



An assessment of breeding success in the Dark-bellied Brent Goose *Branta b. bernicla* in the UK in 1999

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SUMMARY

A total of 82,547 Dark-bellied Brent Geese was aged at 21 estuaries and other coastal sections in Great Britain between September 1999 and March 2000. The overall proportion of juvenile birds present was 23.5%, varying between 0.0% in September and 26.5% in January. The mean brood size per successful pair was 2.44 young. This represents the most successful breeding season since 1991 and is the first time that productivity has exceeded the estimated annual rate of mortality since 1993.

INTRODUCTION AND METHODS

Britain has long been a major wintering area for Dark-bellied Brent Geese *Branta b. bernicla*. The UK Government has a special responsibility to safeguard this species under international legislation (Stroud et al. 1990), and additionally, it is an 'Amber Listed' species in 'Birds of Conservation Concern' (RSPB et al. 1996) and is listed on category B of the African-Eurasian Waterbird Agreement. Information is gathered not only about the abundance and distribution of Brent Geese wintering in Britain (e.g. Cranswick et al. 1999) but also on age ratios (e.g. Hearn 1999), through which estimates of annual recruitment can be made.

For the fifteenth consecutive autumn, the breeding performance of Dark-bellied Brent Geese was assessed by experienced voluntary observers. First-winter Brent Geese have obvious white edging to the wing coverts which the adults lack. Using a telescope in good light conditions, ageing is feasible at distances of up to 400 m. Sample sizes are variable and determined by flock size and field conditions. To determine brood size, distinct groups composed of two adults and one or more juveniles that could be recognised by behaviour or spatial separation from other geese were regarded as a family. Data were collected between 23 September and 3 March. Observers were asked to note the location, date, time and habitat for all observations and the size of flocks, number aged, total number of young and brood sizes.

Counters were encouraged to check flocks whenever possible and no emphasis was placed on obtaining a co-ordinated census that avoided double-counting. Therefore, counts conducted at the same estuaries on different dates will have undoubtedly recorded some birds more than once.

RESULTS

Brent Geese were aged at a total of 116 localities within 21 estuaries or coastal areas from North Lincolnshire to Devon (Figure 1), summarised in Table 1. Of 404 flocks assessed, < 0.1% were in September, 19.4% in

Table 1. Numbers of Dark-bellied Brent Geese aged at 21 British estuaries and coastal areas in winter 1999/2000 and the distribution of flocks across habitats.

Estuary	Sample flocks			No. sites	Total aged	% Young	Mean Brood Size	Percentage distribution across habitats of aged samples					
	First	Last	n					Water	Intertidal	Marsh	Grass	Cereal	
Beaulieu	16 Oct	4 Dec	4	3	176	(27.8)	1.9	100					
Blackwater,	7 Nov	25 Feb	22	8	6,456	25.7	-		7			38	55
Chichester Harbour	16 Oct	11 Dec	28	12	6,118	21.5	2.5	40	8.1			34.5	17.4
Caine	14 Dec	15 Feb	4	4	2,100	21.9	-			28.6		71.4	
Crouch	23 Nov	21 Jan	6	5	3,670	25.5	3.1					56.4	43.6
Deben	11 Jan	11 Jan	1	1	600	27.5	-					100	
Exe	17 Oct	19 Dec	5	3	917	25.7	2.9		100				
Hamford Water	26 Oct	3 Mar	9	7	1,641	34.5	3.5	1.4	12.4				86.2
Jersey	9 Nov	25 Nov	4	2	385	(22.1)	-		100				
Langstone Harbour	16 Oct	22 Feb	224	24	35,202	25.8	2.4	17.3	31	0.7		46.2	4.8
Lymington	17 Oct	14 Nov	4	1	494	(9.5)	2.3		100				
Medway	6 Feb	6 Feb	1	1	560	18.6	-						100
North Lines coast	23 Sep	10 Dec	16	7	2,412	14.6	2.9		60.4	4.5			35.1
North Norfolk	8 Oct	21 Nov	5	3	1,227	19.9	3		4.7	4.7			90.6
Poole Harbour	16 Oct	31 Oct	4	4	169	(13.6)	2.5	100					
Portsmouth Harbour	2 Nov	3 Jan	10	3	863	31.4	2.6		60.3				39.7
Stour	21 Oct	14 Dec	19	9	2,711	28.1	3.3	50.3	26	17			6.7
Thames	10 Oct	8 Jan	8	5	2,869	12.7	2.7	7.8	92.2				
The Fleet	31 Oct	7 Nov	2	1	743	33.4	3.3	75.2	24.8				
The Solent	16 Oct	25 Nov	14	3	3,113	18.2	2.6	1	67.4	3		28.6	
The Wash	2 Oct	5 Dec	14	10	10,121	18.5	2.5		5.9	47.8		8.2	38.1
Totals	23 Sep	3 Mar	404	116	82,547	23.5	2.44	13.4	26.8	7.7		32.4	19.7

