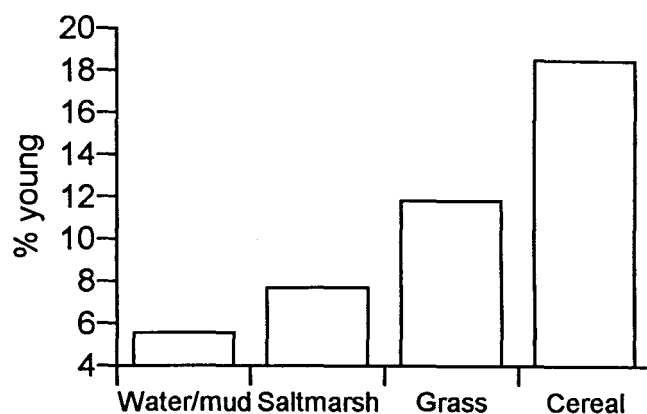


Figure 4. The average proportion of young on different habitat types in autumn 1996.

METHOD LIMITATIONS

Counters were encouraged to check flocks whenever possible and no emphasis was placed on obtaining a co-ordinated census that avoided double counting. Thus, counts conducted at the same estuaries on different dates will have undoubtedly recorded some birds more than once in these totals. For example, the greatest number of counts from a single site was 69 from the Exe Estuary; 23 counts were received from Farlington Marshes Nature Reserve and 17 counts were reported from Langstone Harbour. Some repeat counting of the same geese is therefore, inevitable.

The overall proportion of young Brent Geese recorded, taking the maximum sample size on a *single* visit to each site at any time during the census period (*i.e.* to eliminate double counting at each site) was 7.7% young. Thus it seems that, in 1996, either calculating the overall proportion of young from all counts (including known double counts) or taking the maximum sample size from any single locality gave very similar results.

DISCUSSION

The proportion of young present in Britain in 1996 is shown in comparison to the proportion recorded in each year since 1983 in Figure 5. The breeding 'failure' years occurred in 1984, 1986, 1987, 1989, 1992 and 1995. The poor breeding success in 1992 was also recorded for most other high latitude and Arctic breeding geese that wintered in Britain in 1992/93. Early indications from autumn age counts of other goose species indicate that 1996 was not a productive year for some of the other species.

Information from the Continent is in contrast to our findings. An estimate of breeding success from Dark-bellied Brent Geese checked in The Netherlands indicated 27.7% young in October and November ($n = 5254$, B.Ganter pers.comm.). In France, 12.8% young was recorded in November and December ($n = 2494$, B.Ganter pers.comm.)

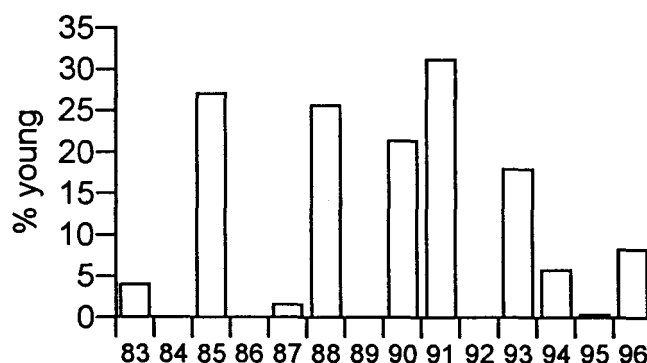


Figure 5. The proportion of young Dark-bellied Brent Geese recorded in Britain in 1983 to 1996.

These two figures are not surprising. The movement of Dark-bellied Brent Geese through The Netherlands, to Britain and to France has been revealed by ring sightings of individually marked birds (e.g. Ebbinge & St Joseph 1992). It is known that successful pairs and their young tend to stay in The Netherlands during the autumn months, arriving in Britain from mid-November (see below). However, it is also known that Brent Geese arrive in great numbers at Foulness and at other localities in Essex and around the Thames Estuary and migrate through these arrival points to sites in the south-west of Britain and south into France. It appears from the figures obtained in autumn 1996, the bulk of the birds checked in October and November in Britain were either failed or non-breeders (c.6-10% young). At the same time The Netherlands supported a large proportion of families (27.7% young). By December more families had left The Netherlands and were wintering in northern France (12.8% young) and southern Britain (12.9% young).

The average proportion of young during September to December (8.3%) is lower than the overall proportion of young present in December in Britain (and France), thus it might be argued that taking age samples early in the autumn reduces the value of the actual proportion of young in the population. In years when Brent Geese have successfully bred, sampling within Britain alone will always be prone to the seasonal nature of the passage of families through this country. Therefore, it is important to sample all cohorts of the Brent Goose population during the passage and wintering periods. Whilst the proportion of young increased in December non-breeding birds may have left Britain to winter in northern France. Currently the data on the proportion of young throughout the winter range is collated by the Wetlands International Goose Specialist Group.