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

October, the majority in November (43.1 %) and December (22.7%), 9.2% in January, 4.3% in February and 1.3% in March. A total of 82,547 geese were aged (a decrease of 5% on the number aged during 1998). The largest numbers of birds aged were at Langstone Harbour (35,202). The Wash (10,121), Chichester Harbour (6,118) and The Blackwater, Essex (6,456). Sample sizes at all other

estuaries were less than 4,000 birds. The overall proportion of first-winter birds was 23.5% and, of 2,455 broods recorded, the mean brood size was 2.44 young per successful pair.

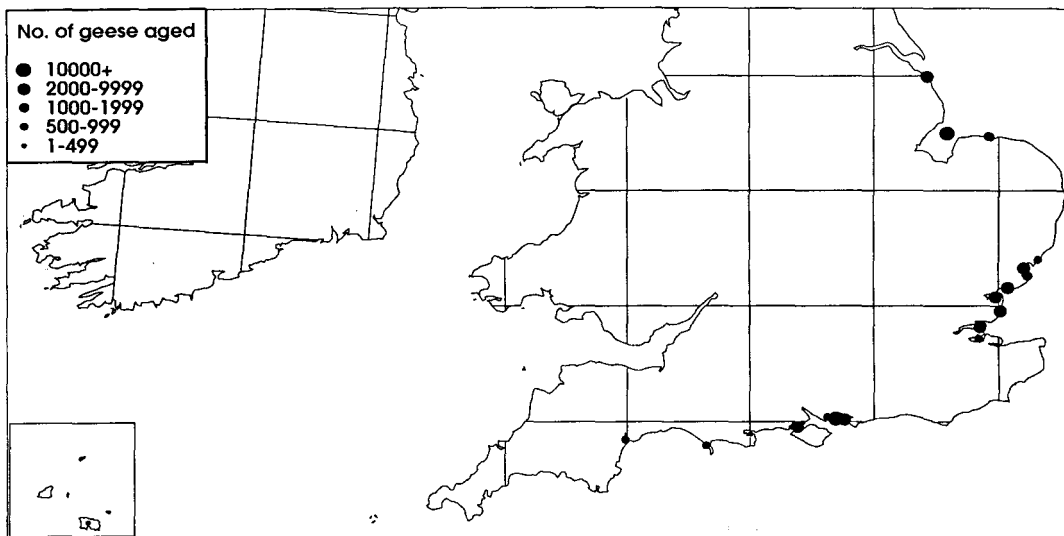


Figure 1. The distribution of estuaries and coastal areas where Dark-bellied Brent Geese were aged, winter 1999/2000.

The average proportion of young present in flocks for each month was calculated (Figure 2). This increased as the winter period advanced, from 0% in September to 21.5% in October, 23.6% in November, 23.8% in December and a peak of 26.5% in January. From then on, the proportion declined. During this time, the mean brood size of successful breeders also increased, although peaking a month earlier in December.

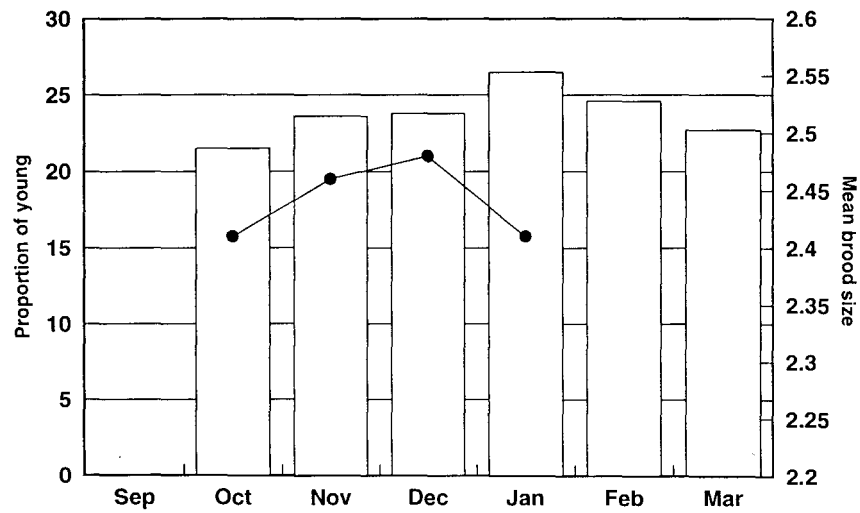


Figure 2. The proportion of young (bars) and mean brood size (dots) recorded in each month, winter 1999/2000.

There were large variations in the proportion of young within individual flocks. This ranged from 0% to 71.4%, with the majority of flocks holding between 15-30% young (Figure 3). However, this does not take into account the size of each flock and a comparison of flock size and the proportion of young and mean brood size found that as flock size increases, the proportion of young decreases but mean brood size increases (Figure 4).

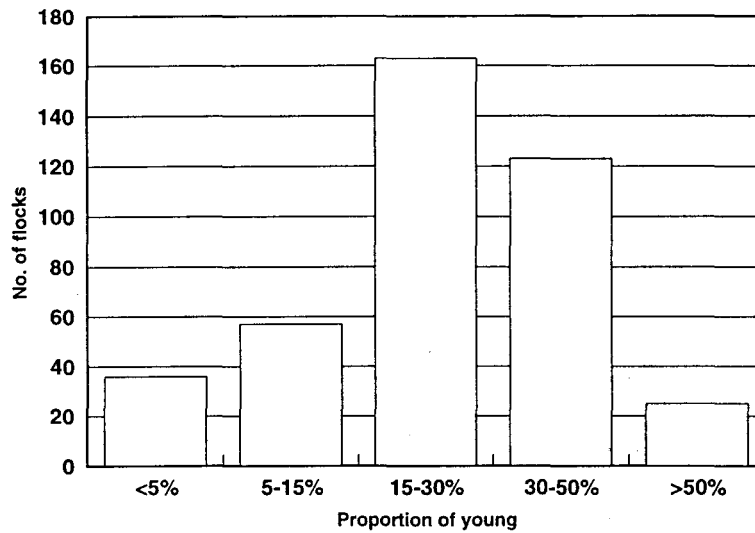


Figure 3. The frequency of the proportion of young in individual flocks, winter 1999/2000.