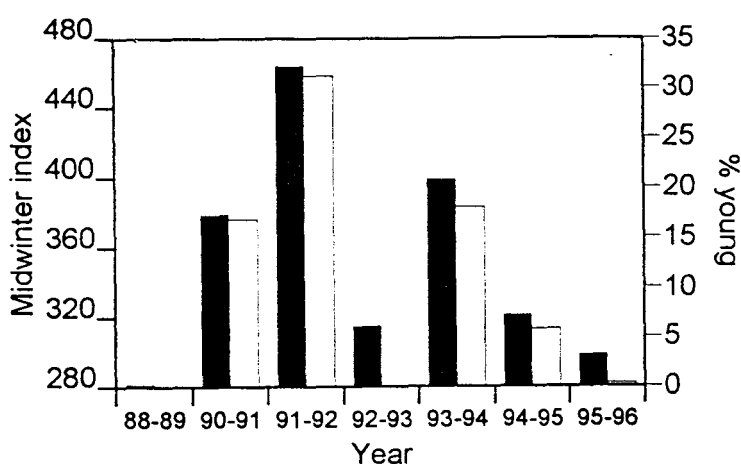


Figure 6. The midwinter index of Dark-bellied Brent Geese numbers in Britain (solid bars) and their proportion of young (open bars), 1988-89 to 1995-96

In recent winters, when the size of the world population of Dark-bellied Brent Geese and the numbers wintering in Britain appear to have stabilised, the yearly fluctuations in numbers closely match the proportion of young (Figure 6, see Cranswick *et al.* 1997).

Other populations of Brent Geese wintering in Europe have also shown contrasts in productivity in the 1996 breeding season. The Svalbard Light-bellied Brent Goose *Branta bernicla hrota* revealed 25% young (S.Percival/P.Clausen pers.comm.) and the Canadian Light-bellied Brent Goose had a poor breeding season with only 256 young recorded in 10,068 birds aged (2.5% young, Delany & Orr 1997).

Unfortunately, estimates of the world population of Dark-bellied Brent Geese are not available for January 1996. However, the maximum British count from the Wetland Bird Survey was c.1 01,000 (in March 1996). Assuming an average of 15% annual mortality (Summers & Underhill 1991) and 8.3% young in 1996 revealed by this study, the midwinter 1996-97 count in Britain may well see between c. 90,000 and c. 1 00,000 using British estuaries. However, this largely depends on the severity of the weather in The Netherlands during the cold snap experienced in early January 1997. Very early accounts from some parts of The Netherlands report a complete freeze, and record numbers of Brent Geese have been reported in some coastal localities of southern Britain.

ACKNOWLEDGEMENTS

These observations were organised as part of the long-term goose monitoring programme in the U.K. which receives financial support from the Joint Nature Conservation Committee and the Department of the Environment for Northern Ireland. Their continued support is much appreciated. We are grateful to Peter Cranswick for reading an earlier version.

We are extremely grateful to the following ornithologists who undertook the counts (with apologies for any misspellings or omissions):

JE Bowley, R Caldw, R Chapman, G Cockburn, CB Collins, A de Potier, M Drake, B Fellows, D George, B Hancock, I Hawkins, R Heath, L James, R Leavett, E Mackrill, J Novorol, R Nowicki, BW Renyard, B Savage, R Smith, SF Smith, KE Talbot, J Thorogood, CR Tubbs, J Walker, P Watts, EJ Wiseman, D Wood.

REFERENCES

Batten, L.A., Bibby, C.J., Clement, P., Elliot, G.D. & Porter, R.F. (1990) *Red Data Birds in Britain*. Poyser, London.

Cranswick, P.A, Waters, R.J., Evans, J. & Pollitt, M.S. (1997) *The Wetland Bird Survey 1995-96: Wildfowl and Wader Counts*. BTO/WWT/RSPB/JNCC, Slim bridge.

Delany, S. & Orr, J. (1997) *Numbers of Light-bellied Brent Geese in Ireland, 4-10 October 1996*. Birdwatch Ireland/WWT Report, Dublin.

Ebbinge, B.S. & St.Joseph, A.K.M. (1992) The Brent Goose colour-ringing scheme: unravelling annual migratory movements from high arctic Siberia to the coasts of western Europe. In: Ebbinge, B.S. *Population limitation in Arctic-breeding geese*. PhD Thesis, University of Groningen.

Mitchell, Carl, & Cranswick, P.A. (1994) *Numbers of dark-bellied Brent Geese in Britain, January/February 1994*. Report to JNCC. WWT, Slimbridge, 5pp.

Mitchell, Carl & King, Roy (1996) *An assessment of breeding success in the Dark-bellied Brent Goose Branta b.bernicla in 1995*. Report to JNCC. WWT, Slimbridge, 4pp

Stroud, D.A., Mudge, G.P. & Pienkowski, M.W. (1990) *Protecting internationally important birds sites: a review of the EEC Special Protection Area network in Great Britain*. NCC, Peterborough.

Summers, R.W. & Underhill, L.G. (1991) The growth of the population of Dark-Bellied Brent Goose *Branta b.bernicla* between 1955 and 1988. *J.Appl.Ecol.* 28: 574-585.

Waters, R.J., Cranswick, P.A., Evans, J. & Pollitt, M.S. (1996) *The Wetland Bird Survey 1994/95: Wildfowl and Wader Counts*. BTO/WWT/RSPB/JNCC, Slim bridge.

28 January 1996