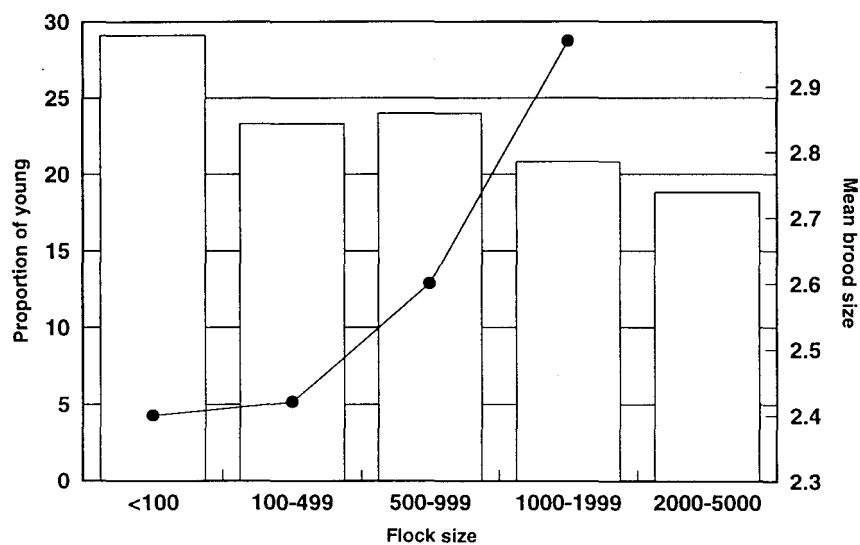


Figure 4. The proportion of young and mean brood size recorded in flocks of different size, winter 1999/2000. Note that no brood size data were collected in the largest flock size group.

Geese were recorded in five main habitat types: water, intertidal (including *Zostera* beds), saltmarsh, grass/pasture and cereal fields, including stubble and oilseed rape. The first three habitat types, which together represent all intertidal habitats, supported 47.9% of birds aged, while a further 32.4% were aged in grass fields and 19.7% were aged in cereal fields. As in previous estimates (*e.g.* Mitchell *et al.* 1997), a greater proportion of families were found foraging on food types with higher nutritional values, such as grass and cereals. Mean brood size was also greater in flocks feeding in these habitats (Figure 5).

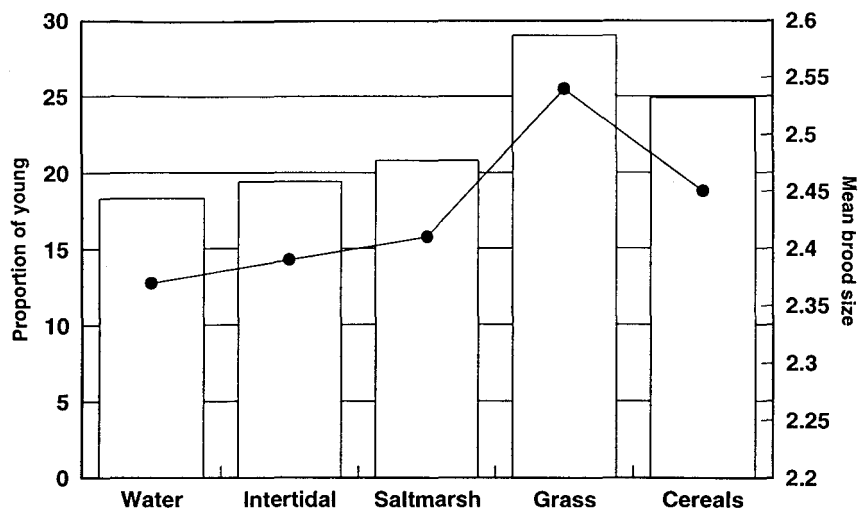


Figure 5. The proportion of young and mean brood size recorded in different habitat groups, winter 1999/2000.

DISCUSSION

The proportion of young present in Britain in each year since 1988 is shown

in Figure 6. According to the predicted three year cycle of good, poor and variable breeding success (Dhondt 1987), 1999 was expected to be a variable season. It proved to be the most successful breeding season since 1991, after the two low 'good' years in 1994 and 1997, and is the first time that productivity has exceeded the estimated annual rate of mortality (15%, Summers & Underhill 1991) since 1993.

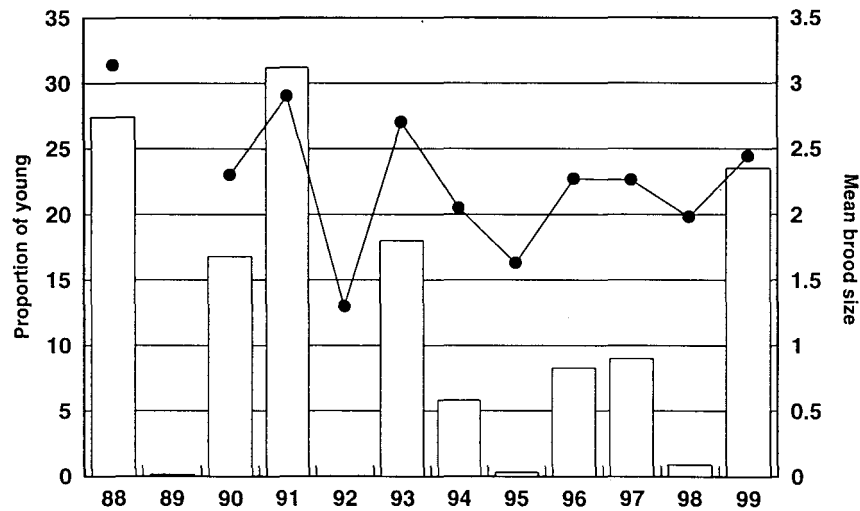


Figure 6. The proportion of young and the mean brood size of Dark-bellied Brent Geese recorded in Britain, 1988-1999. Note that no brood size data were collected in 1989.

In previous years, the census period was from mid-September to mid-December. However, as juvenile Brent Geese are readily identified throughout the winter, the overall estimate of young presented in this report uses data collected between September and March (although more than 85% were collected during October-December inclusive). To allow comparisons, the overall estimate for the traditional period was also calculated and of 66,784 geese aged during that period, the proportion of young was 22.9% (0.6% less than the overall

estimate) and mean brood size was 2.44 per successful pair (the same as the overall estimate). This suggests that: 1) previous estimates of the proportion of young in flocks in Britain during the autumn have accurately estimated the overall proportion of young present during the whole winter period, and 2) future estimates using data collected during the whole winter period should provide an accurate estimate of the proportion of young in Britain.

However, it has been noted that the traditional census period may lead to an underestimate of true productivity for the whole population (Mitchell *et al.* 1997) due to the continued arrival of families after the census period that spent the autumn in The Netherlands. In some years, *e.g.* 1996, this difference has been significant and therefore an estimate that includes data from the second half of the winter may prove more accurate.

In winter 1999/2000, the proportion of young in Britain did indeed continue to increase after the traditional census period to a peak in January. Consequently, the inclusion of these data did increase the overall estimate of the proportion of young. However, provisional autumn estimates from The Netherlands indicate around 25-30% young present in flocks there (K. Koffijberg and B. Ebbing pers. comm.) and so it seems that the inclusion of data from all months still produces a lower estimate of productivity than The Netherlands. However, the peak monthly proportion of young in Britain (26.5% in January) falls within the Dutch estimate.

This, of course, does not mean that the Dutch estimate is a more accurate assessment of productivity in the population as a whole and suggests that there is a difference in the proportion of failed and non-breeders wintering in Britain compared to The Netherlands. The most accurate estimate of productivity for the whole population is likely to result from the combining of productivity estimates from all parts of the flyway. The Goose Specialist Group of Wetlands International will be considering these issues in a forthcoming review.

The temporal distribution of counts used in this report suggest very few Brent Geese were present during September and in the past this has been indicative of a good breeding season (Ebbing *et al.* 1999). Failed and non-breeding birds typically started to arrive some two weeks before the main arrival of families, which occurred in the second half of October. The proportion of young during the four quarters of that month was 0% (n = 210), 0.5% (n = 1,014), 17.7% (n = 5,030) and 26.1 % (n = 9,736). In addition, from October to December the mean brood size increased slightly from 2.41 to 2.46 in November and 2.48 in December and this may suggest that there could be a difference in the arrival times of small broods compared to large broods.

A large proportion (42.6%) of the data presented here was collected at a single site, namely Langstone Harbour. This large increase was a result of a colour-marking programme there which meant increased observer effort directed towards locating marked birds presented

additional opportunities for collecting age ratio data. Conversely, the number of birds aged on the Essex estuaries decreased due to the forced inactivity of two key fieldworkers for much of the winter, serving to further emphasise the bias towards Langstone. However, the proportion of young (21.8%) and mean brood size (2.6 per successful pair) in estimates away from Langstone are not significantly different from the overall estimate and consequently the spatial distribution of the data is not considered to bias the overall estimate.

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